

**Phase 1 Heritage Impact Assessment of a proposed new
Modular Tilapia Production Unit at the Vaal Dam near
Oranjeville, FS Province.**

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Summary

A phase 1 Heritage Impact Assessment was carried out for the proposed new Modular Tilapia Production Unit at the Vaal Dam near Oranjeville, FS Province. The study area is mantled by a well-developed Quaternary overburden (residual soil), resulting in little outcrop visibility, where no fossils were observed. The underlying Ecca Group rocks are allocated a moderate palaeontological significance. However the proposed aquaculture development will make use of aboveground modular tanks for fish breeding, while the existing dams and buildings will be used for food production. As such potential impact on Volksrust Formation sediments is considered negligible. A few isolated and locally derived informal stone tools were recorded, but the 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 (engravings), prehistoric structures, graves or historically significant buildings older than 60 years within the boundaries of the study area. The southwestern boundary is lined by a well-established pine grove. An existing complex of dams as well as a smaller cluster of circular brick-walled dams, located near the southwestern corner of the site, will be re-used as part of the development. In addition, no fossils were recorded within superficial Quaternary sediments as expected, because geologically recent superficial overburden is generally not expected to be fossiliferous in the absence suitable alluvial deposits associated with the nearby Vaal River. It is recommended that the planned development is exempt from further palaeontological investigation. Also, the terrain is regarded as of low archaeological significance and is assigned a rating of Generally Protected C (GP.C). As far as the palaeontological and archaeological heritage is concerned, the proposed development may proceed provided that the pine grove is preferably left intact and that all activities are restricted to within the boundaries of the site.

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Introduction

A phase 1 Heritage Impact Assessment was carried out at a site near Oranjeville where the Department of Agriculture, Forestry and Fisheries of the Free State and the Fezile Dabi Municipality proposes to establish a Modular Tilapia Production Unit on a proposed site near the banks of the Vaal Dam between Villiers and Deneysville, Free State Province (**Fig. 1**) The assessment is required as a prerequisite for new development in terms of the National Environmental Management Act and is also called for in terms of the National Heritage Resources Act (NHRA) 25 of 1999. The region's unique and non-renewable archaeological 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 in the area to be developed, and that make recommendations for protection or mitigation of the impact of such sites.

The NHRA 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 relevant to the proposed development are listed in Section 34 (1), Section 35 (4), Section 36 (3) and Section 38 (1) of the NHR Act and are as follows:

34. (1) No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

35 (4) No person may, without a permit issued by the responsible heritage resources authority—

- destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- *b*) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

36 (3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- (c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

- 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
 - a) exceeding 5000 m² in extent; or
 - b) involving three or more existing erven or subdivisions thereof; or
 - c) involving three or more subdivisions thereof which have been consolidated within the past five years;
- The rezoning of a site exceeding 10 000 m²; or
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

Terms of Reference

The task involved the following:

- 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 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. Maps and aerial photographs (incl. Google Earth) were consulted and integrated with data acquired during the on-site inspection.

Field Rating

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

Locality Data

The proposed site is situated on flat open terrain next to the R176 provincial road near the banks of the Vaal Dam approximately 16 km east of Oranjeville in the Free State Province (**Fig. 2 & 3**). The site falls across 3 farm portions namely Driefontein 387, Parkerton 1386 and Tweefontein A117.

Maps: 1:50 000 topographical map 2628CD Beerlaagte

1:250 000 geological map 2628 East Rand (Oranjeville Aqua)

General Site Coordinates: 26°59'36.27"S 28°21'22.06"E

Background

Palaeontology

Sedimentary deposits in the area are represented by rocks of the Middle Permian Volksrust Formation of the Upper Ecca Group (*Pvo*, Karoo Supergroup) (**Fig. 4**). The predominantly argillaceous Volksrust Formation consists of a monotonous sequence of grey marine shales with thin, bioturbated, siltstone and sandstone lenses, exposed towards the northwest of the study area. It represents a transgressive sequence consisting largely of mud deposited from suspension when large, swampy deltas were formed after Gondwana started to drift from the Antarctic region and rivers flowing into the inland Karoo Sea, deposited huge amounts of sediment along its shorelines consisting of alternating sandstone and mudstone layers. Fossils are significant, but rarely recorded. They include rare temnospondyl amphibian remains, invertebrates, minor coals with plant remains, petrified wood, and low-diversity marine to non-marine trace fossil assemblages.

Another palaeontologically significant sequence in the region not indicated by the SAHRIS palaeo-sensitivity map is represented by late Cenozoic (Plio-Pleistocene) floodplain deposits (overbank sediments) associated with the ancient Vaal River system. In this case the study area is located about 13 km southwest of actual Vaal River deposits

Archaeology

Stone Age archaeology is well represented along the upper Vaal River basin between Vereeniging and the Vaal Dam with the occurrence of Early Stone Age and Middle Stone Age lithic material recovered from several donga systems along the Taaibosspuit (Le Roux 1951). The upper Vaal River region is also characterized by the presence of numerous stone-walled settlements of the late Iron Age (Maggs 1976a, b). Large tracts of low-lying land and potentially many archaeological and historical sites were flooded when the Vaal Dam was built upstream from Vereeniging in 1936.

Field Assessment

The study area is mantled by a well-developed Quaternary overburden (residual soil), resulting in little outcrop visibility, where no fossils were observed (**Fig. 5**). A few isolated and locally derived informal stone tools were recorded, but the pedestrian survey revealed no evidence of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape (**Fig. 6**). There are also no indications of rock art (engravings), prehistoric structures, graves or historically significant buildings older than 60 years within the boundaries of the study area. The southwestern boundary is lined by a well-established pine grove. An existing complex of dams (**Fig. 7**) as well as a smaller cluster of circular brick-walled dams, located near the southwestern corner of the site, will be re-used as part of the development (**Fig. 8**).

Impact Statement & Recommendation

Some of the most significant fossil-bearing rocks in the study are associated with Permian deposits of the Karoo Supergroup, in this case represented by the Ecca Group Volksrust Formation (*Pvo*). These deposits are allocated a moderate palaeontological significance. However the proposed aquaculture development will make use of

aboveground modular tanks for fish breeding, while the existing dams and buildings will be used for food production. As such potential impact on Volksrust Formation sediments is considered negligible. In addition, no fossils were recorded within superficial Quaternary sediments as expected, because geologically recent superficial overburden is generally not expected to be fossiliferous in the absence suitable alluvial deposits associated with the nearby Vaal River.

Impact on palaeontological, archaeological or historically significant remains within development footprint is considered non-existent. It is recommended that the planned development is exempt from further palaeontological investigation. Also, the terrain is regarded as of low archaeological significance and is assigned a rating of Generally Protected C (GP.C). As far as the palaeontological and archaeological heritage is concerned, the proposed development may proceed provided that the pine grove is preferably left intact and that all activities are restricted to within the boundaries of the development footprint.

References

- 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.
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- Maggs T. M. O’C 1976a. *Iron Age Communities of the Southern Highveld*. Occasional Publications of the Natal Museum No. 2. Natal Museum, Pietermaritzburg.
- Maggs T. M. O’C 1976b. Iron Age patterns and Sotho history on the southern Highveld: South Africa. *World Archaeology* 7(3): 319 – 332.

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 and have no conflicting interests in the undertaking of the activity.



13 / 12 / 2017

Tables & 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 proposed development footprint (portion of 1:50 000 scale topographic 2628CD Beerlaagte).



Figure 2. Aerial view of the proposed development footprint.



Figure 3. 180° - degree view of the study area, looking (from left to right) northeast, east and southeast

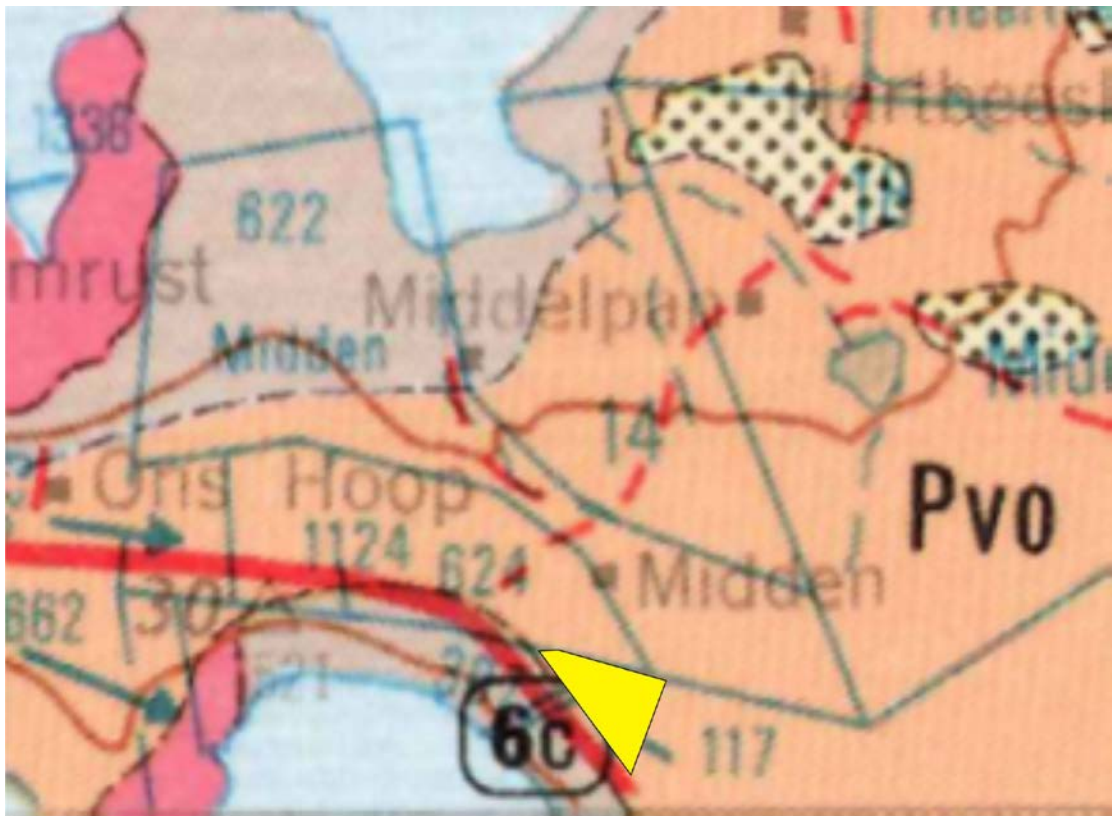


Figure 4. Geological map of the area with site marked by yellow triangle (portion of 1:250 000 scale geological map 2628 East Rand). The underlying geology is represented by Volksrust Formation shales (*Pvo*) of the Permian Ecca Group (Karoo Supergroup).



Figure 5. The study area is made up of flat open terrain mantled by a well-developed Quaternary overburden (residual soil), where no fossils were observed.
Scale 1 = 10 cm



Figure 6. In addition to a variety of modern remains discarded on the landscape (top to bottom right), only a very small number of isolated and locally derived informal stone tools were recorded (bottom left).

Scale 1 = 10cm.



Figure 7. Aerial and general views of the existing dams.



Figure 8. Existing cluster of circular dams and outbuildings located near the southwestern boundary of the site.