

HERITAGE IMPACT ASSESSMENT

submitted in terms of section 38(8) of the National Heritage Resources Act

prepared for

AURECON South Africa (Pty) Ltd

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DR 2404 Central Karoo

Murraysburg – Central Karoo District Municipality, Western Cape

Executive summary

Aurecon South Africa (Pty) Ltd appointed *vidamemoria* to conduct a heritage impact assessment for proposed borrow pit located along DR2404 near Murraysburg, Central Karoo District Municipality. *vidamemoria* appointed Dr John Almond (Natura Viva CC) to conduct necessary palaeontological specialist study and Madelon Tusenius (Natura Viva CC) to conduct necessary archaeological impact assessment. Heritage impact assessment is submitted for comment in terms of Section 38(8) of the NHRAct as a component of an Environmental Management Programme (EMProg in terms of Mineral and Petroleum Resources Development Act 49 of 2008) to be submitted to Department Mineral Resources.

Proposed borrow pit is mainly excavated into mudrocks within the lower part of the Balfour Formation (Lower Beaufort Group / Adelaide Subgroup) of Late Permian age. The only fossil remains recorded during field assessment are occasional fragments of weathered, reworked bone incorporated into Late Permian channel conglomerates. It is likely that further fossil remains are present subsurface within the revised borrow pit footprint. Therefore it is concluded that the palaeontological sensitivity of the revised DR02404/8.5/0.3L borrow pit site is moderate. The original assessment that the affected area is of low archaeological heritage significance thus also applies to the revised polygon. The absence or relatively rare occurrence of stone artefacts has been observed in some other areas around Murraysburg by the author and several colleagues (L. Webley & T. Hart, pers. comm). No significant impact on archaeological heritage remains is expected if the proposed development proceeds. Proposed intervention would not result in a detrimental heritage impact, yielding social and economic benefits without a negative impact on heritage resources. No further archaeological or palaeontological studies or mitigation is required.

1. Introduction

Aurecon South Africa (Pty) Ltd on behalf of the WCPA: Department of Transport and Public Works appointed Quahnita Samie (*vidamemoria*) to conduct a Notification of Intent to Develop (NID) application in terms of Section 38(1) of the National Heritage Resources Act (Act 25 of 1999) **for a proposed borrow pit at km 8.5 along DR 2404 in Murraysburg, Central Karoo District Municipality.** NID dated 01 April 2014 was submitted to Heritage Western Cape (HWC) for consideration. Response dated 23 April 2014 (**case ref 14040403GT0409E**) requested 'a heritage impact assessment limited to archaeological scoping report and a palaeontological scoping report with an integrated set of recommendations is required' (Refer Annexure A). *vidamemoria* appointed Dr John Almond (Natura Viva CC) to conduct the necessary palaeontological specialist study (dated August 2014) and Madelon Tusenius (Natura Viva CC) to conduct necessary archaeological impact assessment (dated August 2014).

The proposed action triggers Section 38(1) (c)(a) *activity that will change the character of a site exceeding 5 000 m²*. This assessment report is submitted for comment in terms of Section 38(8) of the NHRAct as a component of an Environmental Management Programme (EMProg) in terms of the Mineral and Petroleum Resources Development Act (49 of 2008) to be submitted to the Department of Mineral Resources (DMR). Notification as previously submitted to HWC (dated 31 May 2011) and response (dated 20 June 2011) confirmed the approach to be undertaken in submitting borrow pit notifications to HWC.

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<i>Annexure B</i>	Mine plan
<i>Annexure C</i>	Methodology for the preparation, operation and closure of borrow pit
<i>Annexure D</i>	Palaeontological specialist study conducted by Dr John Almond, Natura Viva CC (August 2014)
<i>Annexure E</i>	Archaeological conducted by Madelon Tusenius, Natura Viva CC (August 2014)

Site location and description

The potential source of a wearing coarse gravel pit site is located along the unpaved DR 2404/8.5/0.3L is accessed from the N2 northeast of Murraysburg in Central Karoo District, Western Cape. The affected area lies west of the previous polygon and consists of slightly undulating terrain which slopes very gently to the south and south east. Ferruginised gravelly silty sand and sandstone slabs surround the borrow pit. Proposed borrow pit is located on Farm Driefontein 26. Borrow pit co-ordinates are 31°56'11.07"S and 23°53'43.97"E



Figure 1: Extract from topographical sheets 3320(Dr John E. Amond 2014:3)



Figure 2: View towards the southeast with the gravelly sand in the foreground and the road in the background. (Tusenius 2014:addendum pg 2)



Figure 3: Site context and borrow pit location (Google earth, April 2014)



Figure 4: Aerial view of borrow pit and preliminary pit area (Google earth, April 2014)

Description of proposals

In terms of the Minerals and Petroleum Resources Development Act, all mining activities including extraction of material from borrow pits and quarries requires authorisation from the Department of Mineral Resources (DMR). Where the WCPA: Dept Transport and Public Works is undertaking the maintenance and / or upgrading of roads under its control, no application needs to be submitted for a mining right or permit, however, as per provisions of Section 106(2) of the MPRDAct, they are required to prepare and submit an EMProg to DMR for their approval prior to the extraction of any material from a proposed borrow pit or quarry. According to the MPRDAct, mineral resources are in the custodianship of the State, where WCPA would temporarily acquire the right to mine the borrow pits, subject to approval by the DMR.

For a gravel road to be able to carry traffic safely and effectively an upper layer of gravel known as a wearing course, which meets specific technical requirements, has to be placed on the prepared roadbed. With time, the wearing course is eroded away by both traffic and the elements. This wearing course needs to be replaced in order to continue to deliver a safe and functional surface to road users. Implementation of regravelling activities requires extraction of suitable materials from identified material sources. During decommissioning, working areas are rehabilitated and revegetated. Material excavated from potential borrow pit located at **km 8.5 along DR 2404** will be used for the re-gravelling so as to benefit road users in terms of road safety and user economy as well as to minimise maintenance-related disruptions.

Summary of borrow pit	
Borrow pit / expropriation area	17 896 m ²
Maximum depth	1.5 m
Material description	Mudrocks of the Balfour Formation (lower Beaufort Group)Late Permian age
Proposed usage after rehabilitation	Revegetation
Volume of material to be sourced	24 306 m ³
Estimated proven material reserves	24 300 m ³

Trial pit investigations and sampling were conducted at four proposed borrow pits considered as potential sources of material.

Three were however excluded from consideration due to environmental concerns and / or unsuitability of material for purpose of regravelling.

The mine plan outlining extent of borrow pit and mining is attached as Annexure B. Methodology for the preparation, operation and closure of borrow pit is outlined in Annexure C.

Central Karoo Municipality is to undertake work on behalf of the WCPA. Formal agreements are to be entered into between the landowner and the WCPA, with the municipality managing the site until decommissioning and closure. During decommissioning, the working area will be rehabilitated and revegetated as per the approach outlined in the mining plan. WCPA's liability for the site persists until such time as a Closure Certificate has been issued by the DMR.

Results of consultation

DMR has outlined requirements for public participation in terms of the Minerals and Petroleum Resources Development Act (Act 28 of 2002) for exempted organs of state. This includes liaison with the landowner, notification of the immediate neighbours and either an on-site advertisement or advertisement in the local newspaper. The WCPA has indicated a commitment to developing and maintaining good relations with landowners and therefore landowners concerns are incorporated into the final agreement.

The public consultation process for this project has involved consultation with the landowners and neighbours, and the advertising of the proposed activity in the local newspaper.

No heritage related comments and / or concerns were received.

Requests / concerns of owner:

- None noted

2. Heritage resources

Identification of heritage resources

Proposed site and immediate context do not fall within conservation or protected heritage areas, and is not located near to or visible from any protected heritage sites. The site does not fall within a historical settlement or townscape and does not contribute towards rural or natural landscape of cultural significance. The site is therefore not considered as an integral component of the cultural landscape.

Dr John Almond conducted a palaeontological field assessment and provided a report outlining geological context, palaeontological heritage and palaeontological sensitivity. The fluvial sediments of the Balfour Formation in the Murraysburg area are high fossiliferous, containing a range of reptiles, therapsids ("mammal-like reptiles"), plants and trace fossils (including large vertebrate burrows) that are assigned to the *Cistecephalus* Assemblage Zone. During a previous field assessment (Almond 2012) several vertebrate and plant fossil sites - including therapsid skull material - were recorded within and on the margins of the adjacent, existing borrow pit (DR02404/8.5/OLR). The only fossil remains recorded during this field assessment are occasional fragments of weathered, reworked bone incorporated into Late Permian channel conglomerates. This may well be a reflection of poor bedrock exposure, however. Given the high density of fossil vertebrates within a small area of bedrock on the adjacent existing borrow pit site, it is likely that further fossil remains are present subsurface within the revised borrow pit footprint (Almond 2014: 1).

Madelon Tusenius conducted archaeological field assessment and provided report identifying and assessing archaeological resources, associated impact, assessment of significance and recommendations regarding any mitigation required. The affected area lies west of the previous polygon and consists of slightly undulating terrain which slopes very gently to the south and south east. No archaeological remains of any sort were observed during the survey of the revised polygon (Tusenius 2014: 2).

The site has no known historical, social, or spiritual significance. No built environment issues and / or cultural landscape issues have been identified. No further heritage resources were identified.

Heritage significance

The palaeontological sensitivity of the site is rated as medium (Almond 2014: 17). The proposed pit extension is graded as having low archaeological heritage significance (Tusenius 2014: Addendum pg1).

Heritage indicators

Heritage indicators identified aim to ensure that significance would not be adversely impacted on by the proposed development. Indicators concern impact on the cultural landscape, identified heritage resources and visual impact. No sensitive landscapes and material of archaeological and palaeontological significance were identified.

3. Assessment of impacts

An assessment of the potential development impacts on significance is undertaken using relevant assessment criteria as well as response to indicators. Assessment of impacts on palaeontological significance has been provided as well as consideration of the cultural landscape and assessment of cumulative impacts.

Cultural landscape: Proposed borrow pit would not result in a negative impact on the cultural landscape. The landscape within which the site lies possesses low intrinsic heritage value and no heritage resources were identified within the immediate context. The site and its immediate context are considered as being of low heritage significance. No heritage resources will be impacted and the overall status of the impact is considered as low.

Archaeological and palaeontological impact: No impact on resources would occur as a result of expansion. However bedrocks in the original borrow pit area to the east of the DR2404 should not be disturbed to protect fossil material already exposed on the pit floor. The site has been sufficiently recorded and requires no further recording before borrow pit activity occurs.

Visual impact: Low intensity visual impact is limited to the immediate surroundings and will be limited to operational phase.

Cumulative impact: The proposed moderate intensity intervention lies within a disturbed context with degraded conditions. No new roads would have to be constructed as the borrow pit is accessed directly off main / divisional roads or via existing access tracks. The borrow pit and access tracks would be fenced for the duration of the mining activities. There will be no site buildings located at the borrow pit site. No long-term traffic increase will be experienced. Low impact is associated with impact of increased personnel and cumulative impacts on borrow pit footprint and surroundings.

Site rehabilitation:

Slopes should be smoothed and left neat and tidy, then covered with stockpiled topsoil.

Impact relative to sustainable social and economic benefits: The project will result in social and economic benefits for the local community in terms of service provision and employment opportunities.

4. Discussion

During the course of borrow pit excavations, operations should be planned in such a way that the amount of work that will be necessary for the finishing off of the borrow pit is reduced as far as possible. Indiscriminate excavation without due regard for the desired final shape of the borrow pit should not be permitted and should be rectified immediately. Timing of rehabilitation is important as rehabilitation of disturbed areas should ideally be programmed to occur as soon as practically possible following cessation of work in a specific area. The period between cessation of activities associated with mining of materials and the onset of rehabilitation for that area should ideally not exceed 1 month. Rehabilitation operations should ideally be conducted in parallel with extraction. Accordingly, progressive rehabilitation, in which depleted sections of a borrow pit are reclaimed while extraction is ongoing in other sections of the same pit is encouraged.

Site development, operation, mining and closure guidelines outlined with the Environmental Management Programme provides detailed guidance for the preparation, operation and decommissioning of the site. Rehabilitation of old and current working faces has been undertaken to mitigate visual impact to road users. Measures outlined should be adhered to in order to minimise potential negative impacts. It is recommended within the EMProg that an environmental control officer or suitable experienced engineer monitors the preparation, operational and decommissioning of the borrow pit so as to ensure that mitigation and rehabilitation measures are adhered to.

No significant impact on archaeological heritage remains is expected if the proposed development proceeds. No further archaeological studies or mitigation are therefore recommended. If any human remains are found during the development of the proposed extension, work in that area must cease and the South African Heritage Resources Agency (SAHRA) must be notified immediately (Tusenius 2014: addendum pg2).

The palaeontological sensitivity of the site is assessed as medium and no further studies or specialist mitigation of palaeontological heritage for this borrow pit project are recommended, pending the discovery of new fossil material on site (Almond 2014: 9).

Site is considered to possess a very low level of intrinsic heritage value and the overall status of the impact is considered as low. Proposed intervention would not result in a detrimental heritage impact, yielding social and economic benefits without a negative impact on heritage resources. No further specialist archaeological studies or mitigation is recommended and expansion should be allowed to proceed.

Recommendations

It is therefore recommended that:

1. Proposed pit be supported. However bedrocks in the original borrow pit area to the east of the DR2404 should not be disturbed to protect fossil material already exposed on the pit floor. If such disturbance is unavoidable, It is recommended that the more scientifically valuable fossils in the existing pit area (e.g. cranial material) are fully recorded and collected by a professional palaeontologist *before* the new borrow pit to the west is developed.
2. comment be issued that proposed activity may proceed in terms of Section 38(8) of the NHRAct

References:

- Almond John E PhD (August 2014): *Palaeontological specialist study: field assessment & recommendation for exemption from further studies & mitigation*
- ASAPA Aggregate and Sand Producers Association of Southern Africa (30 September 2009): *The issue of borrow pits being used in the aggregate and sand industry* accessed online
- Aurecon / Nadeson JV (July 2011): *Draft environmental management programme, summary report and mine plan*
- Galliers R M (July 2011): *Geotechnical investigations and geological strategic gravel pit summary report* for Aurecon South Africa
- Heritage Western Cape (April 2014): *Minimum Standards For Phase 1 Archaeological Impact Assessment (Aia) Reports*
- Tusenius M (March 2013): *Archaeological Impact Assessment*
- vidamemoria (April 2014): *Notification of Intent to Develop*