

26 August 2016

Buttai Gravel Pty Ltd
c/- Daracon Group Pty Ltd
PO Box 299
WALLSEND NSW 2287

Attention: Stuart Murray

Dear Stuart

RE: Martins Creek Quarry Extension Project – Environmental Assessment Requirements Preliminary Geotechnical Assessment of 'Land'

1 INTRODUCTION

Qualtest Laboratory NSW Pty Ltd (Qualtest) is pleased to present this preliminary geotechnical assessment of 'Land', to address State Significant Development – Environmental Assessment Requirements (EAR's) for the Martins Creek Quarry Extension Project, on behalf of Buttai Gravel Pty Ltd and Daracon Group Pty Ltd (Daracon).

The following 'Key Issues' were identified in the EAR's:

- *an assessment of the likely impacts of the development on the soils, land capability;*
- *an assessment of the likely impact of the development on landforms (topography), paying particular attention to the long term geotechnical stability of any new landforms (such as overburden dumps); and*
- *an assessment of the compatibility of the development with other land uses in the vicinity of the development in accordance with the requirements of Clause 12 of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.*

This report provides an assessment of the 'Key Issues' outlined above in relation to the proposed Martins Creek Quarry Extension Project.

3 SITE CONDITIONS

The site is located at Martins Creek Quarry, Station Street, Martins Creek, in the Dungog local government area. Martins Creek Quarry has been operating since 1915 and was originally owned and operated by State Rail Authority of NSW and RailCorp. Daracon currently extract Andesite rock types from the quarry to produce aggregates for concrete, road, rail, armour rock and manufactured sand applications.

A summary of the regional and local geological conditions encountered at the site is presented in the Sections 3.1 to 3.5, based on previous site experience, ongoing material quality testing, and with reference to the following reports:

- Qualtest - Quarry Face Stability Assessment (Ref: NEW14P-0135-AC, 27 October 2016);
- VGT Pty Ltd - Extraction Operations Plans (Draft – Interim Report Date 01/10/2015).

3.1 Regional Geology

The site is underlain by Carboniferous volcanic and sedimentary sequences. The quarry is underlain by the Martins Creek 'Andesitic Ignimbrite', identified as 'Clnm' on the geology map. This unit terminates in the vicinity of the railway line to the north and the where the overlying sequences of 'Cln' (Newtown Volcanics) and 'Clnv' (Vacy Ignimbrite Member) commence.

3.2 Local Geology

The quarry faces and floor are dominated by the volcanic rock Andesite which is distinguished by large white rhombohedral plagioclase crystals. The Andesite dips toward the west, and extraction to the base of the unit forms a sloping and undulating quarry floor.

There are some exposures of underlying red sandstone and claystone in parts of the quarry floor and these are known as metasediments. This underlying sequence is thought to be 'Cll' the Wallaringar Formation.

The depth of weathering generally defines the rippability of the material. The D9 dozer generally can rip to 0.5 metres below the surface, below which the material is too hard and competent and must be blasted, indicating soil depths of less than 0.5m in the quarry area.

3.3 Topography

The site is located within a region of moderately to steeply undulating topography. Site slopes have been significantly modified by existing quarry operations over the past 100 years, with natural slope profiles generally in the order of about 14° (1V:4H) to 26° (1V:2H), with locally steeper slopes up to 45° (1V:1H) in the vicinity of gullies and ridges.

Ground levels generally range from about RL 50m to RL 100m (AHD) across the site.

3.4 Soil Types

Reference to the Paterson Acid Sulfate Soil Risk Map (1:25,000 scale, 1997 Edition Two, supplied by the NSW Department of Land and Water Conservation) indicates that the site is located within an area of "no known occurrence" of Acid Sulfate Soils (ASS).

Reference to the CSIRO's Soil and Landscape Grid of Australia (<http://www.clw.csiro.au/aclep/soilandlandscapegrid/ViewData-KML.html>) indicated that the site soils are approximately 0.25m to 0.75m deep. The soil profile from surface to 150mm below ground surface (bgs) consisted of silts (15% to 20%), sands (20% to 40%) and clays (<10%). The pH of the soil ranges from 3.0 to 4.8 and effective Cation Exchange Capacity (CEC) ranges from 5 to 10 meq+100g.

From previous mapping and site works, soil depths encountered are typically less than 0.5m, comprising shallow topsoil and overburden soil, overlying bedrock.

Based on the soil depth and composition information above, the soils are typically of minimal depth with poor fertility for agriculture.

3.5 Surrounding Land / Site Constraints

The extraction area is constrained to the west by a railway line, south by residents, east and north by property boundaries. Residents are located to the west of the site as close as 250 metres currently. As part of the extension, residents to the south will be within 300 metres of the quarry development.

4 ENVIRONMENTAL ASSESSMENT REQUIREMENTS

With reference to the State Significant Development – Environmental Assessment Requirements (EAR's) for the Martins Creek Quarry Extension Project, the following points are noted, with regards to the Environmental Planning Instruments, Policies, Guidelines & Plans listed in Attachment 1 of the EAR's for 'Land'.

4.1 Quarry Operations – Impact of the Development on Landforms

Final Pit Design and Quarry Extraction Operations Plan:

Work is understood to be carried out in accordance with approved quarry extraction operation plans, safety management plans, and site specific safe work method statements and procedures. Quarry face, bench design, final pit design and subsequent rehabilitation measures all to be engineer designed to relevant standards and specifications.

Risk Assessment:

Qualtest has previously carried out a Quarry Face Stability Assessment (Ref: NEW14P-0135-AC, 27 October 2016). This report provided an assessment of the risk of slope instability affecting the site of the proposed Quarry Extension and immediate surrounding area.

The existing quarry and proposed future quarry extension was assessed as having a "**Low**" risk of slope instability, using methods consistent with those presented in Australian Geomechanics Society (AGS) publication "*Practice Note Guidelines for Landslide Risk Management, 2007*".

Impact of the Development on Landforms:

In terms of 'assessment of the likely impact of the development on landforms (topography), paying particular attention to the long term geotechnical stability of any new landforms (such as overburden dumps)', it is understood that:

- Future management of the quarry face is to be carried out in accordance with sound engineering principles, approved quarry extraction operation plans, quarry operation safety management plans, site specific safe work method statements, and considering the geotechnical constraints of the surrounding landforms.
- Where finished faces are available, overburden or non-suitable material will be placed and shaped, and then top dressed with soil and trees. The trees will be placed perpendicular to the face or slope to assist with minimising soil erosion and creating micro-climates for re-growth.

Therefore it is assessed that the proposed development should not impact adversely on the landforms from a geotechnical perspective.

4.2 Agricultural Land Classification (Agfact AC.25)

In general accordance with 'Agfact AC.25: Agricultural Land Classification (NSW Agriculture)' the site is assessed to have an Agricultural Land Classification of 'Class 5', which is defined as:

'Class 5: Land unsuitable for agriculture, or at best only suited to light grazing. Agricultural production is very low to zero as a result of severe constraints, including economic factors which prevent land improvements'.

Class 5 lands suffer extreme limitations for agricultural production. The limitations for this site include (but are not necessarily restricted to) the following features:

- Productivity levels for all types of agricultural crops and pastures are very low;

- Extremes of slope can be expected;
- The land is unsuitable for cultivation;
- Erosion hazard is extreme, and economic control using conventional soil conservation measures is impractical;
- Soil physical and chemical properties present an extreme limitation to the growth of agricultural plant species;
- Recurrent extremes of climate may seriously affect productivity.

In addition, lands which can be clearly excluded from agriculture include quarries and mining areas, land with steep slopes and rock outcrops, all of which exist at this site.

4.3 Agricultural Issues for Extractive Industries (NSW Trade and Investment)

Extractive industries are defined in the 'Standard Instrument (Local Environmental Plans) Order 2006' and involve methods such as excavating, dredging, tunnelling or quarrying, but excludes mining or turf farming.

With reference to the NSW DPI Fact Sheet and Agricultural Resource Impacts, it is assessed that:

- There are no known farming operations in the immediate surrounding locality;
- There are no area of agricultural enterprises in which the proposal would be located;
- No agricultural areas would need to be removed from production as part of the proposed extractive development;
- There is currently no agricultural productivity of the land;
- There would be no areas removed from agricultural use due to quarry operations, infrastructure, plant or access requirements as well as the storage or processing of materials.

4.4 State Environmental Planning Policy

In accordance with the requirements of Clause 12 of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, a preliminary assessment of the compatibility of the development with other land uses in the vicinity of the development has been carried out, addressing the following points:

- *'The existing uses and approved uses of land in the vicinity of the development'* – Existing land use is a hard rock quarry which has been operating for over 100 years. Land in the vicinity of the development and area of proposed quarry extension comprises undeveloped bushland, which is assessed as being unsuitable for agricultural use.
- *'Whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be preferred uses of land in the vicinity of the development'* – Qualtest are not aware of any other known proposed land uses for the subject site area.
- *'Any ways in which the development may be incompatible with any of those existing, approved, or likely preferred land uses'* – Qualtest are not aware of any circumstances in which the proposed extension would be incompatible with any of those existing, approved, or likely preferred land uses, based on current lands use of the site and in the immediate surrounding area.

5 CONCLUSIONS

Based on an assessment of available information and with reference to the Environmental Assessment Requirements (EAR's), from a geotechnical perspective it is assessed that:

- The 'Land' is suitable for the proposed quarry extension, with no adverse impact on the soils, land capability for other potential uses, (land assessed as unsuitable for agriculture).
- The proposed development should not impact adversely on landforms (topography) in terms of long term geotechnical stability of any new landforms (such as overburden dumps), provided future works are carried out in accordance with sound engineering principles in accordance with to relevant standards and specifications.
- Based on existing land use at the site and in the immediate surrounding area, the proposed quarry extension is assessed to be compatible with other current land uses in the vicinity of the development.

6 LIMITATIONS

The findings presented in the report and used as the basis for recommendations presented herein were obtained using normal, industry accepted geotechnical design practices and standards. To our knowledge, they represent a reasonable interpretation of the general conditions of the site.

The extent of testing associated with this assessment is limited to a desktop study of available information and past experience at the site. It should be noted that subsurface conditions following future blasting and quarry extension may be different to those observed and used as the basis of the recommendations contained in this report.

If subsurface conditions encountered during construction or ongoing quarry operations differ from those given in this report further advice should be sought without delay.

Data and opinions contained within the report may not be used in other contexts or for any other purposes without prior review and agreement by Qualtest. If this report is reproduced, it must be in full.

If you have any questions regarding this report please do not hesitate to contact Alan Cullen or the undersigned.

For and on behalf of Qualtest Laboratory (NSW) Pty Ltd.



Jason Lee
Principal Geotechnical Engineer