

A large decorative graphic on the left side of the page consists of several thick, wavy, horizontal bands in red, dark blue, and yellow, mirroring the colors in the Butler Partners logo.

**Geotechnical Investigation  
Residential Subdivision**  
Whitwood Road, Ebbw Vale

Prepared for  
**Chum Street Land Evolution Pty Ltd**  
**Project No. 022-135A**  
15 November 2022

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### ATTACHMENTS

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| Drawing No. 1 Rev B | Locality Plan and Test Locations                       |
| Appendix A          | Test Pit and Bore Report Sheets with Explanatory Notes |
| Appendix B          | Laboratory Test Report Sheets                          |
| Appendix C          | Mining Reports Provided by Chum Street Land Evolution  |

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## SECTION 1 - INTRODUCTION

### **1.1 Project**

It is understood that it is proposed to develop the site by constructing a 408 lot residential subdivision with associated roads and a central waterway corridor.

Based on the information provided and prior knowledge of the area, it was anticipated that the site ground conditions may comprise areas of substantial fill depth, overlying potentially erodible and reactive clay soils that are underlain in turn by weathered sedimentary rock.

Previous investigations by others also indicate that past open-cut and underground mining has occurred at and near to the site.

### **1.2 Proposed Scope of Work**

For the scope of the proposed development and the anticipated ground conditions, it was proposed to geotechnically investigate the site initially by excavating and sampling 50 to 60 test pits as a first stage of geotechnical investigation followed by the drilling and sampling of eight 'deep' bores as the second stage.

Following completion of the fieldwork and laboratory testing, it was further proposed that the results of the geotechnical investigation would be incorporated into a report providing geotechnical design information on each of the following topics, as appropriate:

- subsurface conditions;
- mining subsidence review;
- soil erodibility;
- earthworks and site preparation;
- reactive soil movement and site classification;
- retaining wall pressure coefficients;
- suitable alternative foundation types;
- working bearing pressures;
- anticipated footing settlements;
- pavement subgrade design properties; and
- anticipated construction aspects.

### **1.3 Commission**

Based on the proposed nature of the development, the anticipated subsurface conditions and the scope of investigation work proposed, fees to undertake the two stages of geotechnical investigation was presented in proposals dated 20 April 2022 and 13 June 2022. Butler Partners Pty Ltd (Butler Partners) was subsequently commissioned by Chum Street Land Evolution Pty Ltd (Chum Street Land Evolution) to undertake the geotechnical investigation as proposed. This report was issued as a factual report on 30 June 2022, after the initial stage of the investigation.



## SECTION 2 - THE SITE

### 2.1 Site Description

At the time of the investigation, the site was undeveloped and was generally moderately vegetated with medium to tall trees and shrubs. The site was previously occupied by a quarry with the existing pit having been backfilled. Ground surface levels across the site generally sloped non-uniformly downward to the north-west, from a high of approximately RL92m (at the south-eastern corner of the site) to a low of approximately RL48m. General views of the site at the time of investigation are shown in Photograph 1 and Photograph 2.



*Photograph 1: A general view of the site looking north-east from Test Pit 41*



*Photograph 2: A general view of the site looking west towards Test Pit 50*

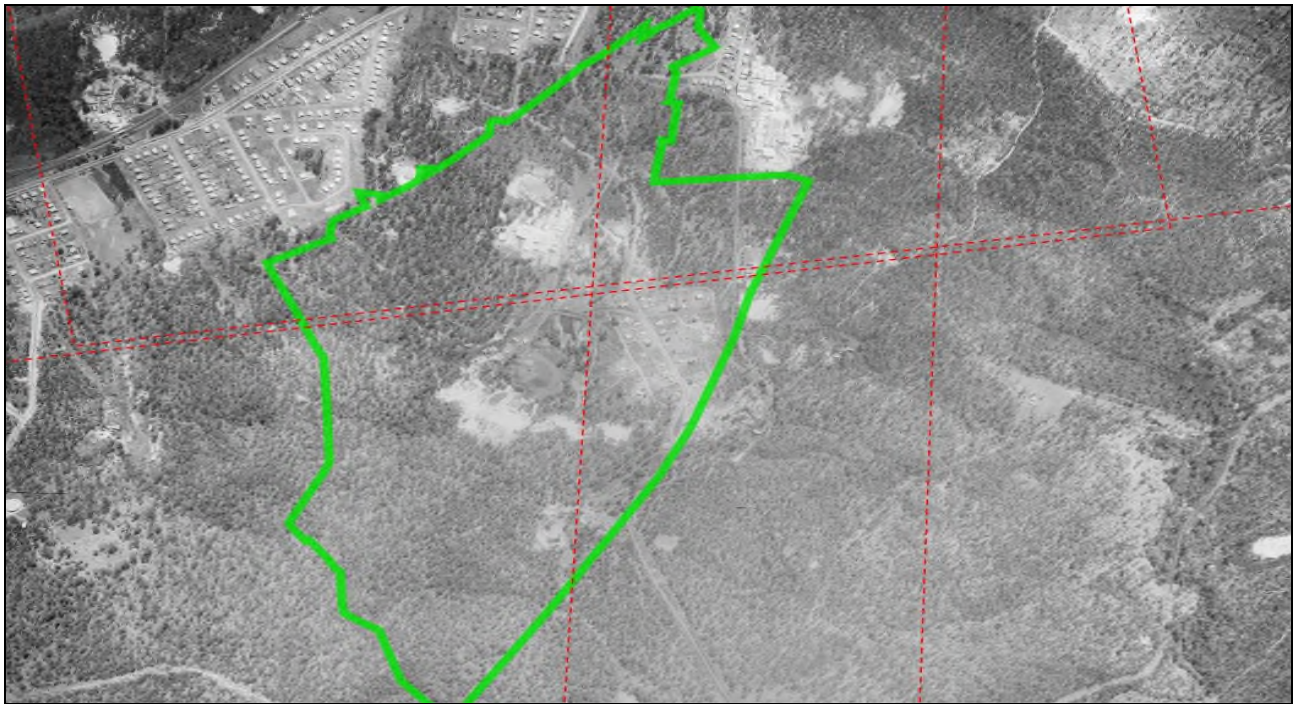
### 2.2 Geology

Reference to the Geological Survey of Queensland's 1:100,000 Series Ipswich Map indicates that the site is located in an area mapped as Early Jurassic Deposits of Tivoli Formation (comprising shale, sandstone, economic coal seams, siltstone and conglomerate).



### **2.3 Review of Aerial Photography**

A review of historical aerial photographs of the site has indicated that the site showed no evidence of major excavations at the site prior to 1960 and the site is generally undeveloped (refer Photograph 3). In December 1972 (refer Photograph 4) large scale open cut excavations are evident, and the site appears to have been substantially backfilled by February 1986 (refer Photograph 5).



*Photograph 3: Historical aerial photo from 9 September 1960*



*Photograph 4: Historical aerial photo from 1 December 1972*





Photograph 5: Historical aerial photo from 21 February 1986

## **2.4 Previous Reports Provided by Chum Street Land Evolution**

The site and surrounding area have previously been subject to mining subsidence assessments by Moreton Geotechnical Services Pty Ltd (Moreton Geotechnical Services), and a preliminary geotechnical investigation by STA Consulting Engineers Pty Ltd (STA Consulting Engineers), and the following reports have been provided for review.

### **2.4.1 December 2010 Moreton Geotechnical Services Report**

Moreton Geotechnical Services Pty Ltd (Moreton Geotechnical Services) has previously carried out geotechnical study which is summarised in the following report and a copy of this report is included in Appendix C:

*Geotechnical Study  
Broadscale Mining Study  
Ebbw Vale*

Project No.: 02010/91 Dated: 17 December 2010

The December 2010 Moreton Geotechnical Services report summarised general mining activities at the site as follows:

Underground mining took place under or in the area of the site between the 1870s and 1960s. Many mine plans of the various operations are held at the Mines Department, however plans for the earliest New Chum Colliery in particular appear to be incomplete. Understanding the various plans is further complicated by the different seam nomenclature used in the adjoining mine operations e.g. the No. 1 Seam (Braeside), No. 5 (Rylance) and "Underbands" (Rylance) describe the same Bergin's Seam.

Open cut mining took place from the 1960s when appropriate equipment became available. Open cut mining also took place on this site well into the 1970s. Good open cut mine plans are seldom available for the whole of the Ipswich region and this is also the case for this site. The most complete plan is that of the Rylance No. 5 Colliery which operated on the east side of High Street on this site. The completeness of this plan appears to be more to do with the failure and gradual movement of the western highwall and High Street itself which required emergency backfilling to stabilise the road reserve and properties above. We have had to rely on other sources of information (1972 topography plan, 1974 aerial photograph) in establishing the extent of open cut mining to the east of the Rylance No. 5 Open Cut due to paucity of open cut mine plans for that area.

The underground mining was carried out in various seams over a large portion of the site and details are given in the Moreton Geotechnical Services report. The Moreton Geotechnical Services report also notes that past open cut mining activity removed the previous underground mine workings over a significant portion of the site. Figure 1 has been excerpted from *Plan 7* attached to the report and it summarises areas of previous underground mining within the site area, generally around the perimeter of the site.



Figure 1: Excerpt from Plan 7 taken from the Moreton Geotechnical Services report

The reported results from the Moreton Geotechnical Services report have been used in the current assessment of potential impact of past mining activities on the site. It should be noted, however, that the data within the report on the possible location of the various mined coal seams is incomplete.

#### **2.4.2 Preliminary Site Investigation Report**

A previous geotechnical investigation has been carried out by STA Consulting Engineers across the overall site. The results of the investigation is included in the following report:

*Geotechnical Investigation  
Preliminary Site Investigation Report  
Whitwood Road, Ebbw Vale*

Project No.: ES200103-B      Dated: 2 March 2021

In very broad summary, the subsurface conditions encountered at the test pit locations comprised a variable surface layer of fill in all the test pits to a termination between 1.4m and 2.5m depth. Natural soils consisting of silty/gravelly clay and silty gravel were encountered in Test Pits 2, 9 and 10 below 0.4m to 2.0m depth.



## SECTION 3 - FIELDWORK

### **3.1     Excavation, Drilling, and Sampling Methods**

The investigation included the excavation and sampling of sixty-one test pits (Test Pits 1 to 61) with a Sumitomo SH145 excavator, using a 450mm wide bucket and the drilling and sampling of eight bores (Bores 62 to 70) using a track mounted Hanjin drilling rig. Strata identification was from inspection of disturbed samples recovered from the bucket in the test pits, and from disturbed material returned to the surface on the augers and in the wash bore circulation fluid, supplemented by the inspection of 'disturbed' standard penetration test (SPT) samples (recovered at selected depths) in the bores. A hand held 'pocket' penetrometer was used in cohesive soils to assist with the assessment of strength.

On completion of drilling and excavation, all bores and test pits were backfilled with spoil and the surface reinstated and/or plugged.

### **3.2     Test Pit and Bore Locations and Supervision**

The test pit and bore locations were set out using a hand-held GPS (and referenced to existing site features), and are shown approximately on Drawing No. 1, attached. The ground surface level at each test location was determined by interpolation from contours given on Bennett + Bennett 'Verification Plot New Chum – All Areas New Chum' Drawing No. '210051\_001\_VER', dated 12 March 2021.

Experienced geotechnical engineers logged the stratigraphy encountered in the test pits and bores, directed the insitu sampling and testing program and supervised the fieldwork.

## SECTION 4 - INVESTIGATION RESULTS

### 4.1 Results

The subsurface conditions encountered in the test pits and bores are given on the Test Pit and Bore Report sheets included in Appendix A, using classification and descriptive terms defined in the accompanying notes (which are based on Australian Standard AS1726-1993). It should be noted that rock types indicated on the Test Pit and Bore Report sheets are based on visual assessment only; no petrographic analysis has been undertaken for confirmation.

For a description of the stratigraphy encountered in the test pits and bores, the Test Pit and Bore Report sheets should be consulted. However, in very broad summary, the subsurface conditions encountered in the test pits and bores generally comprised a variable surface layer of fill, including various composites of cohesive and non-cohesive soil over much of the site. The fill extended beyond the depth of test pit excavation at numerous locations, and was encountered to depths of between 2.3m and 29.0m in Bores 62 to 69. Bore 70 was discontinued due to repeated test hole collapse at 31.5m depth in the fill. The fill was underlain by interbedded layers of loose to very dense gravelly/clayey/silty sand/gravel and firm to hard silty/sandy/gravelly clay/silt. Weathered sedimentary rock of extremely low to medium strength was encountered underlying the soils, and at the surface in some test pit locations. Interbedded layers of coal were encountered in some of the bores.

Strength inversions (i.e. 'stronger' strata underlain by 'weaker' strata) were encountered in the soil/rock in some of the test pits and bores. For example, hard silty clay was underlain by very stiff silty clay below 2.0m depth in Test Pit 1; medium strength mudstone was underlain by very stiff to hard silty clay below 1.8m depth in Test Pit 2; and low to medium strength sandstone was underlain by very low strength sandstone below 9.5m depth in Bore 64.

### 4.2 Groundwater

Free groundwater was encountered between 1.3m to 2.4m depth during the excavation of Test Pit 50 and the auger drilling of Bores 62 and 63. Groundwater seepage was noted at 2.2m depth in Test Pit 16, between 0.2m and 0.4m depth in Test Pit 22, and between 0.3m and 0.6m depth in Test Pit 24. Below the depth of auger drilling in the bores (generally 3m depth) the use of circulation fluid for cuttings removal obscured groundwater observations. It is considered that groundwater levels could vary across and around the site, and would be expected to be dependent on at least, seasonal affects, the prevailing weather, vegetation and site topography.

### 4.3 Laboratory Testing

Selected soil samples recovered from the test pits and bores were tested in one of Ground Testing Services Pty Ltd's (GTS) NATA endorsed geotechnical testing laboratories for determination of erosion and sediment control parameters, particle size distribution, plasticity, shrink swell index, compaction properties, and California bearing ratio (CBR) using Australian Standard AS1289 test methods. Test results report sheets are attached in Appendix B, and the test results are summarised and discussed below.

It should be noted that sample descriptions provided in the laboratory results summary tables (and the laboratory test result sheets) are based on the inspection of each individual laboratory test sample only. No allowance has been made in sample descriptions for sampling, sub-sampling or test methodology in determination of the mass material properties. Estimates of mass material properties are provided on each individual Test Pit and Bore Report sheets and as such, the laboratory test results should be read in conjunction with the relevant report sheets.

#### 4.3.1 Erosion and Sediment Control Parameters

Twenty-four selected samples of fill and soil were selected for testing to determine Emerson Class Number, pH and electrical conductivity and the test results are presented in Table 1.

*Table 1: Summary of Reported Emerson Class, pH and Conductivity Test Results*

| Test Location | Sample Depth (m) | Sample Description         | Emerson Class No. | pH  | Electrical Conductivity (µS/cm) |
|---------------|------------------|----------------------------|-------------------|-----|---------------------------------|
| Test Pit 2    | 1.0 – 1.2        | Silty Clay                 | 1                 | 4.2 | 605                             |
| Test Pit 3    | 0.6 – 0.7        | Gravelly Silty Clay        | 2                 | 3.7 | 247.8                           |
| Test Pit 5    | 0.5 – 0.7        | Sandy Clay                 | 2                 | 3.6 | 288.4                           |
| Test Pit 7    | 1.2 – 1.5        | Silty Clay                 | 3                 | 6.9 | 231.4                           |
| Test Pit 14   | 0.2 – 0.4        | Silty Clay                 | 2                 | 3.7 | 659                             |
| Test Pit 16   | 0.4 – 0.8        | Fill – silty sand          | 2                 | 6.0 | 26                              |
|               | 2.7 – 2.9        | Fill – silty clay          | 2                 | 5.2 | 336                             |
| Test Pit 17   | 2.9 – 3.0        | Silty Clay                 | 5                 | 3.3 | 984                             |
| Test Pit 27   | 2.4 – 2.6        | Fill – sandy clayey gravel | 1                 | 6.3 | 186.4                           |
| Test Pit 29   | 1.1 – 1.3        | Silty Clay                 | 1                 | 3.6 | 146.3                           |
| Test Pit 31   | 1.7 – 1.9        | Fill – sandy clayey gravel | 2                 | 4.6 | 144.2                           |
| Test Pit 39   | 1.3 – 1.5        | Silty Clay                 | 6                 | 4.9 | 905                             |
|               | 2.5 – 2.7        | Sandy Clay                 | 6                 | 4.4 | 478.8                           |
| Test Pit 40   | 2.2 – 2.4        | Silty Clay                 | 2                 | 5.3 | 727                             |
| Test Pit 41   | 1.4 – 1.6        | Silty Clay                 | 2                 | 5.2 | 2042                            |
| Test Pit 43   | 0.9 – 1.1        | Silty Clay                 | 5                 | 4.6 | 2161                            |
|               | 2.8 – 3.1        | Silty Clay                 | 3                 | 4.0 | 2076                            |
| Test Pit 46   | 0.5 – 0.6        | Silty Clay                 | 5                 | 4.3 | 690                             |
| Test Pit 48   | 2.0 – 2.2        | Sandy Silty Gravel         | 6                 | 4.2 | 501                             |
| Test Pit 49   | 1.2 – 1.4        | Fill – sandy clayey gravel | 2                 | 7.3 | 445.6                           |
| Bore 63       | 4.0 – 4.45       | Fill – sandy clayey gravel | 2                 | 4.1 | 113.7                           |
| Bore 65       | 4.0 – 4.45       | Fill – clayey sandy gravel | 1                 | 6.9 | 176.8                           |
| Bore 67       | 2.5 – 2.95       | Fill – sandy clay          | 2                 | 4.4 | 97.4                            |
| Bore 69       | 7.0 – 7.45       | Fill – sandy clay          | 2                 | 3.8 | 443.3                           |

The Emerson Class Number (ECN) test results indicate that the samples' dispersion potential ranged between very low (ECN = 6) to very high (ECN = 1). The soils (and some weathered rock) are expected to be highly erodible.

#### 4.3.2 Particle Size Distribution

Seventeen selected samples of fill and soil recovered from selected test pit and bores were tested for measurement of particle size distribution using wash sieve grading techniques, and the reported results are summarised in Table 2.

*Table 2: Summary of Reported Particle Size Distribution Test Results*

| Test Location | Sample Depth (m) | Sample Description          | Sample Moisture Content (%) | Gravel Fraction <sup>(1)</sup> (%) | Sand Fraction <sup>(2)</sup> (%) | Silt and Clay Fraction <sup>(3)</sup> (%) |
|---------------|------------------|-----------------------------|-----------------------------|------------------------------------|----------------------------------|-------------------------------------------|
| Test Pit 3    | 2.7 – 2.8        | Gravelly Silty Clay         | 12.1                        | 38                                 | 11                               | 51                                        |
| Test Pit 5    | 2.2 – 2.4        | Gravelly Clay               | 14.9                        | 37                                 | 16                               | 47                                        |
| Test Pit 32   | 0.3 – 0.5        | Gravelly Silty Clay         | 15.8                        | 38                                 | 19                               | 43                                        |
| Test Pit 38   | 2.4 – 2.6        | Silty Clay                  | 28.3                        | 7                                  | 18                               | 75                                        |
| Test Pit 41   | 2.2 – 2.4        | Silty Sand                  | 9.4                         | 0                                  | 53                               | 47                                        |
| Test Pit 42   | 0.9 – 1.0        | Silty Clay                  | 16.2                        | 0                                  | 15                               | 85                                        |
| Test Pit 45   | 2.8 – 3.0        | Silty Clay                  | 22.6                        | 5                                  | 14                               | 81                                        |
| Test Pit 46   | 1.9 – 2.1        | Silty Clay                  | 16.1                        | 0                                  | 27                               | 73                                        |
| Test Pit 52   | 0.7 – 0.9        | Fill – gravelly clayey sand | 14.3                        | 13                                 | 44                               | 43                                        |
| Bore 63       | 2.5 – 2.95       | Fill – clayey sandy gravel  | 15.9                        | 47                                 | 33                               | 20                                        |



| Test Location | Sample Depth (m) | Sample Description                                 | Sample Moisture Content (%) | Gravel Fraction <sup>(1)</sup> (%) | Sand Fraction <sup>(2)</sup> (%) | Silt and Clay Fraction <sup>(3)</sup> (%) |
|---------------|------------------|----------------------------------------------------|-----------------------------|------------------------------------|----------------------------------|-------------------------------------------|
| Bore 64       | 5.5 – 5.95       | Fill – sandy clayey gravel                         | 14.9                        | 43                                 | 21                               | 36                                        |
| Bore 65       | 1.0 – 1.45       | Fill – clayey sandy gravel                         | 6.7                         | 64                                 | 20                               | 16                                        |
| Bore 66       | 8.5 – 8.95       | Fill – silty clay                                  | 20.9                        | 6                                  | 27                               | 67                                        |
| Bore 68       | 7.0 – 7.45       | Fill – sandy clayey gravel/<br>sandy gravelly clay | 17.1                        | 35                                 | 30                               | 35                                        |
| Bore 69       | 4.0 – 4.45       | Fill – silty clay                                  | 26.6                        | 28                                 | 21                               | 51                                        |
| Bore 70       | 5.5 – 5.95       | Fill – sandy clayey gravel                         | 12.1                        | 37                                 | 29                               | 34                                        |
|               | 10.0 – 10.45     | Fill – sandy gravel                                | 11.2                        | 73                                 | 19                               | 8                                         |

<sup>(1)</sup> Particle size <60mm, >2mm; <sup>(2)</sup> Particle size (approximately) <2mm, >0.075mm; <sup>(3)</sup> Particle size (approximately) <0.075mm

#### 4.3.3 Plasticity

Twenty-five selected samples of fill and soil were tested for measurement of plasticity using Atterberg limit and linear shrinkage test methods. The reported test results are summarised in Table 3, together with each sample's soil classification.

Table 3: Summary of Reported Plasticity Results

| Test Location | Sample Depth (m) | Sample Description                                 | Sample Moisture Content (%) | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) | Linear Shrinkage (%) | Sample Classification* |
|---------------|------------------|----------------------------------------------------|-----------------------------|------------------|-------------------|----------------------|----------------------|------------------------|
| Test Pit 2    | 0.3 – 0.8        | Silty Clay                                         | 20.3                        | 69               | 18                | 51                   | 13.0                 | CH                     |
| Test Pit 5    | 0.5 – 0.7        | Sandy Clay                                         | 17.1                        | 49               | 17                | 32                   | 13.0                 | CI                     |
| Test Pit 14   | 0.2 – 0.4        | Silty Clay                                         | 15.1                        | 40               | 20                | 20                   | 9.0                  | CI                     |
| Test Pit 17   | 2.9 – 3.0        | Silty Clay                                         | 26.9                        | 73               | 18                | 55                   | 2.0                  | CH                     |
| Test Pit 20   | 1.2 – 1.4        | Fill – sandy clayey gravel                         | 15.6                        | 37               | 15                | 22                   | 11.0                 | CI                     |
| Test Pit 24   | 2.1 – 2.3        | Fill – sandy clay                                  | 18.3                        | 33               | 17                | 16                   | 8.5                  | CI                     |
| Test Pit 26   | 2.8 – 3.0        | Fill – sandy clayey gravel                         | 13.1                        | 36               | 17                | 19                   | 7.5                  | CI                     |
| Test Pit 29   | 1.1 – 1.3        | Silty Clay                                         | 13.3                        | 38               | 18                | 20                   | 8.5                  | CI                     |
| Test Pit 32   | 0.3 – 0.5        | Gravelly Silty Clay                                | 15.8                        | 46               | 20                | 26                   | 10.5                 | CI                     |
| Test Pit 34   | 1.8 – 2.0        | Fill – sandy clayey gravel                         | 14.1                        | 32               | 19                | 13                   | 7.0                  | CI                     |
| Test Pit 38   | 2.4 – 2.6        | Silty Clay                                         | 28.3                        | 97               | 21                | 76                   | 28.0                 | CH                     |
| Test Pit 39   | 1.3 – 1.5        | Silty Clay                                         | 21.6                        | 63               | 18                | 45                   | 11.5                 | CH                     |
| Test Pit 40   | 2.2 – 2.4        | Silty Clay                                         | 29.2                        | 79               | 16                | 63                   | 14.0                 | CH                     |
| Test Pit 41   | 1.4 – 1.6        | Silty Clay                                         | 27.6                        | 90               | 21                | 69                   | 25.5                 | CH                     |
| Test Pit 42   | 0.9 – 1.0        | Silty Clay                                         | 16.2                        | 44               | 17                | 27                   | 10.0                 | CI                     |
| Test Pit 43   | 1.6 – 1.9        | Silty Clay                                         | 32.1                        | 79               | 25                | 54                   | 22.0                 | CH                     |
|               | 2.8 – 3.1        | Silty Clay                                         | 30.7                        | 90               | 22                | 68                   | 26.5                 | CH                     |
| Test Pit 45   | 2.8 – 3.0        | Silty Clay                                         | 22.6                        | 64               | 14                | 50                   | 20.0                 | CH                     |
| Test Pit 46   | 1.9 – 2.1        | Silty Clay                                         | 16.1                        | 55               | 14                | 41                   | 14.0                 | CH                     |
| Test Pit 53   | 1.2 – 1.3        | Fill – silty clay                                  | 16.6                        | 47               | 13                | 34                   | 13.0                 | CI                     |
| Bore 62       | 2.5 – 2.95       | Silty Clay                                         | 19.5                        | 49               | 17                | 32                   | 14.0                 | CI                     |
| Bore 66       | 7.0 – 7.45       | Fill – silty clay                                  | 23.1                        | 29               | 20                | 9                    | 6.0                  | CL                     |
| Bore 68       | 11.5 – 11.95     | Fill – sandy clayey gravel/<br>sandy gravelly clay | 17.7                        | 31               | 16                | 15                   | 8.0                  | CL                     |
| Bore 69       | 1.0 – 1.45       | Fill – silty clay                                  | 10.2                        | 32               | 16                | 16                   | 8.0                  | CL                     |
| Bore 70       | 7.0 – 7.4        | Fill – sandy clay                                  | 12.2                        | 36               | 14                | 22                   | 10.0                 | CI                     |

\* Australian Standard AS1726 – Geotechnical site investigations

#### 4.3.4 Shrink Swell Index

Six selected samples recovered from the test pits were tested to assess shrink swell index ( $I_{ss}$ ) and the test results are summarised in Table 4. The results indicate that the samples tested had a potential for moderate to very high volume change associated with soil moisture content/suction change (i.e. the samples tested ranged from moderately to extremely highly reactive).

Table 4: Summary of Shrink-Swell Index Results

| Test Location | Depth (m)  | Sample Description | Shrinkage (%) | Swell (%) | Shrink Swell Index Iss (%) |
|---------------|------------|--------------------|---------------|-----------|----------------------------|
| Test Pit 1    | 0.8 – 1.1  | Silty Clay         | 2.0           | 0.0       | 1.1                        |
| Test Pit 7    | 1.2 – 1.5  | Silty Clay         | 4.6           | 0.8       | 2.8                        |
| Test Pit 38   | 1.1 – 1.45 | Silty Clay         | 9.4           | 7.6       | 7.3                        |
| Test Pit 45   | 0.4 – 0.8  | Silty Clay         | 8.5           | 4.2       | 5.9                        |
| Test Pit 46   | 1.2 – 1.4  | Silty Clay         | 7.7           | 6.1       | 6.0                        |
| Test Pit 48   | 0.6 – 0.85 | Silty Clay         | 2.9           | 1.9       | 2.1                        |

#### 4.3.5 Moisture-Density Relationship

Ten selected bulk samples recovered from the test pits were tested to determine (Standard) laboratory moisture-density relationship and the maximum dry density (MDD) and optimum moisture content (OMC) results for the sample tested are summarised in Table 5. The results of the moisture-density testing indicate that the (insitu) moisture contents of the samples tested were between approximately 3.9% 'dry' and 1.8% 'wet' of Standard OMC, at the time of sampling.

Table 5: Summary of Moisture-Density Relationship Results

| Test Location | Depth (m) | Sample Description          | Sample Moisture Content (%) | Standard Compaction                     |                              |
|---------------|-----------|-----------------------------|-----------------------------|-----------------------------------------|------------------------------|
|               |           |                             |                             | Maximum Dry Density (t/m <sup>3</sup> ) | Optimum Moisture Content (%) |
| Test Pit 2    | 1.0 – 1.2 | Silty Clay                  | 19.3                        | 1.63                                    | 21.5                         |
| Test Pit 20   | 1.2 – 1.4 | Fill – sandy clayey gravel  | 15.6                        | 1.80                                    | 16.5                         |
| Test Pit 24   | 2.1 – 2.3 | Fill – sandy clay           | 18.3                        | 1.76                                    | 17.0                         |
| Test Pit 34   | 0.6 – 0.9 | Fill – sandy clayey gravel  | 10.5                        | 1.69                                    | 12.0                         |
| Test Pit 39   | 2.5 – 2.7 | Sandy Clay                  | 12.1                        | 1.78                                    | 16.0                         |
| Test Pit 43   | 0.9 – 1.1 | Silty Clay                  | 28.3                        | 1.44                                    | 30.0                         |
| Test Pit 47   | 2.4 – 2.7 | Fill – sandy clayey gravel  | 18.3                        | 1.76                                    | 17.5                         |
| Test Pit 48   | 2.0 – 2.2 | Sandy Silty Gravel          | 12.1                        | 1.81                                    | 16.0                         |
| Test Pit 52   | 0.7 – 0.9 | Fill – gravelly clayey sand | 14.3                        | 1.92                                    | 12.5                         |
| Test Pit 57   | 2.3 – 2.6 | Fill – sandy clayey gravel  | 17.0                        | 1.72                                    | 16.5                         |

#### 4.3.6 California Bearing Ratio

Sub-samples of the materials tested for moisture-density relationship were recompacted using Standard compactive effort at approximate optimum moisture content, soaked for four days under a surcharge load of 4.5kg, then tested to determine CBR. The reported test results are summarised in Table 6.

Table 6: Summary of Reported CBR Test Results

| Test Location | Depth (m) | Sample Description          | Sample Preparation   |                                 | Sample Compaction Properties |                         | Soaking Time (days) | Swell on Soaking (%) | Reported CBR (%) |
|---------------|-----------|-----------------------------|----------------------|---------------------------------|------------------------------|-------------------------|---------------------|----------------------|------------------|
|               |           |                             | Moisture Content (%) | Dry Density (t/m <sup>3</sup> ) | OMC (%)                      | MDD (t/m <sup>3</sup> ) |                     |                      |                  |
| Test Pit 2    | 1.0 – 1.2 | Silty Clay                  | 21.4                 | 1.62                            | 21.5                         | 1.63                    | 4                   | 5.0                  | 1                |
| Test Pit 20   | 1.2 – 1.4 | Fill – sandy clayey gravel  | 18.9                 | 1.76                            | 16.5                         | 1.80                    | 4                   | 0.5                  | 2.5              |
| Test Pit 24   | 2.1 – 2.3 | Fill – sandy clay           | 16.1                 | 1.77                            | 17.0                         | 1.76                    | 4                   | 0.5                  | 6                |
| Test Pit 34   | 0.6 – 0.9 | Fill – sandy clayey gravel  | 11.5                 | 1.70                            | 12.0                         | 1.69                    | 4                   | 0.0                  | 7                |
| Test Pit 39   | 2.5 – 2.7 | Sandy Clay                  | 15.4                 | 1.78                            | 16.0                         | 1.78                    | 4                   | 3.0                  | 2.5              |
| Test Pit 43   | 0.9 – 1.1 | Silty Clay                  | 30.0                 | 1.44                            | 30.0                         | 1.44                    | 4                   | 8.0                  | 1.0              |
| Test Pit 47   | 2.4 – 2.7 | Fill – sandy clayey gravel  | 18.0                 | 1.75                            | 17.5                         | 1.76                    | 4                   | 2.0                  | 4.5              |
| Test Pit 48   | 2.0 – 2.2 | Sandy Silty Gravel          | 15.9                 | 1.81                            | 16.0                         | 1.81                    | 4                   | 0.5                  | 12               |
| Test Pit 52   | 0.7 – 0.9 | Fill – gravelly clayey sand | 11.8                 | 1.93                            | 12.5                         | 1.92                    | 4                   | 1.5                  | 4.5              |
| Test Pit 57   | 2.3 – 2.6 | Fill – sandy clayey gravel  | 15.9                 | 1.74                            | 16.5                         | 1.72                    | 4                   | 4.0                  | 2.0              |

<sup>1</sup> Gibson, R.E. (1953), *Experimental determination of the true cohesion and true angle of internal friction in clays*, Proc 3<sup>rd</sup> I.C.S.M.F.E., Zurich, pp126 - 130

## SECTION 5 - GEOTECHNICAL DESIGN DISCUSSION

### 5.1 Ground Model

The results of the investigation indicate that the ground conditions at the test pits and bore locations comprised a discontinuous surface layer of fill or sandy/clayey silt overlying mostly stiff to hard sandy/silty/gravelly clays and medium dense to dense sands, clay, and gravel mixtures that were underlain in turn by extremely low strength to high strength rock. Strength inversions were encountered at some test locations. For the ground conditions encountered in the test pits and bores, geotechnical design for the proposed subdivision will need to especially (but not exclusively) consider the following:

- condition of the existing fill, where present;
- earthworks and site preparation;
- stable batter slopes;
- excavatability;
- retaining wall pressures;
- foundations;
- groundwater control;
- subgrade materials for pavement design; and
- possible construction difficulties.

Discussion of geotechnical design parameters, as well as design and construction recommendations and suggestions are detailed in the following sections.

### 5.2 Existing Fill Condition

It is not known whether the existing fill material at the site is 'controlled' (i.e. it is not known whether the fill has been placed and uniformly compacted to an appropriate engineering specification). If substantive documentation certifying the compaction of the fill does not exist then it is suggested that the existing fill is assumed to be 'uncontrolled' which would be consistent with the general appearance of the fill at the test locations. Consideration should be given to the potential for variations in both the composition and degree of compaction of the fill to occur within uncontrolled fill. The presence of voids within uncontrolled fill as well as potential soft/loose zones of inclusions of deleterious materials may lead to potentially significant future total and differential settlements (and/or horizontal displacements), possibly occurring over relatively short distances.

In order to control settlement risk, it would be necessary to remove all uncontrolled fill in movement sensitive areas and replace it with uniformly compacted controlled fill placed in accordance with an appropriate specification.

### 5.3 Earthworks - General

#### 5.3.1 Excavatability

Excavation of fill, soils and extremely low to very low strength rock should be readily achieved in bulk excavation using a large hydraulic excavator, with provision for use of rock breaker equipment as required.

As a general guide, it is anticipated that a large tractor (D11) should be able to economically remove low strength and medium strength rock where encountered, however supplementary rock breaking may be required to aid production in medium strength rock (subject to existing rock fracturing). It should be noted that successful ripping would require the use of a large tractor and freedom to rip in all directions. If this is not possible, it is likely that rock breakers will be required in lieu of ripping.

Bulk excavation of medium strength rock will require relatively major use of 'rock breaker' equipment unless joint spacing is moderately close (less than 0.3m). In high strength (or stronger) rock (with relatively few discontinuities), it is likely that the most economic method of excavation will involve pre-splitting (by blasting) followed by either ripping with a heavy tractor or use of a large rock breaker. Without the pre-splitting, rock breaker excavation methods only would be expected to be very slow and potentially severely damaging to equipment.

In confined (trench, footing, etc.) excavations in medium to high strength rock, heavy rock breaker equipment and slow excavation rates should be allowed for. In high strength (or stronger) rock, pre-split blasting may be required in order to minimise equipment damage and to increase production.

### **5.3.2 Use of Cut for Fill**

Except for soils that are organic, over-wet or contain over-size (i.e. >75mm) particles, and/or 'silts', materials recovered in excavations should be suitable for re-use as fill, provided expansive behaviour can be tolerated or designed for where reactive materials are used.

Silty/sandy clays and recompacted weathered rock are expected to have potential for moderate to high soil shrink-swell movements associated with change in soil moisture content. It should be noted that over compacting reactive fill (particularly at a moisture content below optimum), should be avoided as potentially significant expansion could occur on 'wetting up'.

The sedimentary rock encountered in the test pits and bores of less than low strength will breakdown to form moderately to highly reactive 'clayey' fill. Weathered low to very high strength rock from excavations would be suitable for use as low reactivity select fill. However, unless the 'strong' rock is highly fractured naturally (or by processing and/or blasting), it is considered likely that a significant portion of the excavated rock may be 'oversize' and may not be suitable for use as select (or general) fill, unless processed by crushing.

### **5.3.3 Subgrade Preparation**

Following site preparation and excavation, the exposed subgrade in proposed fill areas should be 'proof' rolled under engineering supervision. Any 'soft spots' encountered should be tyned, dried and recompacted, or excavated and replaced with properly compacted fill.

### **5.3.4 Compaction**

All fill should be 'controlled', placed in layers not greater than 250mm (loose thickness) and be uniformly compacted to the minimum dry density ratios nominated in Table 7.

*Table 7: Subgrade and Fill Compaction*

| Location                                        | Minimum Dry Density Ratio  |
|-------------------------------------------------|----------------------------|
| Pavement Subgrade – >500mm below subgrade level | 98% (Standard compaction)  |
| – top 500mm of subgrade                         | 100% (Standard compaction) |

Any reactive (clayey) fill should be placed and maintained at a moisture content not less than Standard optimum moisture content in order to reduce potential shrink-swell movements. It should be noted that over-compacting reactive clay fill (particularly at a moisture content below optimum) should be avoided as potentially significant expansion could occur on 'wetting up'. Due allowance must be made in design and detailing for reactive fill movements if reactive fill is used.



To assist with the achievement of adequate control over embankment fill placement, geotechnical control testing during construction to not less than Level 2 (as described in Section 8 of Australian Standard AS3798-2007 *Guidelines on earthworks for commercial and residential developments*) would be required and Level 1 control is recommended where fill settlement is to be minimised.

#### **5.3.5 Trafficability**

During and following excavation to final site level, trafficability for plant will be very difficult to impossible in clayey/silty soils and extremely low, and very low strength rock in the 'wet', and consideration should be given to the placement of a coarse granular working surface to provide 'all weather' site access. The required layer thickness will depend on the type of plant proposed to traffic the site and should be determined on a case by case basis. However, a layer thickness of not less than approximately 0.15m is anticipated over 'clayey' subgrade for 'light' equipment.

Operation of construction traffic over 'wet' clayey subgrades during and following wet weather would be expected to result in significant disturbance to the exposed subgrade, with consequent potential significant loss of subgrade strength.

#### **5.3.6 Site Drainage**

During construction, the site should be graded such that water does not collect and pond over the site, otherwise softening of the subgrade soils and any extremely low to very low strength rock will occur, especially under the trafficking of construction plant and heavy vehicles.

### **5.4 Earthworks – Deep Fill Areas**

The central section of the site was underlain at the bore locations by deep fill (i.e. fill to depths of approximately 20m to greater than 31.5m). The results of insitu testing (SPTs) at regular depth intervals in the bores indicate that the fill is variable, but appears to be generally reasonably well compacted. However, in deep fill like this, settlement within the fill due to its self-weight would be expected to occur, and the weight of the fill placed would be expected to generate settlement within the underlying 'natural' strata. Because the fill has been in place for 30 to 35 years (very approximately), it is possible that a significant portion of this settlement has occurred, but without a detailed site history, or information on the methodology of fill placement, it is difficult (to impossible) to reliably quantify the magnitude of future settlement that may occur.

Where the fill has not been placed as controlled fill, an unquantifiable risk exists of the fill including poorly compacted zones, or zones where deleterious materials that may break down with time have been included within the fill. If/where such zones exist they could lead to potential future differential settlements occurring, potentially over relatively short distances. The likelihood of an abrupt differential settlement profile occurring may be able to be reduced (but not eliminated) by partially removing a certain depth of the fill and replacing it as properly compacted controlled fill. The magnitude of the risk reduction would be difficult to quantify but would be expected to increase with increasing depth of the removal and replacement zone. Future settlement risk in the deep fill areas would also be expected to be lower in any areas where the proposed future ground surface level is lower than the current ground surface level as the remaining fill will have been subject effectively to a 'surcharge load'. The magnitude of the risk reduction would be expected to increase with magnitude of the lowering of the ground surface.

As a **very broad** guide to the possible magnitude of settlement within the existing fill due to self-weight for the fill as encountered at each bore location, estimates are provided in Table 8.

**Table 8: Possible order of settlement within the fill encountered at the bore locations due to self-weight**

| Bore | Approximate Fill Depth (m) | Very Approximate Settlement Range (mm) |
|------|----------------------------|----------------------------------------|
| 62   | 2.3                        | 50 – 150                               |
| 63   | 7.7                        | 80 – 220                               |
| 64   | 8.2                        | 60 – 200                               |
| 65   | 29.0                       | 200 – 550                              |
| 66   | 10.8                       | 60 – 200                               |
| 67   | 20.6                       | 250 – 600                              |
| 68   | 19.8                       | 100 – 300                              |
| 69   | 22.2                       | 120 – 350                              |
| 70   | >31.5                      | >200 – 500                             |

It is suggested that a review of earthworks levels and potential construction procedures be carried out to assess the impact of the magnitude of the potential settlements on future development. It is also strongly recommended that a risk assessment be carried out to investigate the possible impact on future development if the existing fill includes poorly compacted zones or zones of deleterious materials. Monitoring of ground surface levels over a 1 to 2 year period in the areas of 'deep' fill may enable the above settlement estimates to be reviewed and potentially refined.

### **5.5 Erosion and Sediment Control**

The results of testing on selected samples given in Table 1 can be used, in conjunction with relevant soil classifications from the Test Pit and Bore Report sheets, to input to an erosion hazard assessment for the site (e.g. IECA, 2008<sup>1</sup>).

It is considered that both cut and fill slopes at the site (and any open channels etc.) will experience (potentially significant) erosion and will require inspection and assessment on a location by location basis, to assess suitable erosion control measures.

### **5.6 Reactive Ground Movements**

The site is underlain at the test locations by moderately to extremely reactive clay soils. The magnitude of potential reactive soil movements can be estimated using the following equation (from Australian Standard AS2870 – 2011 *Residential slabs and footings*) and parameters for the site selected based on recommendations in AS2870:

$$y_s = \frac{1}{100} \sum_{n=1}^N \left( \alpha \cdot I_{ss} \cdot \overline{\Delta u} \cdot h \right)_n$$

where  $y_s$  is the characteristic surface movement, in millimetres;  
 $\alpha$  is the lateral restraint factor;  
 $I_{ss}$  is the shrink-swell index, taken to vary between 0.5% per pF and 7.3% per pF based on the results of the laboratory testing and correlation with plasticity and past experience with similar soils;  
 $\overline{\Delta u}$  is the soil suction change averaged over the thickness of the layer under consideration (estimated to vary between 1.2pF at the ground surface to zero at the design depth of suction change);  
 $h$  is the thickness of layer under consideration, in millimetres, taken as 2.3m at Ebbw Vale; and  
 $N$  is the number of soil layers within the design depth of suction change ( $H_s$ ).

<sup>1</sup> IECA (2008), *Best Practice Erosion and Sediment Control*, International Erosion Control Association (Australasia), Picton NSW – Book 4

Based on the materials encountered in the test locations and using the methods described in Australian Standard AS 2870, it is estimated that free ground surface movements as a result of soil shrinking and swelling from normal soil moisture variations for the site in its current condition would be expected to vary between 20mm and 120mm.

## 5.7 Batter Slopes

If movement sensitive features/sections, etc are not located 'close' behind excavations, and geometry permits, battered slopes may be adopted. Provided slopes are protected from groundwater or surface water effects, the preliminary maximum cut slope angles given in the Table 9 may be used with a relatively low risk of instability for unsurcharged batters up to approximately 10m in height. Where batters exceed 5m in height, mid-slope benches (not less than 5m wide) may be required and will require detailed stability assessment on a location by location basis. Detailed stability analysis prior to bulk earthworks design finalisation will be required to confirm stable batter slopes and detailed inspection by an experienced geotechnical engineer will be required at the time of construction to confirm the stability of batter faces and the need for any supplementary mechanical support.

Table 9: Preliminary Maximum Unsurcharged Cut Batter Slopes for 'Dry' Slopes 10m High

| Material                                               |                          | Maximum Temporary Slope | Maximum Permanent Slope |
|--------------------------------------------------------|--------------------------|-------------------------|-------------------------|
| Fill (controlled – refer Section 5.3.4) <sup>(1)</sup> |                          | 1V:1H                   | 1V:2H                   |
| Gravelly/Silty/Sandy Clay, Clayey Silt                 | - stiff to hard          | 1V:1H                   | 1V:2.5H <sup>(2)</sup>  |
| Gravelly/Clayey/Silty Sand, Silty/Sandy/Clayey Gravel  | - medium dense to dense  | 1V:2H                   | 1V:3H                   |
| Siltstone/Sandstone/Mudstone                           | - extremely low/very low | 1V:1H                   | 1V:2H                   |
|                                                        | - low                    | 1V:1H                   | 1V:1.5H                 |
|                                                        | - medium                 | 1V:0.75H <sup>(3)</sup> | 1V:1H <sup>(3)</sup>    |

<sup>(1)</sup> Note that where batter slopes exceed 5m in height mid-slope benches (not less than 5m wide) may be required

<sup>(2)</sup> Overfilled and cut back to design profile

<sup>(3)</sup> Flatter if fissured – final batter slope to be confirmed by detailed inspection during construction

If insufficient space exists for the construction of cut batters at the maximum slopes given above, mechanical excavation support will be required in order to prevent excavation instability.

At the batter angles nominated above, there may be some localised slumping of batter slopes and it will be necessary to ensure that the faces are protected from any surface water or groundwater seepage effects. It is also recommended that an allowance be made in project costings for the installation of soil nails/rock dowels and shotcrete 'as required' (or alternative 'rock fall control' means), to support localised zones of unstable material for (at least), partial support of soil and fill batters.

## 5.8 Retaining Wall Pressure

Permanent retaining wall pressures can be obtained for both 'flexible' and 'rigid' walls under drained conditions, with horizontal backfill, using a triangular pressure distribution in conjunction with the parameters given in Table 10.

Table 10: Retaining Wall Design Parameters

| Material Type                                         | Strength        | Total Weight (t/m <sup>3</sup> ) | Flexible Wall 'Active' Pressure Coefficient (k <sub>a</sub> ) | Rigid Wall 'At Rest' Pressure Coefficient (k <sub>o</sub> ) |
|-------------------------------------------------------|-----------------|----------------------------------|---------------------------------------------------------------|-------------------------------------------------------------|
| Fill                                                  | controlled      | 1.9                              | 0.4                                                           | 0.6                                                         |
| Gravelly/Silty/Sandy Clay, Clayey Silt                | stiff to hard   |                                  |                                                               |                                                             |
| Gravelly/Clayey/Silty Sand, Silty/Sandy/Clayey Gravel | medium dense    | 2.0                              | 0.3                                                           | 0.5                                                         |
|                                                       | dense           | 2.2                              | 0.25                                                          | 0.4                                                         |
| Siltstone/Sandstone/Mudstone                          | extremely low   | 2.3                              | 0.4                                                           | 0.5                                                         |
|                                                       | very low to low |                                  | 0.3                                                           | 0.45                                                        |
|                                                       | medium          |                                  | 0.2                                                           | 0.3                                                         |

Due allowance must also be included in the calculation of wall pressure for groundwater pressure, back fill compaction, surcharge effects from adjacent structures and/or construction loading, the effects of sloping retained materials, reactive soil/fill pressures etc.

Even if a drainage system is installed behind retaining walls, consideration should be given to the potential for water pressures to act on the wall as elevated groundwater levels may occur during or following prolonged 'wet' weather, or from blocked drainage etc. Drain design should incorporate free draining backfill and slotted pipe discharging into a sealed disposal system.

### 5.9 Pavement and Slab Subgrade Properties

Subgrade properties may vary significantly over the site following bulk earthworks and detailed subgrade testing will be required at the time of construction in order to confirm design values. For the purposes of initial costing and preliminary design the subgrade values given in Table 11 may be adopted.

Table 11: Preliminary Subgrade Design Values

| Subgrade Material                                                   | CBR (%) <sup>(1)</sup> |
|---------------------------------------------------------------------|------------------------|
| Gravelly/Silty/Sandy Clay, Clayey Silt (Natural or Controlled fill) | 1 – 5                  |
| Gravelly/Clayey/Silty Sand                                          | 3 – 6                  |
| Silty/Clayey Gravel                                                 | 6 – 15                 |
| Sandy Gravel                                                        | 15 – 40                |
| Rock – extremely low to low strength <sup>(2)</sup>                 | 5 – 10                 |
| Rock – remoulded medium strength <sup>(3)</sup>                     | 20 – 50                |

<sup>(1)</sup> For transient loading only

<sup>(2)</sup> In-situ material will break down under the action of construction plant to form material with clay like properties

<sup>(3)</sup> Potentially variable and should be confirmed during construction

Any 'weathered' rock in the subgrade may break down significantly under the action of the general excavation equipment and tracked plant. As a result, if extremely low to very low/low strength rock is exposed at subgrade level or is used as fill, recompaction will result in a 'clayey' subgrade with properties significantly degraded below those of undisturbed rock.

Reactive subgrade materials should not be allowed to 'dry out', otherwise significant softening and swell movements on 'wetting up' could potentially occur.

### 5.10 Foundations

In order to minimise potential differential foundation settlements, all footings to individual structures should be fully supported in the same quality material underlying the structure, unless each structure can be designed and detailed to be relatively flexible (e.g. footings to individual structures should not be supported in both clays/fill and rock). Maximum allowable working bearing pressures are given in Table 12 for foundation sizing.

Ultimate bearing stress design values can be obtained by multiplying the working stress bearing pressure values given in Table 12 by 2.5.



*Table 12: Maximum Working Stress Design Parameters for Footings*

| Founding Material                                        | Strength      | Maximum Allowable Working Bearing Pressure <sup>(1)</sup><br>(kPa) |
|----------------------------------------------------------|---------------|--------------------------------------------------------------------|
| Fill – controlled                                        | Level 1       | 100                                                                |
| Gravelly/Silty/Sandy Clay, Clayey Silt                   | stiff         | 100                                                                |
|                                                          | very stiff    | 200                                                                |
|                                                          | hard          | 350                                                                |
| Gravelly/Clayey/Silty Sand,<br>Silty/Sandy/Clayey Gravel | medium dense  | 150 <sup>(2)</sup>                                                 |
|                                                          | dense         | 350 <sup>(2)</sup>                                                 |
| Siltstone/Sandstone/Mudstone                             | extremely low | 500                                                                |
|                                                          | low           | 1,000                                                              |
|                                                          | medium        | 2,500                                                              |

<sup>(1)</sup> Not underlain by any 'softer' zones within the zone of footing influence

<sup>(2)</sup> Preliminary only – subject to footing dimensions, depth and groundwater level

All foundation excavations should be inspected by an experienced geotechnical engineer prior to casting, to confirm adequate bearing capacity (and final foundation dimensions/depths) and all footing excavations should be clean, dry and free of loose/softened materials immediately prior to casting. If footing excavations are to remain open for longer than ten hours prior to casting (which is not recommended) and/or wet weather is likely, it is suggested that a concrete blinding layer be cast in the base to prevent moisture ingress (and base softening).

At the values of stress given in Table 12 individual footing settlement would not be expected to exceed 1.0% to 1.5% of footing width for a properly constructed footing. Actual foundation settlements should be checked by analysis once footing size, layout, and loads are confirmed.

## SECTION 6 - POTENTIAL UNDERMINING EFFECTS

### 6.1 **Subsidence Estimation Theory**

The Moreton Geotechnical Services report has been used to assess the potential for ground surface subsidence to occur as a result of past mining activities and to estimate the magnitude of the subsidence. It is intended that the subsidence estimates can then be used in a preliminary structural assessment and design of foundation systems that can accommodate (where possible), these effects without compromising the structural integrity of the overlying residential building.

Four broad methods have typically been adopted in the published literature to predict the ground subsidence, including:

- methods based on elastic solutions;
- empirical methods based on the past records;
- physical modelling; and
- numerical modelling.

Of these methods, empirical methods are the most widely used and are able to generate acceptably accurate predictions, if sufficient data has been observed in the same or similar mining area. For example, the predicted subsidence parameters based on the *Subsidence Engineer's Handbook* (SEH) published by the UK Coal Board generally produce results that are within 10% of measured values for coalfields in the UK (Waddington 2009). However, subsidence estimates historically determined using the SEH when used in Australian Coalfields are generally reported as much higher than the actual measured subsidence, because of different geological conditions.

Research has been carried out by the New South Wales Department of Mineral Resources to develop a prediction method suitable for Australian conditions. The research work produced three publications specifically for predicting subsidence parameters in the Southern Coalfields, the Newcastle Coalfields and the Western Coalfields of New South Wales. The research results are used for the estimation of the subsidence generated by a single longwall panel and have been used previously in the Ipswich area for subsidence assessments.

An incremental profile method has also been developed (Holla 1987), based on the superposition of the subsidence caused by excavation of each panel in a series of longwall panels, to extend the above methods for a single panel to multiple panels. With sufficient field recording of the subsidence data during the early stages of mining, a more accurate prediction can be made for the likely subsidence parameters in a future mining operation in the same area, or in an area with similar geological conditions.

The empirical methods presented by Holla (1987) are applicable to workings that are deeper than 60m below ground surface level and have been used in this report to investigate potential mining subsidence from the Aberdare No.8 Colliery. There is some information contained within the Moreton Geotechnical Services report on the relative depths of the various coal seams mined, but these depths are not specifically and quantitatively nominated for the various locations. However, the report does indicate that the open cut methods removed the mine workings in a significant part of the site, and it therefore inferred that there will be workings that are at shallower depth. For these shallower workings, analysis of the subsidence troughs generated from ground movements associated with tunnel collapse has been carried out using empirical methods based on a Gaussian curve as outlined by Peck (1969), O'Rielly and New (1982) and extended by O'Rielly and New (1991). These methods are commonly used in assessment of subsidence as a result of tunnel construction.

Ground movements are based on the assumption that the subsidence trough at the ground surface perpendicular to the line of a tunnel can be approximated by a Gaussian curve. The actual Gaussian curve profiles can be altered by changes in ground profile and the presence of structures.

Figure 2 shows the general case of an advancing tunnel with its axis at depth below ground level. Collapse of the tunnel results in ground settlements with a settlement trough developing above and ahead of the tunnel.

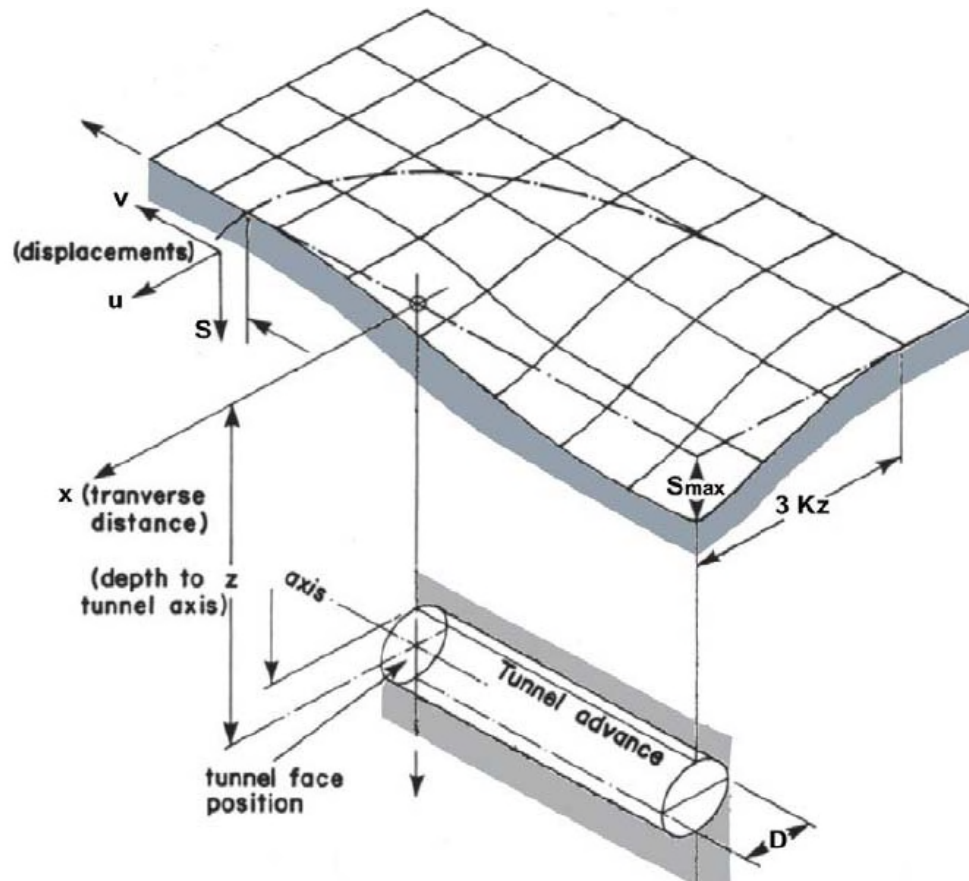


Figure 2: Settlement trough above a tunnel (Attewell et al, 1986)

The fundamental parameters that underlie the empirical method used to estimate subsidence using a Gaussian curve are the volume loss and a trough width parameter. Volume loss can be defined as the ratio of the collapsed ground over the volume of the tunnel/workings per unit length of tunnel/workings. The trough width parameter models the way in which deformations are transferred through the ground, defining the width of the trough generated at the ground surface.

For near surface settlements, O'Rielly and New (1982) showed that the horizontal distance from the tunnel centreline to the point of inflexion on the settlement trough is an approximately linear function of the depth and broadly independent of tunnel construction method, and this was confirmed by Rankine (1988). Values of the trough width parameter may require some judgement, since it depends on whether the ground is primarily cohesive or granular. Generally, for tunnels in clay strata, the full width of the transverse settlement trough is about three times the depth of the tunnel crown below ground surface.

When two or more tunnels are likely to be present (as is the case for the mine workings that are believed to have occurred at the site based on the excerpts of the mine plans included in the Moreton Geotechnical Services report) it is generally assumed that the predicted ground movements for each tunnel acting independently can be superimposed.

The subsidence parameters significant to the estimation of potential structural damage to overlying residences, include the vertical displacement, tilt, horizontal ground strain and curvature of the ground surface. Their relationship for a single longwall panel is shown in Figure 3.

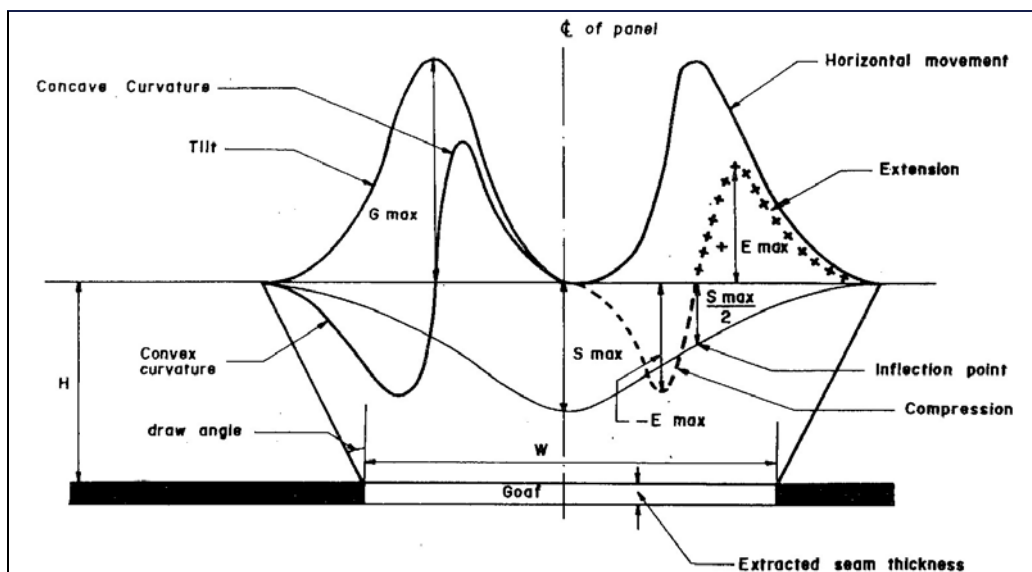


Figure 3: Relationship between different subsidence parameters (Waddington 2009)

Subsidence caused by underground mining is the result of a complicated interaction between the soil/rock, mining void and geological features existing in the ground. The characteristics of the subsidence parameters depend on a large number of factors relating to the above three broad aspects, including the geometry of the excavation, depth of excavation, geometry of pillars and walls, modulus and strength (and their variation) of the overburden rock, characteristics of geological structures (e.g. fault, joint, bedding plane etc.) and environmental changes among others. Due to the extreme difficulty in giving an adequate description of the problem itself, any attempt to predict the mining induced ground subsidence has to involve a certain degree of simplification and uncertainty.

## 6.2 Reported Mining Activity

Based on the Moreton Geotechnical Services report, five areas of mining subsidence have been identified and are summarised in Table 13 and the interpreted locations of these areas are indicated in **Error!** **Reference source not found..**

Table 13: Underground Mine Workings Areas

| Area (see <b>Error!</b> Reference source not found.) | Description                                                                                              |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| A                                                    | One level of underground mine workings in the Cochrane Seam (Cochrane Seam not described in the report). |
| B                                                    | Backfilled open cut over mine working in the Rob Roy Seam                                                |
| C                                                    | Two levels of underground mine workings in the Four Foot Top Seam and the Four Foot Seam                 |
| D                                                    | Four levels of underground mine workings in the Four Foot Top Seam, the Four Foot Seam, the Striped      |



|   |                                                                                                                                           |
|---|-------------------------------------------------------------------------------------------------------------------------------------------|
|   | Bacon Seam and the Rob Roy Seam                                                                                                           |
| E | Backfilled open cut and surface disturbance over two levels of underground mine workings in the Four Foot Top Seam and the Four Foot Seam |



Figure 4: Underground mine workings areas from Moreton Geotechnical Services report

It should be recognised that the methodology adopted has some limitations. Firstly, full details of the mining carried out are not and presumably, because the works were carried out between the 1870's and the 1960's, no detailed ground surface observation was normally required and there are therefore no specific field data available to calibrate the currently available subsidence estimation methods. Secondly, the currently used empirical methods mostly deal with the instantaneous response of the ground subsidence observed during the mining operation, rather than 'longer term' subsidence. Published field data sometimes include a delayed response, generally in the order of days and months (but not decades) and very few field data are available for subsidence several decades after the end of mining operations.

The empirical method based on the use of a Gaussian curve for tunnelling has been adopted in order to estimate the potential subsidence for shallow workings. The following assumptions about the geometry of the mining excavations have been included in the current subsidence assessment:

- cuts of approximately 5.5m wide
- pillars of approximately 12m wide
- seam thickness of 1.5m

- up to five cuts were considered to run parallel to each other
- it was assumed that an additional 15% of the void space may still collapse

The parameters and method discussed above have then been applied adopting 20m of cover to the shallowest mined seam, then 5m from the Four Feet Top Seam workings to the Four Feet Seam Workings, then 20m depth separation to the lower Striped Bacon Seam and Rob Roy Seam. Where multiple depths of workings exist over each other the results have been combined using superposition.

### 6.2.1 20m Cover to Single Seam Workings

The calculated maximum subsidence parameters for a single depth of underground mine workings with 20m cover having undergone assumed additional collapse using this method are presented in Table 14. An idealised surface subsidence profile plotted with horizontal displacements and strains is shown in Figure 5.

Table 14: Maximum Subsidence Parameters for Continued Collapse of a Single Tunnel with 20m Cover

| Subsidence Parameters   | Calculated Values |
|-------------------------|-------------------|
| Subsidence              | 92mm              |
| Horizontal Displacement | 28mm              |
| Tensile strain          | 1.24mm/m          |
| Compressive strain      | -1.30mm/m         |
| Tilt                    | 2.81mm/m          |
| Angular distortion      | 1 in 281          |

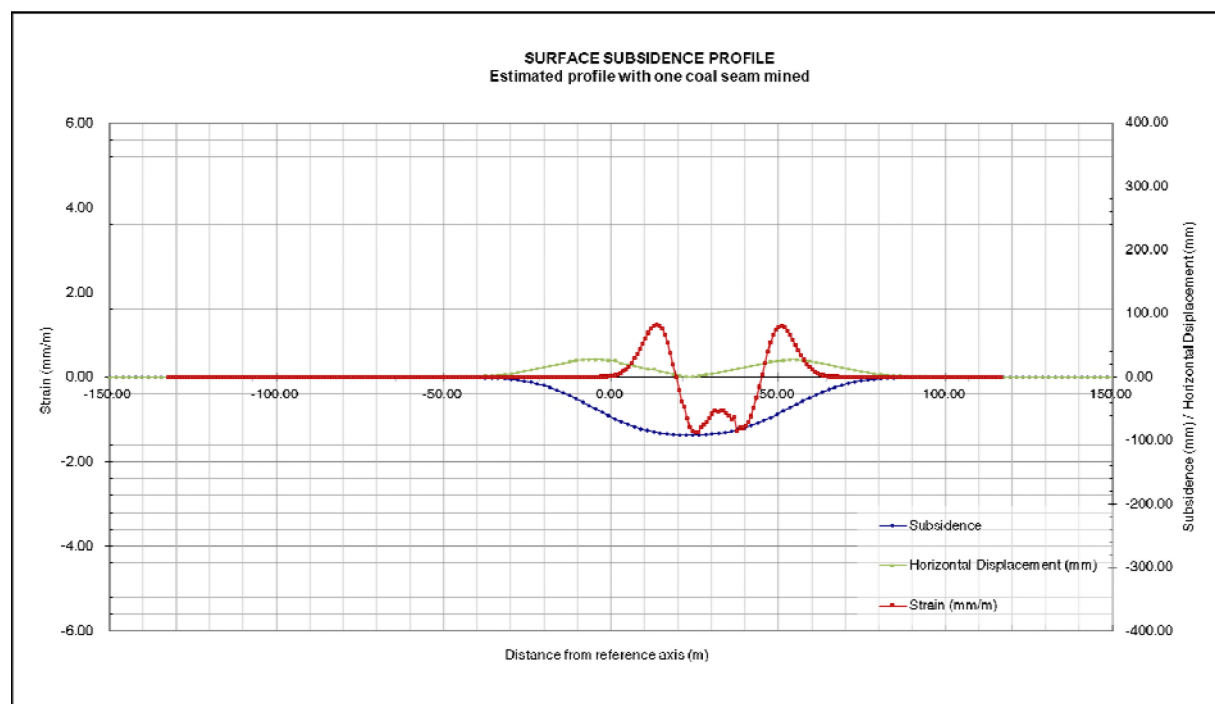


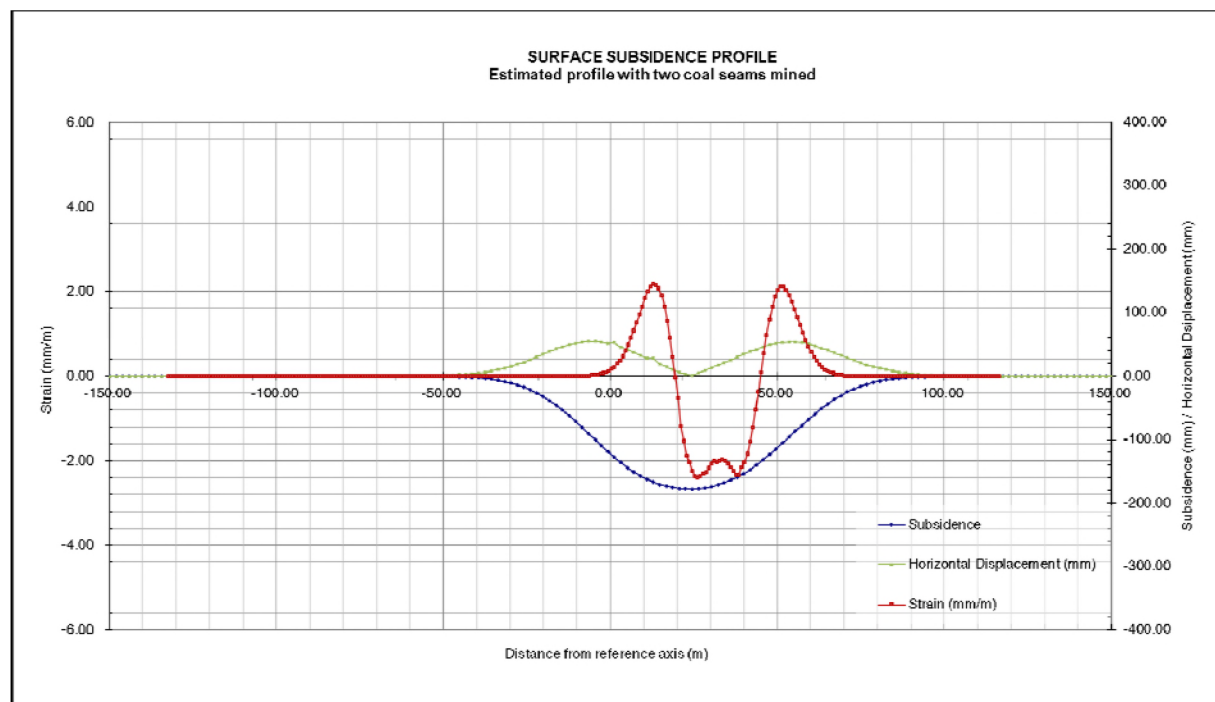
Figure 5: Subsidence profile for continued collapse of a single level of workings with 20m cover

### 6.2.2 20m Cover to Two Levels of Workings

The calculated maximum subsidence parameters for two levels of underground mine workings within the Four Foot Top Seam and the underlying Four Foot Seam, with 20m cover to the upper level of workings, having undergone assumed additional collapse using this method are presented in Table 15. An idealised surface subsidence profile plotted with horizontal displacements and strains is shown in Figure 6.

**Table 15: Maximum Subsidence Parameters for Continued Collapse of a Single Tunnel with 20m Cover**

| Subsidence Parameters   | Calculated Values |
|-------------------------|-------------------|
| Subsidence              | 178mm             |
| Horizontal Displacement | 54mm              |
| Tensile strain          | 2.16mm/m          |
| Compressive strain      | -2.41mm/m         |
| Tilt                    | 5.02mm/m          |
| Angular distortion      | 1 in 199          |



**Figure 6: Subsidence profile for continued collapse of two levels of workings with 20m cover**

### 6.2.3 20m Cover to the First of Four Levels of Workings

The calculated maximum subsidence parameters for a four levels of underground mine workings with 20m cover to the upper most level of the workings are presented in Table 16 and assume that the workings have undergone initial collapse. An idealised surface subsidence profile plotted with horizontal displacements and strains is shown in Figure 7.

**Table 16: Maximum Subsidence Parameters for Continued Collapse of a Single Tunnel with 20m Cover**

| Subsidence Parameters   | Calculated Values |
|-------------------------|-------------------|
| Subsidence              | 208mm             |
| Horizontal Displacement | 69mm              |
| Tensile strain          | 1.60mm/m          |
| Compressive strain      | -2.80mm/m         |
| Tilt                    | 4.61mm/m          |
| Angular distortion      | 1 in 216          |

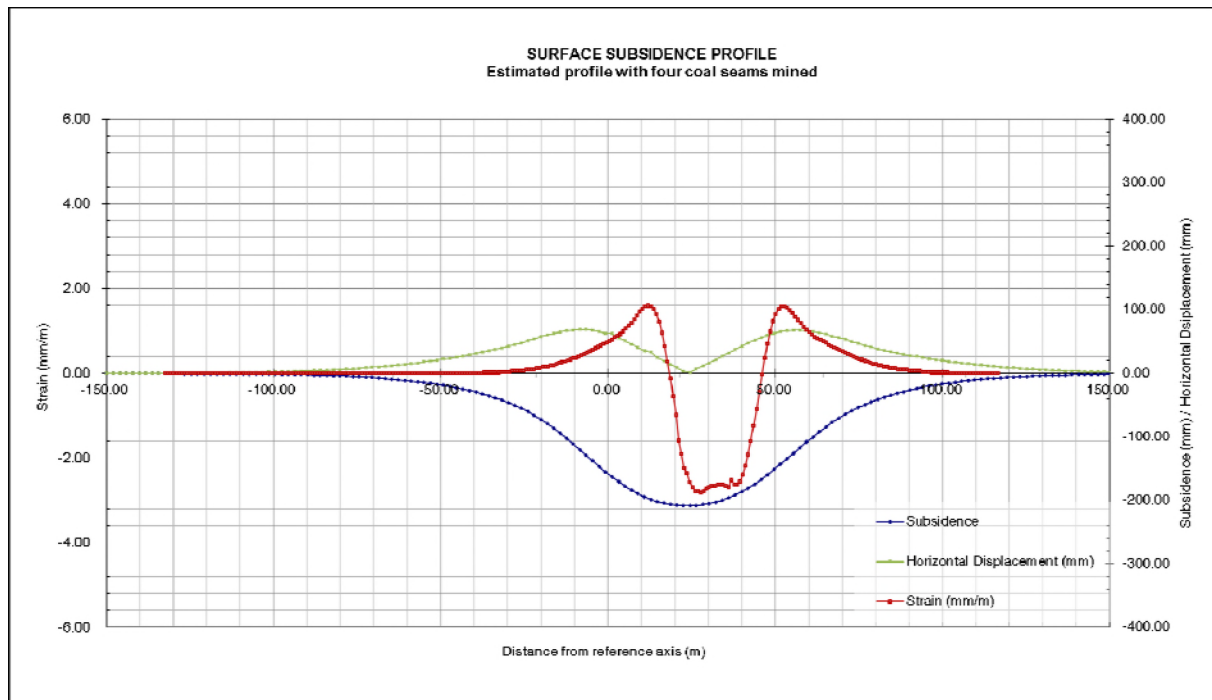


Figure 7: Subsidence profile for continued collapse of four levels of workings with 20m cover

### 6.3 Implications to Foundation Design

***Footing design is dictated by the combined effect of the mining subsidence and geotechnical conditions encountered at the site. Appropriate footings should be designed to suit the type of structures to be built and to accommodate the specific geotechnical and estimated mining subsidence parameters. The comments given below relate only to mining subsidence and a separate assessment of bearing capacity, soil reactivity etc. must also be undertaken as part of the footing design process.***

***It should be noted that several of the comments below also relate to the damage effects of subsidence on 'conventional' construction where no specific structural design has been undertaken to accommodate the potential subsidence related ground movements.***

#### 6.3.1 **Potential Structural Damage**

The overall magnitude of the vertical deflection as a result of potential mine subsidence must be assessed by the structural engineers, but it can be less important than the differences in vertical movement across a particular structure and the resultant horizontal ground strain induced by differential vertical movements. Structural damage as a result of mining subsidence will be influenced by each of the following factors, usually in combination:

- tilt or differential settlement;
- horizontal ground strain; and
- angular distortion and ground surface curvature.

Conventional building construction types can be compared against the likely magnitude/nature of the subsidence, or, specific structural design of foundations can be undertaken to accommodate the parameters given (e.g. potentially introducing additional reinforcement into concrete slabs to resist tensile forces/bending moments, incorporating additional movement tolerance by structural detailing etc.).

In the following sections, the damage categories described in Table 17 have been adopted and commentary about anticipated types of building construction likely to be acceptable in various areas is based on the likelihood of some damage up to Category 2 – Slight, being acceptable.

*Table 17: Damage Categories based on Extent of Damage (Waddington 2009)*

| Damage Category  | External Cracking                                                                   | Internal Cracking                                                                   | Loss of Bearing                                                                  | Extent of Damage                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Types of Repair Likely to be Required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NO DAMAGE        | None                                                                                | None                                                                                | None                                                                             | No visible damage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | No repairs required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 0<br>NEGLIGIBLE  | Several hairline cracks in one or more walls.                                       | Several cracks up to 1mm in one or more walls.                                      | Displacement at end of beam or lintel or at damp-proof course less than 1mm.     | Difficult to distinguish between mine subsidence impact & normal pre-existing cracks. Any cracks in the building are generally considered to have negligible structural implications. This type of damage can be expected to occur in almost all buildings at any location & are not generally related to subsidence or foundation movement. Tilts less than 2mm/m.                                                                                                                  | Internally, repairs are generally not required, but minor cracks can be filled & the walls & ceilings can be redecorated if necessary. Externally, cracks are rarely visible & remedial works are not normally required. Minor adjustment may be required to one or two doors.                                                                                                                                                                                                                                          |
| 1<br>VERY SLIGHT | Several cracks up to 2mm in one or more walls that can be easily repaired.          | Several cracks 1mm to 2mm in one or more walls that can be easily repaired.         | Displacement at end of beam or lintel or at damp-proof course 1mm to 2mm.        | These cracks may occasionally have some minor structural significance. Often these cracks are more visible inside buildings than in external brickwork. Would generally be located at points of structural weakness in building, e.g. window/door openings. Some doors or windows might stick slightly & need adjustment. Tilts 2mm/m to 5mm/m.                                                                                                                                      | Internally cracks can be repaired. Wall coverings may need to be replaced. Wall tiles may need to be re-grouted. Cracked tiles may need to be replaced. Minor adjustment may be required to multiple doors & windows. Externally cracks may be visible & sometimes repairs will be required for weathertightness or aesthetic reasons. Some adjustment to roof gutters might be required.                                                                                                                               |
| 2<br>SLIGHT      | Several cracks 2mm to 5mm in one or more walls that require only localised repairs. | Several cracks 2mm to 5mm in one or more walls that require only localised repairs. | Displacement at end of beam or lintel or at damp-proof course 2mm to 5mm.        | Larger cracks could have some structural significance & will almost always occur at points of weakness or hinge points. In some cases the structural integrity of the building might need to be checked. Generally cracks will be visible internally & externally & will indicate foundation or other structural movement enough to distort door & window frames & make doors & windows stick. Weathertightness may be an issue that needs to be investigated. Tilts 5mm/m to 7mm/m. | It is likely that internal cracks will need to be raked out & repaired to a recognised specification. Wider cracks may need to be cut back & repaired with expanded metal & plaster, prior to redecoration. Wall coverings will need to be replaced. Doors & windows will need adjustment. Small areas of tiling may need to be replaced. Externally cracks will require raking out & sealing. Small sections of cracked brickwork may require replacement. Roof gutters & wet area floor levels might need adjustment. |
| 3<br>MODERATE    | Several cracks 5mm to 15mm                                                          | Several cracks 5mm to 15mm                                                          | Displacement at end of beam or lintel or at damp-proof course 5mm to 15mm.       | There will almost certainly be some compromise of the integrity of the structure & weathertightness may be impaired. Serious distortion may be occasioned to door & window frames & glass fracturing is possible, as could be service fractures & straining. Tilts 7mm/m to 10mm/m.                                                                                                                                                                                                  | Internally cracks will need to be raked out & repaired to a recognised specification. In some cases, sections of plasterboard may need to be replaced. Large areas of tiling may need to be replaced. Realignment of door & window frames may be required. External cracks might require reconstruction of a panel of brickwork. Building might require levelling.                                                                                                                                                      |
| 4<br>SEVERE      | Several cracks 15mm to 25mm                                                         | Several cracks 15mm to 25mm                                                         | Displacement at end of beam or lintel or at damp-proof course 15mm to 25mm.      | Structural integrity severely compromised. Floors loping, walls leaning or bulging. Bearings of beams/intels suspect. Pipe fractures & straining likely. Windows broken. Tilts 10mm/m to 20mm/m.                                                                                                                                                                                                                                                                                     | Major reconstruction works to both internal & external wall skins are likely to be required. Replacement & realignment of window & door frames may be necessary. Building will probably require levelling due to tilt or curvature. Cost of repairs is less than cost of rebuilding.                                                                                                                                                                                                                                    |
| 5<br>VERY SEVERE | Several cracks greater than 25mm                                                    | Several cracks greater than 25mm                                                    | Displacement at end of beam or lintel or at damp-proof course greater than 25mm. | Potential danger from failed or fractured structural elements & potential instability of the building structure. Safety issues must be considered. Tilts greater than 20mm/m.                                                                                                                                                                                                                                                                                                        | Major reconstruction works to both internal & external wall skins will be required & levelling will almost certainly be required. Replacement of windows & doors, plus other structural elements likely to be necessary. Demolition & rebuild will need to be considered. Cost of repairs could exceed cost of rebuilding.                                                                                                                                                                                              |



### 6.3.2 Potential Damage Due to Ground Tilt

A tilt threshold of 1 in 150 (or 6.6mm/m) has been found (Maconochie et al 1992) to cause minor structural damage and noticeable cosmetic damage for residences constructed using conventional slab construction in the Ipswich area without specific allowance for subsidence induced movements. Typical allowable differential movements for design of footings and rafts range from 1 in 300 (or 3.33mm/m) for a clad frame residential structure, through to 1 in 2000 (or 0.5mm/m) for full masonry residential construction.

### 6.3.3 Potential Damage Due to Horizontal Ground Strain

The National Coal Board of the United Kingdom has published a method (reproduced in Figure 8) to assess the potential impacts of mining on structures and this method relates the level of ground strain and the length of the building to the potential level of damage. The damage categories noted in Figure 8 are those described in Table 17.

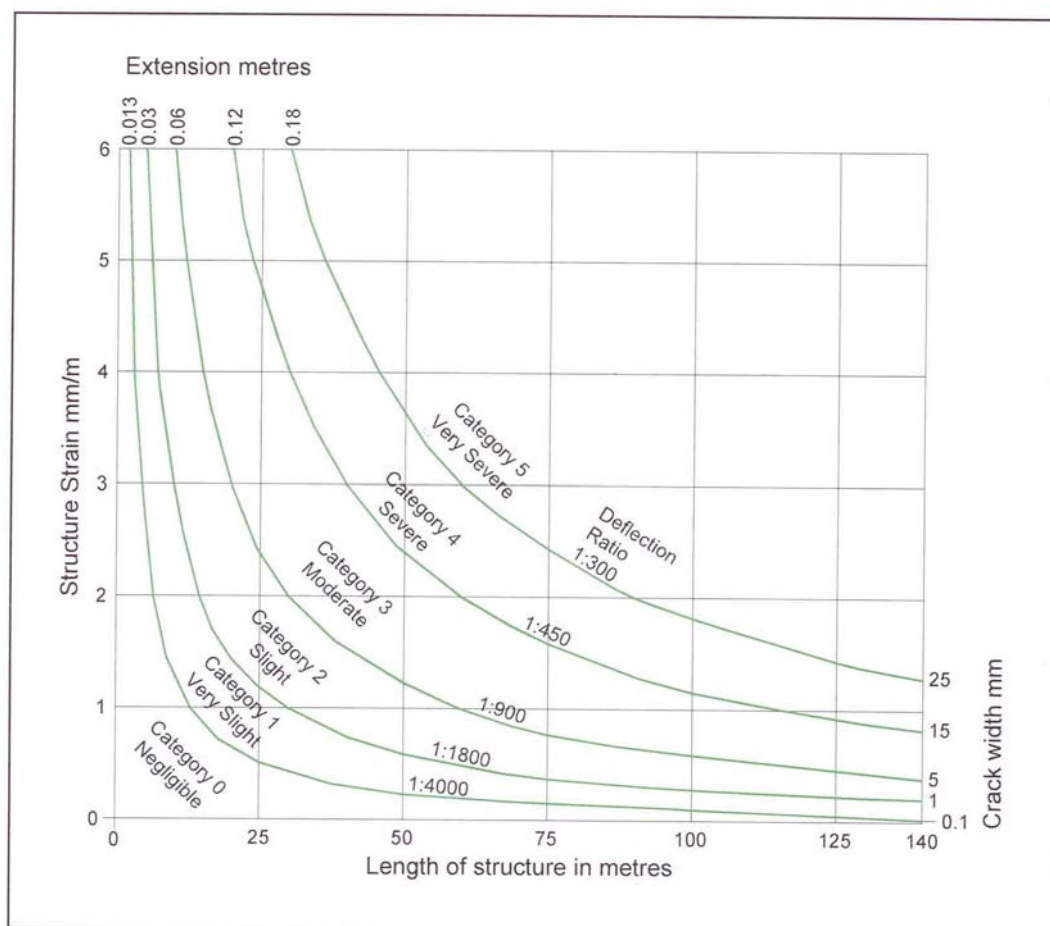


Figure 8: Damage classification based on horizontal ground strain and building length for two storey brick structures

It is important to note that not all of the calculated ground surface strains will be transferred to the structure. Where flat slabs are adopted and are cast over bedding sand and a damp proof membrane, then significantly less ground strain will be transferred to the structure compared to a structure founded on a series of parallel strip footings running perpendicular to the predicted ground strain direction. Past experience in the NSW coalfields (Waddington 2009) has suggested that possibly as little as 25% of the ground strain gets transferred to the structure for a typical slab on ground construction.

### 6.3.4 Angular Distortion

As well as the tensile and compressive ground strains, the subsidence profile includes an angular distortion and typical damage criteria based on the combination of angular distortion and tensile strain needs to be considered in structural design. As a guide to structure performance under the combined effects of angular distortion and ground strain for masonry load bearing wall structures on a conventional foundation that is undermined, the damage categories presented in Figure 9 could be adopted.

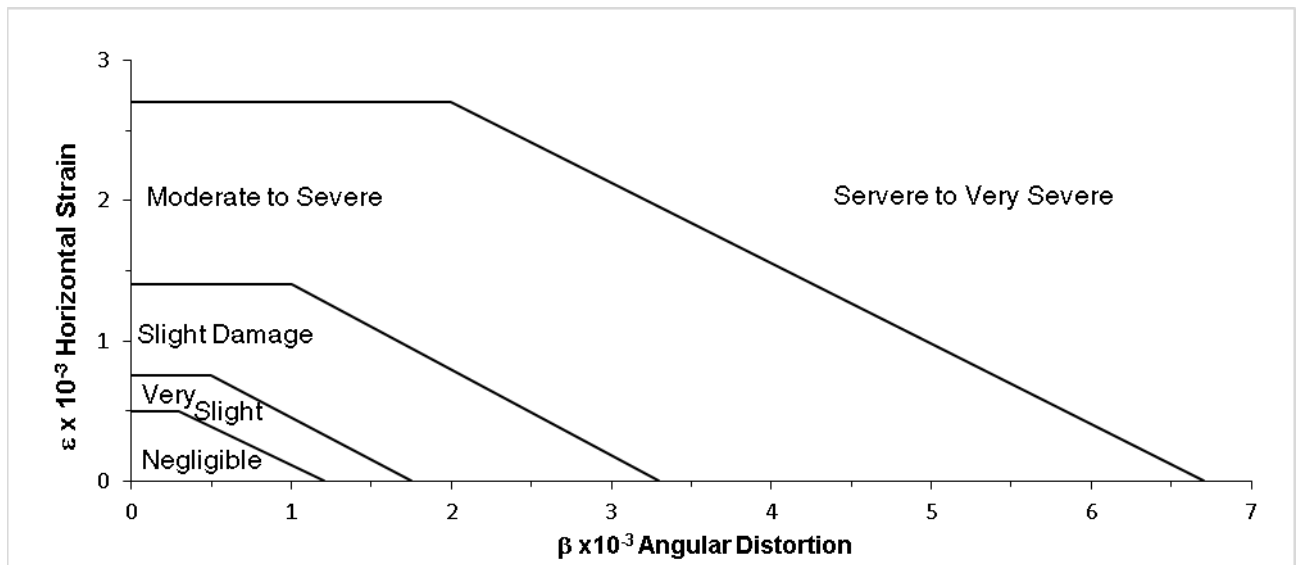


Figure 9: Damage Criteria for Masonry Bearing Wall Structures

The effects of ground curvature also need to be considered and limits based on deflection ratio (defined as the ratio of the mid span deflection measured from a straight line connection the two ends of a foundation to the length of the foundation) are common in the literature. Suggested construction types are given in Table 18 for various types of structure constructed on a conventional on ground slab and subject to a range of deflection ratio limits.

Table 18: Allowable Deflection Ratios for Different Types of Wall Construction (Waddington 2009, after Holla 1987)

| Type of Wall             | Deflection Ratio | Controlling Element                           |
|--------------------------|------------------|-----------------------------------------------|
| Solid Masonry            | 1/2000           | Plaster                                       |
| Articulated Masonry      | 1/800            | Internal Brickwork                            |
| Brick Veneer             | 1/500            | External Brickwork                            |
| Articulated Brick Veneer | 1/300            | Internal Plaster                              |
| Timber or Prefabricated  | 1/200            | Internal Linings and Door and Window openings |

### 6.4 Sinkhole Risk

Where there are undocumented workings and/or tunnel entries and shafts, it is considered that potentially significant and unquantifiable risk of sinkhole development exists. It is considered that this risk is greatest in the area where the coal seams daylight and the adjoining area to the west where they are expected to exist at shallow depth.

All tunnel entries and shafts should be capped/backfilled as part of any future development of the site.

## **6.5     Additional Investigation**

It is recommended that additional geotechnical investigation be carried out (including geophysics and the drilling and sampling of a series of bores in the areas of identified mine workings) to provide data on the anticipated workings such that the analysis of potential subsidence can be updated with reduced uncertainty. It is possible that where tunnel entries exist at shallow depth and can be capped/backfilled and there are no intermediate underground workings, it may be possible to identify areas that are suitable for conventional construction.

### **BUTLER PARTNERS PTY LTD**

**CHRIS LUXTON**  
Geotechnical Engineer

**MIKE NEIGHBOUR**  
Principal

Reviewed by  
**HARKAMAN GURUNG**  
Principal

## SECTION 7 - REFERENCES

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# Important Information about Your Geotechnical Engineering Report

*Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.*

*While you cannot eliminate all such risks, you can manage them. The following information is provided to help.*

## **Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects**

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

## **Read the Full Report**

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## **A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors**

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

## **Subsurface Conditions Can Change**

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

## **Most Geotechnical Findings Are Professional Opinions**

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## **A Report's Recommendations Are *Not* Final**

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual



subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

## **A Geotechnical Engineering Report Is Subject to Misinterpretation**

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

## **Do Not Redraw the Engineer's Logs**

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

## **Give Contractors a Complete Report and Guidance**

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time to perform additional study.* Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

## **Read Responsibility Provisions Closely**

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

## **Geoenvironmental Concerns Are Not Covered**

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

## **Obtain Professional Assistance To Deal with Mold**

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

## **Rely on Your ASFE-Member Geotechnical Engineer for Additional Assistance**

Membership in ASFE/THE BEST PEOPLE ON EARTH exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910  
Telephone: 301/565-2733 Facsimile: 301/589-2017  
e-mail: [info@asfe.org](mailto:info@asfe.org) [www.asfe.org](http://www.asfe.org)

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**Butler Partners**  
geotechnical • geo-environmental • groundwater



Butler Partners Pty Ltd  
ABN 14 816 574 888  
2/23 Traders Way  
Currumbin Queensland 4223  
PO Box 234  
Currumbin LPO  
Queensland 4223  
Ph: 61 7 5535 2539  
enquiries@butlerpartners.com.au



Site



UGD Reference: Map 214 Grid R11 (ACS.v8) nbs

## Residential Subdivision Development

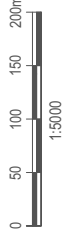
Whitwood Road, Ebbw Vale

Locality Plan and Test Locations

Chum Street Land Evolution Pty Ltd

CLIENT:

SCALE AT A3:



|             |           |
|-------------|-----------|
| DATE:       | JULY 2022 |
| DRAWN:      | LA        |
| APPROVED:   |           |
| PROJECT No: | 022-135A  |
| DRAWING No: | 1         |
| REV:        | B         |

# **APPENDIX A**

## **TEST PIT AND BORE REPORT SHEETS WITH EXPLANATORY NOTES**

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 1

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:** RL61.3m\*

| Depth (m) | Description                                                                             | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>SILTY CLAY (CH)</b><br>- very stiff, red-brown, trace of fine to coarse grained sand | 61.3   |           |             | 0.0              | pp=250       |
|           |                                                                                         | 61.0   |           |             |                  |              |
|           |                                                                                         |        |           |             | 0.8              |              |
| 1         | - hard, with fine to coarse grained sand                                                |        |           | U           | 1.1              | pp>600       |
|           |                                                                                         | 60.0   |           |             | 1.5              | pp>600       |
| 2         | - very stiff                                                                            |        |           |             | 2.0              | pp=480       |
|           |                                                                                         | 59.0   |           |             |                  |              |
|           |                                                                                         |        |           |             | 2.6              | pp>600       |
|           | <b>SANDY CLAY (CL)</b><br>- hard, red-brown, fine to coarse grained sand                |        |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                  |        |           |             |                  |              |
|           |                                                                                         | 58.0   |           |             |                  |              |
| 4         |                                                                                         |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482524

**Coordinates:** N: 6945661



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 2

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:** RL61.3m\*

| Depth (m) | Description                                                                                                          | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>CLAYEY SILT (ML)</b><br>- stiff, dark brown, with fine to medium grained sand                                     | 61.3   |           |             | 0.0              | pp=170       |
|           | <b>SILTY CLAY (CH)</b><br>- stiff, red-brown, with fine to coarse grained sand                                       | 61.0   |           | D           | 0.3              | pp=160       |
|           | <b>SILTY CLAY (CL)</b><br>- stiff to very stiff, orange-brown mottled grey, with fine to coarse grained sand         |        |           | D           | 0.8              | pp=300       |
| 1         |                                                                                                                      |        |           | B           | 1.0              |              |
|           |                                                                                                                      | 60.0   |           |             | 1.2              |              |
|           | <b>MUDSTONE (DW)</b><br>- medium strength, brown with orange mottling, fine grained                                  |        |           | D           | 1.6              |              |
|           | <b>SILTY CLAY (CI)</b><br>- very stiff to hard, pale grey with orange mottling, trace of fine to medium grained sand |        |           |             | 1.7              |              |
| 2         |                                                                                                                      | 59.0   |           |             | 2.5              | pp=400       |
| 3         | End of Test Pit at 3 m                                                                                               | 58.0   |           |             |                  |              |
| 4         |                                                                                                                      |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482543

**Coordinates:** N: 6945687

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 3

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:** RL69.5m\*

| Depth (m) | Description                                                                                                                                      | RL (m) | Lithology | Sample Type | Sample Depth (m)  | Test Results |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|-------------------|--------------|
| 0         | <b>FILL</b><br>- red-brown and grey mottled, gravelly silty clay, fine to coarse sub-angular to angular gravel, with fine to coarse grained sand | 69.5   |           |             |                   |              |
|           | <b>GRAVELLY SILTY CLAY (CL)</b><br>- hard, red-brown and pale grey mottled, fine to medium angular gravel, trace of fine to coarse grained sand  | 69.0   |           | D           | 0.5<br>0.6<br>0.7 | pp>600       |
| 1         |                                                                                                                                                  | 68.0   |           |             | 1.6               | pp>600       |
| 2         |                                                                                                                                                  | 67.0   |           | D           | 2.7<br>2.8        | pp>600       |
| 3         | End of Test Pit at 3 m                                                                                                                           | 66.0   |           |             |                   |              |
| 4         |                                                                                                                                                  |        |           |             |                   |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482597

**Coordinates:** N: 6945664

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 4

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:** RL75.8m\*

| Depth (m) | Description                                                                              | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>MUDSTONE (DW)</b><br>- very low to low strength, grey and brown mottled, fine grained | 75.8   |           |             |                  |              |
|           |                                                                                          |        |           |             | 0.4              |              |
|           |                                                                                          | 75.0   |           | D           | 0.8              |              |
| 1         |                                                                                          |        |           |             |                  |              |
|           |                                                                                          | 74.0   |           |             |                  |              |
| 2         |                                                                                          |        |           |             |                  |              |
|           |                                                                                          |        |           |             | 2.6              |              |
|           |                                                                                          | 73.0   |           | D           | 2.8              |              |
| 3         | End of Test Pit at 3 m                                                                   |        |           |             |                  |              |
|           |                                                                                          | 72.0   |           |             |                  |              |
| 4         |                                                                                          |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482642

**Coordinates:** N: 6945737

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 5

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:** RL63.5m\*

| Depth (m) | Description                                                                                                                             | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>SANDY CLAY (CI)</b><br>- very stiff, red-brown and pale grey mottling, fine to coarse grained sand                                   | 63.5   |           |             |                  |              |
|           |                                                                                                                                         | 63.0   |           | D           | 0.5              | pp=300       |
|           | - hard                                                                                                                                  |        |           |             | 0.7              |              |
|           |                                                                                                                                         |        |           |             | 0.8              | pp>600       |
| 1         |                                                                                                                                         |        |           |             |                  |              |
|           | <b>GRAVELLY CLAY (CI)</b><br>- hard, red-brown with pale grey mottling, fine to medium angular gravel, with fine to coarse grained sand | 62.0   |           |             |                  |              |
| 2         |                                                                                                                                         |        |           |             |                  |              |
|           |                                                                                                                                         |        |           | D           | 2.2              |              |
|           |                                                                                                                                         | 61.0   |           |             | 2.4              |              |
| 3         | End of Test Pit at 3 m                                                                                                                  |        |           |             |                  |              |
|           |                                                                                                                                         | 60.0   |           |             |                  |              |
| 4         |                                                                                                                                         |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482527

**Coordinates:** N: 6945764



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 6

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:** RL62.5m\*

| Depth (m) | Description                                                                                                                                                                                                                                                                                                                                                                 | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- red-brown, silty clay, with fine to coarse grained sand, trace of fine to medium sub-angular to angular gravel<br>- brown, silty sand, fine to coarse grained sand, with fine to medium sub-rounded to angular gravel<br>- red-brown, with clay<br>- brown, gravelly silty sand, fine to coarse grained sand, fine to coarse sub-angular to angular gravel | 62.5   |           |             |                  |              |
|           |                                                                                                                                                                                                                                                                                                                                                                             | 62.0   |           |             |                  |              |
| 1         |                                                                                                                                                                                                                                                                                                                                                                             | 61.0   |           |             |                  |              |
| 2         | - trace of cobbles                                                                                                                                                                                                                                                                                                                                                          | 60.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                                                                                                                                                                                                                                                      | 59.0   |           |             |                  |              |
| 4         |                                                                                                                                                                                                                                                                                                                                                                             |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482522

**Coordinates:** N: 6945736

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 7

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL56.8m\*

| Depth (m) | Description                                                                                                                                  | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, trace of cobbles | 56.8   |           |             |                  |              |
| 1         | <b>SILTY CLAY (CL)</b><br>- very stiff, orange-brown and grey mottled, trace of fine to medium grained sand                                  | 56.0   |           | U/D         | 1.2              | pp=450       |
|           | <b>MUDSTONE (DW)</b><br>- very low to low strength, brown, fine grained                                                                      | 55.0   |           | D           | 1.5              |              |
| 2         |                                                                                                                                              |        |           |             | 1.8              |              |
| 3         |                                                                                                                                              | 54.0   |           | D           | 2.8              |              |
|           | End of Test Pit at 3 m                                                                                                                       |        |           |             | 3.0              |              |
| 4         |                                                                                                                                              | 53.0   |           |             |                  |              |

**D** Disturbed Sample

**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample

**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa

**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482451

**Coordinates:** N: 6945700

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 8

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL62.8m\*

| Depth (m) | Description                                                                                                                                            | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- grey-brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with cobbles and boulders | 62.8   |           |             |                  |              |
| 1         |                                                                                                                                                        | 62.0   |           |             |                  |              |
| 2         |                                                                                                                                                        | 61.0   |           |             |                  |              |
| 3         |                                                                                                                                                        | 60.0   |           |             |                  |              |
| 4         | End of Test Pit at 3.1 m                                                                                                                               | 59.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482525

**Coordinates:** N: 6945783

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 9

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:** RL69.8m\*

| Depth (m) | Description                                                                              | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>MUDSTONE (DW)</b><br>- very low to low strength, grey and brown mottled, fine grained | 69.8   |           | D           | 0.2              |              |
|           |                                                                                          |        |           |             | 0.5              |              |
| 1         | <b>MUDSTONE (XW)</b><br>- very low to low strength, grey and brown mottled, fine grained | 69.0   |           |             |                  |              |
| 2         |                                                                                          | 68.0   |           |             |                  |              |
|           |                                                                                          |        |           | D           | 2.4              |              |
|           |                                                                                          |        |           |             | 2.5              |              |
| 3         | End of Test Pit at 3 m                                                                   | 67.0   |           |             |                  |              |
| 4         |                                                                                          | 66.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482615

**Coordinates:** N: 6945760



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 10

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:**

| Depth (m) | Description                                                                                 | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|---------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>SANDSTONE (SW)</b><br>- medium to high strength, grey and orange mottled, coarse grained | 0.0    |           |             |                  |              |
|           |                                                                                             |        |           | D           | 0.5<br>0.6       |              |
| 1         | - red-orange                                                                                | -1.0   |           |             |                  |              |
|           |                                                                                             |        |           | D           | 1.7<br>1.9       |              |
| 2         |                                                                                             | -2.0   |           |             |                  |              |
|           | End of Test Pit at 2.4 m<br>(Refusal)                                                       |        |           |             |                  |              |
| 3         |                                                                                             | -3.0   |           |             |                  |              |
| 4         |                                                                                             | -4.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482673

**Coordinates:** N: 6945775

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 11

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL80.8m\*

| Depth (m) | Description                                                                                                                               | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- pale grey and orange, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand | 80.8   |           |             |                  |              |
|           | - dark grey, sandy gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand                                      | 80.0   |           |             |                  |              |
| 1         | - pale brown and pale grey, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand            | 79.0   |           |             |                  |              |
| 2         | - grey-brown                                                                                                                              |        |           |             |                  |              |
|           | - red-brown                                                                                                                               |        |           |             |                  |              |
|           | - grey                                                                                                                                    | 78.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                    |        |           |             |                  |              |
|           |                                                                                                                                           | 77.0   |           |             |                  |              |
| 4         |                                                                                                                                           |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482701

**Coordinates:** N: 6945839

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 12

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:** RL72.8m\*

| Depth (m) | Description                                                                                                                     | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|---------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- grey-brown, gravelly clayey sand, fine to coarse grained sand, fine to coarse angular gravel, trace of cobbles | 72.8   |           |             |                  |              |
| 1         | <b>SILTY CLAY (CI)</b><br>- very stiff, brown, trace of fine to coarse grained sand                                             | 72.0   |           | U           | 0.9<br>1.0       | pp=370       |
|           | - hard                                                                                                                          |        |           |             | 1.3              | pp>600       |
| 2         | <b>MUDSTONE (DW)</b><br>- very low to low strength, grey and brown mottled, fine grained                                        | 71.0   |           | D           | 1.8<br>2.0       |              |
|           | <b>SANDSTONE (SW)</b><br>- medium to high strength, red-orange and grey mottled, fine to coarse grained                         |        |           | D           | 2.4<br>2.6       |              |
| 3         | End of Test Pit at 3.2 m                                                                                                        | 70.0   |           |             |                  |              |
| 4         |                                                                                                                                 | 69.0   |           |             |                  |              |

**D** Disturbed Sample

**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample

**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa

**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482646

**Coordinates:** N: 6945817

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 13

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:** RL64.8m\*

| Depth (m) | Description                                                                              | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>MUDSTONE (DW)</b><br>- very low to low strength, grey and brown mottled, fine grained | 64.8   |           |             |                  |              |
| 1         |                                                                                          | 64.0   |           |             |                  |              |
|           |                                                                                          |        |           | D           | 1.3<br>1.4       |              |
| 2         |                                                                                          | 63.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                   | 62.0   |           |             |                  |              |
| 4         |                                                                                          | 61.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482588

**Coordinates:** N: 6945802

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 14

**Page No:** 1 of 1

**Date:** 23 May 2022

**Ground Surface Level:** RL62.8m\*

| Depth (m) | Description                                                                                      | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|--------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>SILTY CLAY (CI)</b><br>- very stiff, brown and grey mottled, with fine to coarse grained sand | 62.8   |           |             |                  | pp=500       |
|           |                                                                                                  |        |           | D           | 0.2              |              |
|           |                                                                                                  |        |           |             | 0.4              |              |
|           |                                                                                                  |        |           |             |                  |              |
| 1         | <b>MUDSTONE (XW)</b><br>- very low to low strength, grey and brown mottled, fine grained         | 62.0   |           | D           | 0.8              |              |
|           |                                                                                                  |        |           |             | 1.0              |              |
|           |                                                                                                  |        |           |             |                  |              |
|           |                                                                                                  |        |           |             |                  |              |
| 2         |                                                                                                  | 61.0   |           |             |                  |              |
|           |                                                                                                  |        |           |             |                  |              |
|           |                                                                                                  |        |           |             |                  |              |
|           |                                                                                                  |        |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                           | 60.0   |           |             |                  |              |
|           |                                                                                                  |        |           |             |                  |              |
|           |                                                                                                  |        |           |             |                  |              |
|           |                                                                                                  |        |           |             |                  |              |
| 4         |                                                                                                  | 59.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482562

**Coordinates:** N: 6945831



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 15

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL58.0m\*

| Depth (m) | Description                                                                                                                | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, gravelly clayey sand, fine to coarse grained sand, fine to coarse sub-rounded to angular gravel    | 58.0   |           |             |                  |              |
| 1         | - grey-brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with cobbles | 57.0   |           |             |                  |              |
| 2         | - with boulders                                                                                                            | 56.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                     | 55.0   |           |             |                  |              |
| 4         |                                                                                                                            | 54.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482542

**Coordinates:** N: 6945894

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 16

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL61.0m\*

| Depth (m) | Description                                                                                                             | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- pale brown, silty sand, fine to coarse grained sand, trace of clay                                     | 61.0   |           |             |                  |              |
|           |                                                                                                                         |        |           |             | 0.3              |              |
|           |                                                                                                                         |        |           |             | 0.4              | pp=50        |
|           |                                                                                                                         |        |           | D           |                  |              |
|           |                                                                                                                         |        |           |             | 0.8              |              |
| 1         |                                                                                                                         | 60.0   |           |             |                  |              |
|           |                                                                                                                         |        |           |             |                  |              |
|           |                                                                                                                         |        |           |             |                  |              |
|           |                                                                                                                         |        |           |             |                  |              |
| 2         |                                                                                                                         | 59.0   |           |             |                  |              |
|           |                                                                                                                         |        |           |             |                  |              |
|           |                                                                                                                         |        |           |             |                  |              |
|           |                                                                                                                         |        |           |             |                  |              |
|           | - dark grey with red mottling, silty clay, with fine to coarse grained sand, trace of fine to medium sub-angular gravel |        |           | D           | 2.7              | pp=200       |
|           |                                                                                                                         |        |           |             | 2.9              |              |
| 3         | End of Test Pit at 2.9 m<br>(Test Pit Collapsing)                                                                       | 58.0   |           |             |                  |              |
|           |                                                                                                                         |        |           |             |                  |              |
|           |                                                                                                                         |        |           |             |                  |              |
|           |                                                                                                                         |        |           |             |                  |              |
| 4         |                                                                                                                         | 57.0   |           |             |                  |              |

**D** Disturbed Sample

**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample

**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa

**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** Seepage encountered at approximately 2.2m depth during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482596

**Coordinates:** N: 6945881

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 17

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL74.3m\*

| Depth (m) | Description                                                                                                                            | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- pale grey and red mottled, clayey sand, fine to coarse grained sand, trace of fine sub-rounded gravel                 | 74.3   |           |             |                  |              |
|           | - grey-brown, sandy silty gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles              | 74.0   |           |             |                  |              |
| 1         |                                                                                                                                        | 73.0   |           |             |                  |              |
| 2         | - red-brown, dark grey and pale grey, silty sandy clay, fine to coarse grained sand, with fine to coarse sub-rounded to angular gravel | 72.0   |           |             |                  |              |
| 3         | <b>SILTY CLAY (CH)</b><br>- firm, red and grey mottled, trace of fine to coarse grained sand                                           |        |           | D           | 2.9<br>3.0       | pp=100       |
|           | End of Test Pit at 3 m                                                                                                                 | 71.0   |           |             |                  |              |
| 4         |                                                                                                                                        |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482657

**Coordinates:** N: 6945905

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 18

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL83.3m\*

| Depth (m) | Description                                                                                                                                       | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- pale brown and pale grey mottled, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand | 83.3   |           |             |                  |              |
| 1         | - with cobbles                                                                                                                                    | 83.0   |           |             |                  |              |
| 2         | - red-brown, grey and orange, sandy clay, fine to coarse grained sand, with fine to coarse sub-rounded to angular gravel                          | 82.0   |           |             |                  |              |
| 3         | <b>SANDSTONE (DW)</b><br>- medium to high strength, red and grey mottled, coarse grained                                                          | 81.0   |           |             |                  |              |
|           | End of Test Pit at 3.3 m                                                                                                                          | 80.0   |           | D           | 3.0              |              |
| 4         |                                                                                                                                                   |        |           |             | 3.3              |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482700

**Coordinates:** N: 6945900

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 19

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL87.3m\*

| Depth (m) | Description                                                                                                                    | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|--------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand     | 87.3   |           |             |                  |              |
|           | - red, brown, orange, pale grey and grey, with cobbles                                                                         | 87.0   |           |             |                  |              |
| 1         |                                                                                                                                | 86.0   |           |             |                  |              |
| 2         | - red-brown and orange mottled, sandy clay, fine to coarse grained sand, with fine to coarse sub-rounded to sub-angular gravel | 85.0   |           |             |                  |              |
| 3         | End of Test Pit at 3.1 m                                                                                                       | 84.0   |           |             |                  |              |
| 4         |                                                                                                                                |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482742

**Coordinates:** N: 6945950



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 20

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL83.0m\*

| Depth (m) | Description                                                                                                                                   | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- red-brown and orange mottled, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand | 83.0   |           | B           | 1.2<br>1.4       | pp>600       |
| 1         |                                                                                                                                               | 82.0   |           |             |                  |              |
| 2         | - red-brown mottled grey, sandy clay, fine to coarse grained sand, with fine to coarse sub-rounded to angular gravel                          | 81.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                        | 80.0   |           |             |                  |              |
| 4         |                                                                                                                                               | 79.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482719

**Coordinates:** N: 6945975

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 21

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL79.8m\*

| Depth (m) | Description                                                                                                                                  | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, trace of cobbles | 79.8   |           |             |                  |              |
|           | - with ash, with cobbles                                                                                                                     |        |           |             |                  |              |
| 1         |                                                                                                                                              | 79.0   |           |             |                  |              |
|           | - with boulders                                                                                                                              |        |           |             |                  |              |
| 2         | - pale grey and red-pink mottled                                                                                                             | 78.0   |           |             |                  |              |
| 3         |                                                                                                                                              | 77.0   |           |             |                  |              |
|           | End of Test Pit at 3.1 m                                                                                                                     |        |           |             |                  |              |
| 4         |                                                                                                                                              | 76.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482663

**Coordinates:** N: 6945974

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 22

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL66.8m\*

| Depth (m) | Description                                                                                                                              | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with cobbles | 66.8   |           |             |                  |              |
| 1         |                                                                                                                                          | 66.0   |           |             |                  |              |
| 2         |                                                                                                                                          | 65.0   |           |             |                  |              |
| 3         | - dark grey, sandy gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with clay                          | 64.0   |           |             |                  |              |
|           | End of Test Pit at 3.3 m                                                                                                                 | 63.0   |           |             |                  |              |
| 4         |                                                                                                                                          |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** Surface seepage encountered at approximately 0.2m to 0.4m depth during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482606

**Coordinates:** N: 6945955

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 23

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL54.0m\*

| Depth (m) | Description                                                                                                                                  | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy gravelly cobbles, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with boulders | 54.0   |           |             |                  |              |
| 1         |                                                                                                                                              | 53.0   |           |             |                  |              |
| 2         |                                                                                                                                              | 52.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                       | 51.0   |           |             |                  |              |
| 4         |                                                                                                                                              | 50.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482488

**Coordinates:** N: 6945950

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 24

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL57.2m\*

| Depth (m) | Description                                                                                                                                             | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey and dark brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with cobbles | 57.2   |           |             |                  |              |
|           | - dark brown                                                                                                                                            |        |           |             |                  |              |
| 1         |                                                                                                                                                         | 56.0   |           |             |                  |              |
| 2         | - brown and red mottled, sandy clay, fine to coarse grained sand, with fine to coarse sub-rounded to angular gravel                                     | 55.0   |           | B           | 2.1<br>2.3       | pp=270       |
|           | - trace of cobbles                                                                                                                                      |        |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                                  | 54.0   |           |             |                  |              |
| 4         |                                                                                                                                                         |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** Surface seepage encountered at approximately 0.3m to 0.6m depth during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482547

**Coordinates:** N: 6945986



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 25

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL62.3m\*

| Depth (m) | Description                                                                                                                                      | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- red-brown and pale grey mottled, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand | 62.3   |           |             |                  |              |
|           | - pale brown, sandy gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand                                        | 62.0   |           |             |                  |              |
| 1         | - red-brown and pale grey mottled, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand                | 61.0   |           |             |                  |              |
| 2         | - grey-brown and red mottled, silty clay, with fine to coarse grained sand, with fine to coarse sub-rounded to sub-angular gravel                | 60.0   |           | B           | 2.1<br>2.3       | pp=270       |
|           | - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand                                             |        |           |             |                  |              |
| 3         | - pale grey and red-brown mottled, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand                |        |           |             |                  |              |
|           | End of Test Pit at 3.1 m                                                                                                                         | 59.0   |           |             |                  |              |
| 4         |                                                                                                                                                  |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482571

**Coordinates:** N: 6946064

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 26

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL73.8m\*

| Depth (m) | Description                                                                                                                                                   | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey and grey mottled, sandy clayey gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, trace of cobbles | 73.8   |           |             |                  |              |
| 1         | - with cobbles and boulders                                                                                                                                   | 73.0   |           |             |                  |              |
| 2         | - pale grey and orange-brown mottled                                                                                                                          | 72.0   |           |             |                  |              |
|           | - dark grey                                                                                                                                                   |        |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                                        | 71.0   |           |             |                  |              |
|           |                                                                                                                                                               |        |           | D           | 2.8              | pp>600       |
|           |                                                                                                                                                               |        |           |             | 3.0              |              |
| 4         |                                                                                                                                                               | 70.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482626

**Coordinates:** N: 6945027

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 27

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL76.8m\*

| Depth (m) | Description                                                                                                                                              | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown with pale brown and grey mottling, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand | 76.8   |           |             |                  |              |
| 1         |                                                                                                                                                          | 76.0   |           |             |                  |              |
|           | - with cobbles                                                                                                                                           | 75.0   |           |             |                  |              |
| 2         |                                                                                                                                                          |        |           |             | 2.4              | pp=250       |
|           | - red-brown and grey mottled                                                                                                                             | 74.0   |           | D           | 2.6              |              |
| 3         | End of Test Pit at 3 m                                                                                                                                   |        |           |             |                  |              |
| 4         |                                                                                                                                                          | 73.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482680

**Coordinates:** N: 6946069

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 28

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL84.3m\*

| Depth (m) | Description                                                                                                                              | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown and dark grey, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand | 84.3   |           |             |                  |              |
|           |                                                                                                                                          | 84.0   |           |             |                  |              |
| 1         | - red, brown and grey                                                                                                                    |        |           |             |                  |              |
|           |                                                                                                                                          | 83.0   |           |             |                  |              |
|           | - pale brown, with cobbles                                                                                                               |        |           |             |                  |              |
| 2         |                                                                                                                                          | 82.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                   | 81.0   |           |             |                  |              |
| 4         |                                                                                                                                          |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482752

**Coordinates:** N: 6946047

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 29

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL92.3m\*

| Depth (m) | Description                                                                                                         | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|---------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, sandy gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand | 92.3   |           |             |                  |              |
|           | - brown, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand         | 92.0   |           |             |                  |              |
|           | <b>SILTY CLAY (CI)</b><br>- very stiff, pale grey and orange mottled, trace of fine to medium grained sand          |        |           |             | 0.8              | pp=310       |
| 1         |                                                                                                                     |        |           | D           | 1.1              |              |
|           |                                                                                                                     | 91.0   |           |             | 1.3              |              |
|           | <b>MUDSTONE (DW)</b><br>- very low to low strength, pale grey with red-orange mottling, fine to medium grained      |        |           |             | 1.7              |              |
| 2         |                                                                                                                     |        |           | D           | 1.9              |              |
|           |                                                                                                                     | 90.0   |           |             |                  |              |
|           | <b>SANDSTONE (DW)</b><br>- medium to high strength, grey and red-orange, coarse grained                             |        |           |             | 2.8              |              |
| 3         |                                                                                                                     |        |           | D           | 3.0              |              |
|           | End of Test Pit at 3.2 m                                                                                            | 89.0   |           |             |                  |              |
| 4         |                                                                                                                     |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482787

**Coordinates:** N: 6946009



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 30

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL78.5m\*

| Depth (m) | Description                                                                                                                              | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- pale grey and brown, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand | 78.5   |           |             |                  |              |
|           | - brown                                                                                                                                  | 78.0   |           |             |                  |              |
| 1         | - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles                       | 77.0   |           |             |                  |              |
| 2         |                                                                                                                                          | 76.0   |           |             |                  |              |
| 3         | - brown, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand                              |        |           |             |                  |              |
|           | End of Test Pit at 3.1 m                                                                                                                 | 75.0   |           |             |                  |              |
| 4         |                                                                                                                                          |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482819

**Coordinates:** N: 6946085

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 31

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL66.0m\*

| Depth (m) | Description                                                                                                                                                           | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- orange and grey mottled, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand<br>- dark grey, with cobbles | 66.0   |           |             |                  |              |
| 1         |                                                                                                                                                                       | 65.0   |           |             |                  |              |
| 2         | - brown                                                                                                                                                               | 64.0   |           | D           | 1.7<br>1.9       |              |
| 3         | - dark grey                                                                                                                                                           | 63.0   |           |             |                  |              |
| 4         | End of Test Pit at 3.1 m                                                                                                                                              | 62.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482803

**Coordinates:** N: 6946151

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 32

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL73.8m\*

| Depth (m) | Description                                                                                                                                    | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown and dark grey, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand       | 73.8   |           |             |                  |              |
|           | <b>GRAVELLY SILTY CLAY (CI)</b><br>- hard, pale grey with orange mottling, fine to medium sub-angular gravel, with fine to coarse grained sand |        |           | D           | 0.3              | pp>600       |
|           |                                                                                                                                                |        |           |             | 0.5              |              |
|           |                                                                                                                                                |        |           | D           | 0.7              |              |
|           |                                                                                                                                                |        |           |             | 0.9              |              |
| 1         | <b>MUDSTONE (DW)</b><br>- very low to low strength, pale grey with orange mottling, fine to medium grained                                     | 73.0   |           |             |                  |              |
| 2         |                                                                                                                                                | 72.0   |           |             |                  |              |
| 3         | <b>SANDSTONE (DW)</b><br>- medium to high strength, orange-brown with grey mottling, coarse grained                                            | 71.0   |           | D           | 2.8              |              |
|           | End of Test Pit at 3 m                                                                                                                         |        |           |             | 3.0              |              |
| 4         |                                                                                                                                                | 70.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482717

**Coordinates:** N: 6946131

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 33

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL64.8m\*

| Depth (m) | Description                                                                                                                       | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles | 64.8   |           |             |                  |              |
| 1         | - brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand                           | 64.0   |           |             |                  |              |
|           | - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles                |        |           |             |                  |              |
| 2         | - brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with cobbles             | 63.0   |           |             |                  |              |
|           | - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles                | 62.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                            |        |           |             |                  |              |
| 4         |                                                                                                                                   | 61.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482604

**Coordinates:** N: 6946153

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 34

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL65.5m\*

| Depth (m) | Description                                                                                                                                         | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with cobbles, with boulders | 65.5   |           |             |                  |              |
|           | - dark grey, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with cobbles                           | 65.0   |           | B           | 0.6              |              |
| 1         |                                                                                                                                                     |        |           |             | 0.9              |              |
|           | - light brown                                                                                                                                       | 64.0   |           | D           | 1.8              |              |
| 2         | - brown                                                                                                                                             |        |           |             | 2.0              |              |
| 3         | End of Test Pit at 3 m                                                                                                                              | 63.0   |           |             |                  |              |
|           |                                                                                                                                                     | 62.0   |           |             |                  |              |
| 4         |                                                                                                                                                     |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482673

**Coordinates:** N: 6946195

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 35

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL64.8m\*

| Depth (m) | Description                                                                                                                                                                                                                                  | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, silty sand, fine to coarse grained sand, with fine to coarse sub-rounded to sub-angular gravel<br>- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles | 64.8   |           |             |                  |              |
| 1         |                                                                                                                                                                                                                                              | 64.0   |           |             |                  |              |
| 2         | - red-brown and orange, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand<br>- with cobbles                                                                                                 | 63.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                                                                                                                       | 62.0   |           |             |                  |              |
| 4         |                                                                                                                                                                                                                                              | 61.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482728

**Coordinates:** N: 6946198



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 36

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL65.0m\*

| Depth (m) | Description                                                                                                                                     | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- grey and light red mottled, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand | 65.0   |           |             |                  |              |
|           | - pale grey and orange mottled                                                                                                                  |        |           |             |                  |              |
|           | - dark grey                                                                                                                                     |        |           |             |                  |              |
| 1         | - with cobbles                                                                                                                                  | 64.0   |           |             |                  |              |
|           |                                                                                                                                                 |        |           |             |                  |              |
| 2         | - brown                                                                                                                                         | 63.0   |           |             |                  |              |
|           |                                                                                                                                                 |        |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                          | 62.0   |           |             |                  |              |
|           |                                                                                                                                                 |        |           |             |                  |              |
| 4         |                                                                                                                                                 | 61.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482787

**Coordinates:** N: 6946200

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 37

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL66.0m\*

| Depth (m) | Description                                                                        | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, silty sand, fine to coarse grained sand, trace of clay | 66.0   |           |             |                  |              |
| 1         |                                                                                    | 65.0   |           |             |                  |              |
| 2         |                                                                                    | 64.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                             | 63.0   |           | D           | 2.7<br>3.0       |              |
| 4         |                                                                                    | 62.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482762

**Coordinates:** N: 6946247

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 38

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL58.8m\*

| Depth (m) | Description                                                                                                                                      | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles, with boulders | 58.8   |           |             |                  |              |
| 1         | <b>SILTY CLAY (CI)</b><br>- very stiff, red-brown, trace of fine grained sand                                                                    | 58.0   |           |             | 0.9              | pp=310       |
|           |                                                                                                                                                  |        |           | U           | 1.1              | pp=275       |
|           |                                                                                                                                                  |        |           |             | 1.45             |              |
|           | - grey and red-brown mottled                                                                                                                     | 57.0   |           |             | 1.7              | pp=320       |
| 2         |                                                                                                                                                  |        |           |             |                  |              |
|           | <b>SILTY CLAY (CH)</b><br>- very stiff, grey and orange mottled, with fine to coarse grained sand, trace of fine sub-angular to angular gravel   |        |           | D           | 2.4              |              |
|           |                                                                                                                                                  |        |           |             | 2.6              |              |
| 3         |                                                                                                                                                  | 56.0   |           |             | 2.8              | pp=400       |
|           | End of Test Pit at 3 m                                                                                                                           |        |           |             |                  |              |
| 4         |                                                                                                                                                  | 55.0   |           |             |                  |              |

**D** Disturbed Sample

**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample

**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa

**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482731

**Coordinates:** N: 6946283

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 39

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL59.3m\*

| Depth (m) | Description                                                                                                                                        | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles, with boulders   | 59.3   |           |             |                  |              |
| 1         |                                                                                                                                                    | 59.0   |           |             |                  |              |
|           | <b>SILTY CLAY (CH)</b><br>- very stiff, grey and red-brown mottled, trace of fine to coarse grained sand, trace of fine sub-rounded gravel         | 58.0   |           | D           | 1.3              | pp=500       |
| 2         |                                                                                                                                                    |        |           |             | 1.5              |              |
|           | <b>SANDY CLAY (CL)</b><br>- hard, pale grey and orange mottled, fine to coarse grained sand, with fine to coarse sub-rounded to sub-angular gravel | 57.0   |           | B           | 2.5              |              |
| 3         |                                                                                                                                                    |        |           |             | 2.7              |              |
|           | End of Test Pit at 3.1 m                                                                                                                           | 56.0   |           |             |                  |              |
| 4         |                                                                                                                                                    |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482681

**Coordinates:** N: 6946247

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 40

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL58.5m\*

| Depth (m) | Description                                                                                                                       | RL (m) | Lithology | Sample Type | Sample Depth (m)  | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|-------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles | 58.5   |           |             |                   |              |
|           | - pale brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand                      | 58.0   |           |             |                   |              |
|           | - brown, with cobbles                                                                                                             |        |           |             |                   |              |
| 1         |                                                                                                                                   |        |           |             |                   |              |
|           | - with boulders                                                                                                                   | 57.0   |           |             |                   |              |
| 2         |                                                                                                                                   |        |           |             |                   |              |
|           | <b>SILTY CLAY (CH)</b><br>- stiff, grey and red mottled, trace of fine to medium grained sand                                     | 56.0   |           | D           | 2.1<br>2.2<br>2.4 | pp=200       |
| 3         | End of Test Pit at 3 m                                                                                                            |        |           |             | 2.9               | pp=210       |
| 4         |                                                                                                                                   | 55.0   |           |             |                   |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482679

**Coordinates:** N: 6946275

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 41

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL53.5m\*

| Depth (m) | Description                                                                                                                                                  | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, silty clay, trace of fine to coarse grained sand                                                                                     | 53.5   |           |             |                  |              |
|           | <b>SILTY CLAY (CI)</b><br>- firm, grey-brown, trace of fine to coarse grained sand                                                                           |        |           |             | 0.4              | pp=140       |
|           |                                                                                                                                                              | 53.0   |           |             |                  |              |
|           |                                                                                                                                                              |        |           |             | 0.9              | pp=200       |
| 1         | - stiff                                                                                                                                                      |        |           |             |                  |              |
|           | <b>SILTY CLAY (CH)</b><br>- very stiff, grey and orange mottled, with fine to coarse grained sand, trace of fine to medium sub-rounded to sub-angular gravel |        |           |             | 1.2              | pp=370       |
|           |                                                                                                                                                              |        |           |             | 1.4              |              |
|           |                                                                                                                                                              | 52.0   |           | D           | 1.6              |              |
| 2         |                                                                                                                                                              |        |           |             |                  |              |
|           | <b>SILTY SAND (SM)</b><br>- dense to very dense, pale grey, fine to coarse grained sand, trace of fine sub-rounded gravel                                    |        |           | D           | 2.2              |              |
|           |                                                                                                                                                              |        |           |             | 2.4              |              |
|           |                                                                                                                                                              | 51.0   |           |             |                  |              |
|           | <b>MUDSTONE (XW)</b><br>- very low to low strength, orange with grey mottling, fine grained, with fine to coarse grained sand veins                          |        |           | D           | 2.8              |              |
| 3         |                                                                                                                                                              |        |           |             | 3.0              |              |
|           | End of Test Pit at 3 m                                                                                                                                       |        |           |             |                  |              |
|           |                                                                                                                                                              | 50.0   |           |             |                  |              |
| 4         |                                                                                                                                                              |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482752

**Coordinates:** N: 6946341



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 42

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL53.0m\*

| Depth (m) | Description                                                                                                                     | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|---------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, silty clay, with fine to coarse grained sand, trace of fine to medium sub-rounded to sub-angular gravel | 53.0   |           |             |                  |              |
|           | <b>SILTY CLAY (CI)</b><br>- hard, pale grey with orange mottling, with fine to coarse grained sand                              |        |           |             | 0.6              | pp>600       |
| 1         |                                                                                                                                 | 52.0   |           | D           | 0.9              | pp>600       |
|           | <b>SILTSTONE (DW)</b><br>- very low to low strength, pale grey, fine grained                                                    |        |           |             | 1.0              |              |
|           |                                                                                                                                 |        |           | D           | 1.4              |              |
|           |                                                                                                                                 |        |           |             | 1.6              |              |
| 2         | <b>SANDSTONE (XW)</b><br>- low to medium strength, red-brown, coarse grained                                                    | 51.0   |           |             |                  |              |
|           |                                                                                                                                 |        |           |             |                  |              |
|           |                                                                                                                                 |        |           |             |                  |              |
|           | <b>SANDSTONE (DW)</b><br>- medium to high strength, red-brown, coarse grained                                                   |        |           |             | 2.8              |              |
| 3         |                                                                                                                                 | 50.0   |           | D           | 3.0              |              |
|           | End of Test Pit at 3 m                                                                                                          |        |           |             |                  |              |
| 4         |                                                                                                                                 | 49.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482783

**Coordinates:** N: 6946406

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 43

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL54.3m\*

| Depth (m) | Description                                                                                                                     | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|---------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, silty clay, with fine to coarse grained sand, trace of fine to coarse sub-rounded to sub-angular gravel | 54.3   |           |             |                  |              |
|           |                                                                                                                                 | 54.0   |           |             |                  |              |
|           | <b>SILTY CLAY (CI)</b><br>- stiff, grey-brown, trace of fine to coarse grained sand                                             |        |           |             | 0.6              | pp=160       |
|           |                                                                                                                                 |        |           |             | 0.9              | pp=250       |
| 1         | - grey and orange mottled                                                                                                       |        |           | D           | 1.1              |              |
|           |                                                                                                                                 | 53.0   |           |             |                  |              |
|           | <b>SILTY CLAY (CH)</b><br>- very stiff, grey with red and orange mottling, trace of fine to coarse grained sand                 |        |           | D           | 1.6              | pp=310       |
|           |                                                                                                                                 |        |           |             | 1.9              |              |
| 2         |                                                                                                                                 | 52.0   |           |             |                  |              |
|           | - with fine to coarse grained sand, trace of fine to coarse sub-rounded to angular gravel                                       |        |           | D           | 2.8              |              |
| 3         |                                                                                                                                 |        |           |             | 3.1              |              |
|           | End of Test Pit at 3.1 m                                                                                                        | 51.0   |           |             |                  |              |
| 4         |                                                                                                                                 |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482691

**Coordinates:** N: 6946368

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 44

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL51.0m\*

| Depth (m) | Description                                                                                                                                                | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, red and grey, sandy gravelly clay, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand, trace of cobbles | 51.0   |           |             |                  |              |
|           | - dark grey                                                                                                                                                |        |           |             |                  |              |
|           | - brown, red and grey                                                                                                                                      |        |           |             |                  |              |
| 1         | <b>SANDSTONE (DW)</b><br>- medium to high strength, pale grey, coarse grained                                                                              | 50.0   |           | D           | 1.0<br>1.2       |              |
| 2         |                                                                                                                                                            | 49.0   |           | D           | 2.1<br>2.3       |              |
|           | End of Test Pit at 2.3 m<br>(Refusal)                                                                                                                      |        |           |             |                  |              |
| 3         |                                                                                                                                                            | 48.0   |           |             |                  |              |
| 4         |                                                                                                                                                            | 47.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482624

**Coordinates:** N: 6946320

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 45

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL53.5m\*

| Depth (m) | Description                                                                                                                               | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, silty clay, with fine to coarse grained sand, trace of fine to coarse sub-rounded to sub-angular gravel           | 53.5   |           |             |                  |              |
|           | <b>SILTY CLAY (CI)</b><br>- stiff, grey-brown, trace of fine to coarse grained sand                                                       | 53.0   |           | U           | 0.4              | pp=170       |
|           |                                                                                                                                           |        |           |             | 0.8              |              |
| 1         | - very stiff, grey with red mottling, with fine to coarse sub-rounded to sub-angular gravel, with fine to coarse grained sand             | 52.0   |           |             | 1.2              | pp=320       |
| 2         | - grey with orange mottling                                                                                                               | 51.0   |           |             | 2.0              | pp=450       |
|           | <b>SILTY CLAY (CH)</b><br>- very stiff, grey with orange mottling, trace of fine to coarse grained sand, trace of fine sub-rounded gravel |        |           | D           | 2.8              | pp=400       |
| 3         | End of Test Pit at 3 m                                                                                                                    | 50.0   |           |             | 3.0              |              |
| 4         |                                                                                                                                           |        |           |             |                  |              |

**D** Disturbed Sample

**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample

**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa

**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482649

**Coordinates:** N: 6946379

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 46

**Page No:** 1 of 1

**Date:** 26 May 2022

**Ground Surface Level:** RL53.3m\*

| Depth (m) | Description                                                                                                              | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|--------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- red and brown, silty clay, with fine to coarse grained sand, trace of fine to medium sub-rounded gravel | 53.3   |           |             |                  |              |
|           | <b>SILTY CLAY (CI)</b><br>- stiff, grey-brown, trace of fine to medium grained sand                                      | 53.0   |           | D           | 0.5<br>0.6       | pp=150       |
| 1         | <b>SILTY CLAY (CH)</b><br>- very stiff, grey and red mottled, trace of fine to medium grained sand                       | 52.0   |           | U           | 1.2<br>1.4       | pp=400       |
|           | - hard, pale grey with red mottling, with fine to coarse grained sand                                                    |        |           |             | 1.8<br>1.9       | pp>600       |
| 2         |                                                                                                                          |        |           | D           | 2.1              |              |
|           | <b>SANDSTONE (XW)</b><br>- very low to low strength, orange-brown, coarse grained                                        | 51.0   |           |             |                  |              |
| 3         | <b>SANDSTONE (DW)</b><br>- low to medium strength, grey, coarse grained                                                  |        |           | D           | 2.9<br>3.0       |              |
|           | End of Test Pit at 3 m                                                                                                   | 50.0   |           |             |                  |              |
| 4         |                                                                                                                          |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482750

**Coordinates:** N: 6946435

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 47

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL47.8m\*

| Depth (m) | Description                                                                                                                   | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- grey-brown, silty sand, fine to coarse grained sand, with fine to medium sub-rounded gravel                  | 47.8   |           |             |                  |              |
|           | - brown, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand, trace of cobbles | 47.0   |           |             |                  |              |
| 1         |                                                                                                                               |        |           |             |                  |              |
|           |                                                                                                                               | 46.0   |           |             |                  |              |
| 2         |                                                                                                                               |        |           |             |                  |              |
|           |                                                                                                                               |        |           | B           | 2.4              |              |
|           |                                                                                                                               |        |           |             | 2.7              |              |
|           |                                                                                                                               | 45.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                        |        |           |             |                  |              |
|           |                                                                                                                               |        |           |             |                  |              |
|           |                                                                                                                               | 44.0   |           |             |                  |              |
| 4         |                                                                                                                               |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482438

**Coordinates:** N: 6946278



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 48

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL52.5m\*

| Depth (m) | Description                                                                                                                                 | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, silty sand, fine to coarse grained sand, with fine to coarse sub-rounded gravel                                     | 52.5   |           |             |                  |              |
|           | <b>SILTY CLAY (CI)</b><br>- very stiff, red and grey mottling, with fine to coarse grained sand, trace of fine to coarse sub-rounded gravel | 52.0   |           | U           | 0.3              | pp=550       |
|           |                                                                                                                                             |        |           |             | 0.6              |              |
|           |                                                                                                                                             |        |           |             | 0.85             |              |
| 1         |                                                                                                                                             |        |           |             | 1.2              | pp=550       |
|           | <b>SANDY SILTY GRAVEL (GM)</b><br>- dense, pale brown, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand        | 51.0   |           | B           | 2.0              |              |
| 2         |                                                                                                                                             |        |           |             | 2.2              |              |
| 3         | End of Test Pit at 3 m                                                                                                                      | 50.0   |           |             |                  |              |
|           |                                                                                                                                             | 49.0   |           |             |                  |              |
| 4         |                                                                                                                                             |        |           |             |                  |              |

**D** Disturbed Sample

**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample

**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa

**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482343

**Coordinates:** N: 6946221

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 49

**Page No:** 1 of 1

**Date:** 27 May 2022

**Ground Surface Level:** RL48.8m\*

| Depth (m) | Description                                                                                                                                                                                                                            | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- pale grey and orange mottled, sandy clay, fine to coarse grained sand, with fine to coarse sub-rounded gravel<br>- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand | 48.8   |           |             |                  |              |
| 1         | - brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with cobbles<br>- with boulders                                                                                               | 48.0   |           | D           | 1.2<br>1.4       |              |
| 2         |                                                                                                                                                                                                                                        | 47.0   |           |             |                  |              |
| 3         | - dark brown, sandy gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with cobbles<br>End of Test Pit at 3 m                                                                                          | 46.0   |           |             |                  |              |
| 4         |                                                                                                                                                                                                                                        | 45.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482406

**Coordinates:** N: 6946191

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 50

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL49.5m\*

| Depth (m) | Description                                                                                                                                                                                                                          | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown, silty sand, fine to coarse grained sand, with fine to medium sub-rounded to sub-angular gravel<br>- dark grey, sandy silty gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand | 49.5   |           |             |                  |              |
| 1         |                                                                                                                                                                                                                                      | 49.0   |           |             |                  |              |
| 2         |                                                                                                                                                                                                                                      | 48.0   |           |             |                  |              |
| 3         | - with cobbles                                                                                                                                                                                                                       | 47.0   |           |             |                  |              |
| 4         | End of Test Pit at 3 m                                                                                                                                                                                                               | 46.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** Free groundwater encountered at approximately 1.9m depth during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482437

**Coordinates:** N: 6946129

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 51

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL56.3m\*

| Depth (m) | Description                                                                                                                                    | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles and boulders | 56.3   |           |             |                  |              |
|           |                                                                                                                                                | 56.0   |           |             |                  |              |
| 1         |                                                                                                                                                |        |           |             |                  |              |
|           |                                                                                                                                                | 55.0   |           |             |                  |              |
| 2         |                                                                                                                                                |        |           |             |                  |              |
|           |                                                                                                                                                | 54.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                         |        |           |             |                  |              |
|           |                                                                                                                                                | 53.0   |           |             |                  |              |
| 4         |                                                                                                                                                |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482375

**Coordinates:** N: 6946115

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 52

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL60.3m\*

| Depth (m) | Description                                                                                                                                    | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- orange and pale brown mottled, silty sand, fine to coarse grained sand, with fine to coarse sub-rounded to sub-angular gravel | 60.3   |           |             |                  |              |
|           | - pale brown with pale grey mottling, gravelly clayey sand, fine to coarse grained sand, fine to coarse sub-rounded to sub-angular gravel      | 60.0   |           |             |                  |              |
|           |                                                                                                                                                |        |           | B           | 0.7              |              |
| 1         | - with cobbles                                                                                                                                 | 59.0   |           |             | 0.9              |              |
| 2         |                                                                                                                                                | 58.0   |           |             |                  |              |
| 3         | - dark brown, sandy clay, fine to coarse grained, with fine to coarse sub-rounded to sub-angular gravel                                        |        |           |             |                  |              |
|           | End of Test Pit at 3.1 m                                                                                                                       | 57.0   |           |             |                  |              |
| 4         |                                                                                                                                                |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482338

**Coordinates:** N: 6946154

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 53

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL67.8m\*

| Depth (m) | Description                                                                                                                                          | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles                    | 67.8   |           |             |                  |              |
| 1         | - pale grey and red-brown mottled, silty clay, with fine to coarse grained sand, trace of fine to medium sub-rounded to sub-angular gravel           | 67.0   |           | D           | 1.2<br>1.3       |              |
| 2         | - pale grey and orange, sandy gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand                                  | 66.0   |           |             |                  |              |
| 3         | - orange and pale grey mottled, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand, trace of cobbles | 65.0   |           | D           | 2.9<br>3.1       |              |
|           | End of Test Pit at 3.1 m                                                                                                                             |        |           |             |                  |              |
| 4         |                                                                                                                                                      | 64.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482358

**Coordinates:** N: 6946044



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 54

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL55.5m\*

| Depth (m) | Description                                                                                                                                    | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, grey and red-brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand | 55.5   |           |             |                  |              |
|           | - pale brown                                                                                                                                   | 55.0   |           |             |                  |              |
| 1         | - pale grey, sandy silty gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand                                 |        |           |             |                  |              |
|           | - brown and orange, sandy clayey gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles               | 54.0   |           |             |                  |              |
| 2         | - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles                             |        |           |             |                  |              |
|           | - brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand                                        | 53.0   |           | D           | 2.3<br>2.5       |              |
| 3         | - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, trace of cobbles                         |        |           |             |                  |              |
|           | End of Test Pit at 3 m                                                                                                                         |        |           |             |                  |              |
|           |                                                                                                                                                | 52.0   |           |             |                  |              |
| 4         |                                                                                                                                                |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482416

**Coordinates:** N: 6946074

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 55

**Page No:** 1 of 1

**Date:** 24 May 2022

**Ground Surface Level:** RL52.5m\*

| Depth (m) | Description                                                                                                                       | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles | 52.5   |           |             |                  |              |
|           |                                                                                                                                   | 52.0   |           |             |                  |              |
| 1         |                                                                                                                                   | 51.0   |           |             |                  |              |
| 2         | - with boulders                                                                                                                   | 50.0   |           |             |                  |              |
|           | End of Test Pit at 2.5 m<br>(Test Pit Collapsing)                                                                                 | 50.0   |           |             |                  |              |
| 3         |                                                                                                                                   | 49.0   |           |             |                  |              |
| 4         |                                                                                                                                   |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482464

**Coordinates:** N: 6946048

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 56

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL58.3m\*

| Depth (m) | Description                                                                                                                                | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- orange-brown, silty sand, fine to coarse grained sand, with fine to coarse sub-rounded to angular gravel, trace of clay   | 58.3   |           |             |                  |              |
|           | - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand                                       | 58.0   |           |             |                  |              |
|           | - orange-brown and grey mottled, silty sand, fine to coarse grained sand, with fine to coarse sub-rounded to angular gravel, trace of clay |        |           |             |                  |              |
| 1         | - pale brown, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand                           |        |           |             |                  |              |
|           | - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles                         | 57.0   |           |             | 1.7              |              |
| 2         |                                                                                                                                            |        |           | D           | 2.0              |              |
|           | - dark brown and dark grey mottled, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand     | 56.0   |           |             |                  |              |
| 3         | End of Test Pit at 3.1 m                                                                                                                   | 55.0   |           |             |                  |              |
| 4         |                                                                                                                                            |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482433

**Coordinates:** N: 6945991

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 57

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL65.5m\*

| Depth (m) | Description                                                                                                                                               | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- orange-brown and grey mottled, silty sand, fine to coarse grained sand, with fine to coarse sub-angular to angular gravel, trace of clay | 65.5   |           |             | 0.0              |              |
|           | - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles                                        | 65.0   |           | D           | 0.3              |              |
| 1         | - with boulders                                                                                                                                           | 64.0   |           |             |                  |              |
| 2         | - brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand                                                   | 63.0   |           | B           | 2.3              | pp=450       |
|           |                                                                                                                                                           |        |           |             | 2.6              |              |
| 3         | End of Test Pit at 3 m                                                                                                                                    | 62.0   |           |             |                  |              |
| 4         |                                                                                                                                                           |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482408

**Coordinates:** N: 6945963

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 58

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL70.0m\*

| Depth (m) | Description                                                                                                                       | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles | 70.0   |           |             |                  |              |
| 1         | - pale brown, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with cobbles        | 69.0   |           |             |                  |              |
| 2         | - dark grey-brown                                                                                                                 | 68.0   |           |             |                  |              |
| 3         | - pale grey, sandy silty gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand                        | 67.0   |           |             |                  |              |
| 4         | End of Test Pit at 3 m                                                                                                            | 66.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482365

**Coordinates:** N: 6945996

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 59

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL73.0m\*

| Depth (m) | Description                                                                                                                         | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- pale brown, sandy gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand, with clay | 73.0   |           |             |                  |              |
|           | - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles                  |        |           |             |                  |              |
| 1         |                                                                                                                                     | 72.0   |           |             |                  |              |
|           | - with boulders                                                                                                                     |        |           |             |                  |              |
| 2         |                                                                                                                                     | 71.0   |           |             |                  |              |
|           | End of Test Pit at 2.4 m<br>(Test Pit Collapsing)                                                                                   |        |           |             |                  |              |
| 3         |                                                                                                                                     | 70.0   |           |             |                  |              |
| 4         |                                                                                                                                     | 69.0   |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482282

**Coordinates:** N: 6945925



# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 60

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL62.3m\*

| Depth (m) | Description                                                                                                                                        | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- pale grey, silty sandy gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with clay, with cobbles | 62.3   |           |             | 0.1              |              |
|           |                                                                                                                                                    | 62.0   |           | D           | 0.4              |              |
|           | - brown, orange and grey mottled, sandy clayey gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand, with cobbles |        |           |             |                  |              |
| 1         | - with boulders                                                                                                                                    | 61.0   |           |             |                  |              |
|           | - pale grey, silty sandy gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with clay, trace of cobbles            |        |           | D           | 1.6              |              |
| 2         |                                                                                                                                                    |        |           |             | 1.8              |              |
|           | - brown, orange, dark grey and red, sandy clay, fine to coarse grained sand, with fine to coarse sub-angular to angular gravel                     | 60.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                             | 59.0   |           |             |                  |              |
| 4         |                                                                                                                                                    |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482388

**Coordinates:** N: 6945876

# TEST PIT REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## TEST PIT 61

**Page No:** 1 of 1

**Date:** 25 May 2022

**Ground Surface Level:** RL59.3m\*

| Depth (m) | Description                                                                                                                                                     | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 0         | <b>FILL</b><br>- brown and grey, sandy silty gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, trace of clay, trace of cobbles | 59.3   |           |             |                  |              |
|           |                                                                                                                                                                 | 59.0   |           |             |                  |              |
| 1         | - with clay                                                                                                                                                     |        |           |             |                  |              |
|           | - with cobbles                                                                                                                                                  | 58.0   |           |             |                  |              |
|           | - pale brown and pale grey                                                                                                                                      |        |           |             |                  |              |
| 2         |                                                                                                                                                                 | 57.0   |           |             |                  |              |
| 3         | End of Test Pit at 3 m                                                                                                                                          | 56.0   |           |             |                  |              |
| 4         |                                                                                                                                                                 |        |           |             |                  |              |

**D** Disturbed Sample  
**U** Undisturbed Tube (50mm diameter)

**B** Bulk Sample  
**pp** Pocket Penetrometer Test (kPa)

**V** Vane Shear Strength (Uncorrected) kPa  
**Is(50)** Point Load Test Result (MPa)

**Excavator:** 14 Tonne Sumitomo

**Bucket Size:** 450mm Standard Bucket

**Groundwater:** No free groundwater encountered during excavation

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

**Logged By:** KVB

**Coordinates:** E: 482432

**Coordinates:** N: 6945908

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 62

**Page No:** 1 of 1

**Date:** 5 July 2022

**Ground Surface Level:** RL62.6m\*

| Depth (m) | Description                                                                                                                           | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results     |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|------------------|
| 0         | <b>FILL</b><br>- pale brown, gravelly sandy silty clay, fine to coarse grained sand, fine to coarse sub-angular gravel, with boulders | 62.6   |           |             |                  |                  |
| 1         |                                                                                                                                       | 62.0   |           | S           | 0.5              | 1,1,1<br>N=9     |
|           |                                                                                                                                       |        |           | S           | 0.95<br>1.0      | 2,2,4<br>N=6     |
| 2         |                                                                                                                                       | 61.0   |           |             | 1.45             |                  |
| 3         | <b>SILTY CLAY (CI)</b><br>- very stiff, pale grey and orange-brown mottled, with fine to coarse grained sand                          | 60.0   |           | S           | 2.5              | 6,10,15<br>N=25  |
|           |                                                                                                                                       |        |           |             | 2.95             |                  |
| 4         | - hard                                                                                                                                | 59.0   |           |             |                  |                  |
|           |                                                                                                                                       |        |           | S           | 4.0              | 15,18,20<br>N=38 |
| 5         |                                                                                                                                       | 58.0   |           |             | 4.45             |                  |
| 6         | End of Bore at 5.95 m                                                                                                                 | 57.0   |           | S           | 5.5              | 12,19,20<br>N=39 |
|           |                                                                                                                                       |        |           |             | 5.95             |                  |
| 7         |                                                                                                                                       | 56.0   |           |             |                  |                  |
| 8         |                                                                                                                                       | 55.0   |           |             |                  |                  |
| 9         |                                                                                                                                       | 54.0   |           |             |                  |                  |
| 10        |                                                                                                                                       | 53.0   |           |             |                  |                  |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjon D8

**Logged by:** CL

**Drilling Method:** Auger to 2.5m, then washbore

**Groundwater:** Free groundwater encountered at approximately 1.3m depth during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 63

**Page No:** 1 of 2

**Date:** 5 July 2022

**Ground Surface Level:** RL57.4m\*

| Depth (m) | Description                                                                                          | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results     |
|-----------|------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|------------------|
| 0         | <b>FILL</b><br>- dark brown, clayey sandy gravel, fine to medium grained sand, fine to coarse gravel | 57.4   |           |             |                  |                  |
| 0.5       |                                                                                                      |        |           | S           | 0.5              | 2,7,6<br>N=13    |
| 0.95      |                                                                                                      |        |           |             | 0.95             |                  |
| 1.0       |                                                                                                      |        |           | S           | 1.0              | 4,8,6<br>N=14    |
| 1.45      |                                                                                                      | 56.0   |           |             | 1.45             |                  |
| 2.5       |                                                                                                      | 55.0   |           | S           | 2.5              | 4,3,3<br>N=6     |
| 2.95      |                                                                                                      |        |           |             | 2.95             |                  |
| 4.0       |                                                                                                      | 54.0   |           | S           | 4.0              | 2,4,3<br>N=5     |
| 4.45      |                                                                                                      | 53.0   |           |             | 4.45             |                  |
| 5.5       |                                                                                                      | 52.0   |           | S           | 5.5              | 4,3,3<br>N=39    |
| 5.95      |                                                                                                      | 51.0   |           |             | 5.95             |                  |
| 7.0       |                                                                                                      | 50.0   |           | S           | 7.0              | 2,1,6<br>N=7     |
| 7.45      |                                                                                                      |        |           |             | 7.45             |                  |
| 8.5       | <b>SILTY CLAY (CI)</b><br>- hard, dark brown                                                         | 49.0   |           | S           | 8.5              | 15,22,21<br>N=43 |
| 8.95      |                                                                                                      |        |           |             | 8.95             |                  |
| 10        |                                                                                                      | 48.0   |           |             |                  |                  |

|    |                                    |     |                                        |    |                      |        |                              |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|--------|------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) | Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d)    | Diametral Test               |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a)    | Axial Test                   |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i)    | Lump Test                    |

**Rig:** Hanjon D8

**Logged by:** CL

**Drilling Method:** Auger to 2.5m, then washbore

**Groundwater:** Free groundwater encountered at approximately 2.4m depth during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 63

**Page No:** 2 of 2

**Date:** 5 July 2022

**Ground Surface Level:** RL57.4m\*

| Depth (m) | Description                                                      | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results     |
|-----------|------------------------------------------------------------------|--------|-----------|-------------|------------------|------------------|
| 11        | <b>SILTY CLAY (CI)</b><br>- hard, dark brown                     | 47.0   |           | S           | 10.0             | 13,27,29<br>N=56 |
|           |                                                                  |        |           |             | 10.45            |                  |
| 12        | <b>MUDSTONE (XW)</b><br>- very low strength, brown, fine grained | 46.0   |           | S           | 11.5             | 30/70mm          |
|           |                                                                  |        |           |             | 11.57            |                  |
| 13        |                                                                  | 45.0   |           |             |                  |                  |
|           |                                                                  |        |           | S           | 13.0             | 30/90mm          |
|           | End of Bore at 13.09 m                                           | 13.09  |           |             |                  |                  |
| 14        |                                                                  | 44.0   |           |             |                  |                  |
| 15        |                                                                  | 43.0   |           |             |                  |                  |
| 16        |                                                                  | 42.0   |           |             |                  |                  |
| 17        |                                                                  | 41.0   |           |             |                  |                  |
| 18        |                                                                  | 40.0   |           |             |                  |                  |
| 19        |                                                                  | 39.0   |           |             |                  |                  |
| 20        |                                                                  | 38.0   |           |             |                  |                  |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjon D8

**Logged by:** CL

**Drilling Method:** Auger to 2.5m, then washbore

**Groundwater:** Free groundwater encountered at approximately 2.4m depth during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 64

**Page No:** 1 of 2

**Date:** 6 July 2022

**Ground Surface Level:** RL73.9m\*

| Depth (m) | Description                                                                                                        | RL (m) | Lithology | Sample Type | Sample Depth (m)           | Test Results                 |
|-----------|--------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|----------------------------|------------------------------|
| 0         | <b>FILL</b><br>- dark brown, sandy silty clay, fine to medium grained sand, with fine to coarse sub-angular gravel | 73.9   |           |             |                            |                              |
| 1         |                                                                                                                    | 73.0   |           | S           | 0.5<br>0.95<br>1.0<br>1.45 | 6,5,3<br>N=8<br>4,3,3<br>N=6 |
| 2         | - brown, gravelly sand, fine to coarse grained sand, fine to coarse sub-angular gravel                             | 72.0   |           |             |                            |                              |
| 3         |                                                                                                                    | 71.0   |           | S           | 2.5<br>2.95                | 2,2,2<br>N=4                 |
| 4         | - dark brown, sandy clayey gravel, fine to coarse sub-angular gravel, fine to coarse grained sand                  | 70.0   |           |             |                            |                              |
| 5         |                                                                                                                    | 69.0   |           |             |                            |                              |
| 6         |                                                                                                                    | 68.0   |           | S           | 5.5<br>5.95                | 3,4,3<br>N=7                 |
| 7         |                                                                                                                    | 67.0   |           |             |                            |                              |
| 8         |                                                                                                                    | 66.0   |           | S           | 7.0<br>7.45                | 9,9,4<br>N=13                |
| 9         | <b>SANDSTONE (HW)</b><br>- low to medium strength, brown and grey                                                  | 65.0   |           |             |                            |                              |
| 10        | - very low strength                                                                                                | 64.0   |           |             |                            |                              |
|           |                                                                                                                    |        |           | S           | 8.5<br>8.53                | 30/30mm                      |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** CL/NA

**Drilling Method:** Auger to 2.5m, casing to 5.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021



# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 64

**Page No:** 2 of 2

**Date:** 6 July 2022

**Ground Surface Level:** RL73.9m\*

| Depth (m) | Description                                                                        | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 11        | <b>SANDSTONE (HW)</b><br>- very low strength, brown and grey                       | 63.0   |           | S           | 10.0<br>10.08    | 30/80mm      |
| 12        | <b>SILTSTONE (HW)</b><br>- low to medium strength, brown and grey                  | 62.0   |           | S           | 11.5<br>11.59    | 30/90mm      |
| 13        | <b>SANDSTONE (HW)</b><br>- low strength, brown                                     | 61.0   |           | S           | 13.0<br>13.06    | 30/60mm      |
| 14        | <b>SILTSTONE (HW)</b><br>- extremely low strength, dark grey, with thin coal seams | 60.0   |           | S           | 14.5<br>14.77    | 22,30/120mm  |
| 15        | End of Bore at 14.77 m                                                             | 59.0   |           |             |                  |              |
| 16        |                                                                                    | 58.0   |           |             |                  |              |
| 17        |                                                                                    | 57.0   |           |             |                  |              |
| 18        |                                                                                    | 56.0   |           |             |                  |              |
| 19        |                                                                                    | 55.0   |           |             |                  |              |
| 20        |                                                                                    | 54.0   |           |             |                  |              |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** CL/NA

**Drilling Method:** Auger to 2.5m, casing to 5.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 65

**Page No:** 1 of 4

**Date:** 12 July 2022

**Ground Surface Level:** RL50.8m\*

| Depth (m) | Description                                                                                               | RL (m) | Lithology | Sample Type | Sample Depth (m)   | Test Results   |
|-----------|-----------------------------------------------------------------------------------------------------------|--------|-----------|-------------|--------------------|----------------|
| 0         | <b>FILL</b><br>- dark brown-grey, clayey sandy gravel, fine to coarse gravel, fine to coarse grained sand | 50.8   |           |             |                    |                |
| 1         |                                                                                                           | 50.0   |           | S           | 0.5<br>0.95<br>1.0 | 4,3,10<br>N=13 |
| 2         |                                                                                                           | 49.0   |           | S           | 1.45               | 9,6,4<br>N=10  |
| 3         |                                                                                                           | 48.0   |           | S           | 2.5<br>2.95        | 2,1,1<br>N=2   |
| 4         |                                                                                                           | 47.0   |           | S           | 4.0<br>4.45        | 11,4,2<br>N=6  |
| 5         | - dark grey, clayey gravel, fine to coarse sub-angular gravel                                             | 46.0   |           |             |                    |                |
| 6         |                                                                                                           | 45.0   |           | S           | 5.5<br>5.95        | 2,2,2<br>N=4   |
| 7         |                                                                                                           | 44.0   |           | S           | 7.0<br>7.45        | 3,3,2<br>N=5   |
| 8         |                                                                                                           | 43.0   |           |             |                    |                |
| 9         |                                                                                                           | 42.0   |           | S           | 8.5<br>8.95        | 2,3,3<br>N=6   |
| 10        |                                                                                                           | 41.0   |           |             |                    |                |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** CL/NA

**Drilling Method:** Auger to 2.5m, casing to 29.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 65

**Page No:** 2 of 4

**Date:** 12 July 2022

**Ground Surface Level:** RL50.8m\*

| Depth (m) | Description                                                                                              | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results     |
|-----------|----------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|------------------|
| 11        | <b>FILL</b><br>- dark grey, clayey gravel, fine to coarse sub-angular gravel                             | 40.0   |           | S           | 10.0<br>10.45    | 3,3,2<br>N=5     |
| 12        |                                                                                                          | 39.0   |           | S           | 11.5<br>11.95    | 3,7,6<br>N=13    |
| 13        |                                                                                                          | 38.0   |           | S           | 13.0<br>13.45    | 4,6,7<br>N=13    |
| 14        | - dark grey, clayey sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand         | 37.0   |           | S           | 14.5<br>14.95    | 4,4,5<br>N=9     |
| 15        |                                                                                                          | 36.0   |           | S           | 16.0<br>16.45    | 5,5,6<br>N=11    |
| 16        | - dark grey, sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand, trace of clay | 35.0   |           | S           | 17.5<br>17.95    | 11,13,15<br>N=28 |
| 17        | - grey, clayey gravel, fine to coarse sub-angular gravel, fine to coarse grained sand                    | 34.0   |           | S           |                  |                  |
| 18        |                                                                                                          | 33.0   |           | S           |                  |                  |
| 19        |                                                                                                          | 32.0   |           |             |                  |                  |
| 20        |                                                                                                          | 31.0   |           |             |                  |                  |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** CL/NA

**Drilling Method:** Auger to 2.5m, casing to 29.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 65

**Page No:** 3 of 4

**Date:** 12 July 2022

**Ground Surface Level:** RL50.8m\*

| Depth (m) | Description                                                                                                    | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results     |
|-----------|----------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|------------------|
| 21        | <b>FILL</b><br>- dark grey, gravel, fine to medium angular gravel, with fine to coarse grained sand, with clay | 30.0   |           | S           | 20.5<br>20.95    | 7,7,8<br>N=15    |
| 22        |                                                                                                                | 29.0   |           |             |                  |                  |
| 23        |                                                                                                                | 28.0   |           |             |                  |                  |
| 24        |                                                                                                                | 27.0   |           | S           | 23.5<br>23.95    | 12,13,20<br>N=15 |
| 25        |                                                                                                                | 26.0   |           |             |                  |                  |
| 26        |                                                                                                                | 25.0   |           |             |                  |                  |
| 27        |                                                                                                                | 24.0   |           | S           | 26.5<br>26.95    | 6,12,15<br>N=27  |
| 28        |                                                                                                                | 23.0   |           |             |                  |                  |
| 29        | <b>COAL (SW)</b><br>- low strength, black, fine grained                                                        | 22.0   |           |             |                  |                  |
| 30        |                                                                                                                | 21.0   |           | S           | 29.5<br>29.54    | 30/40mm          |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** CL/NA

**Drilling Method:** Auger to 2.5m, casing to 29.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

**BORE 65**

**Page No:** 4 of 4

**Date:** 12 July 2022

**Ground Surface Level:** RL50.8m\*

| Depth (m) | Description                                                         | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|---------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 31        | <b>SILTSTONE (DW)</b><br>- medium strength, pale grey, fine grained | 20.0   |           | S           | 31.0<br>31.02    | 30/80mm      |
|           | End of Bore at 31.02 m                                              |        |           |             |                  |              |
| 32        |                                                                     | 19.0   |           |             |                  |              |
| 33        |                                                                     | 18.0   |           |             |                  |              |
| 34        |                                                                     | 17.0   |           |             |                  |              |
| 35        |                                                                     | 16.0   |           |             |                  |              |
| 36        |                                                                     | 15.0   |           |             |                  |              |
| 37        |                                                                     | 14.0   |           |             |                  |              |
| 38        |                                                                     | 13.0   |           |             |                  |              |
| 39        |                                                                     | 12.0   |           |             |                  |              |
| 40        |                                                                     | 11.0   |           |             |                  |              |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** CL/NA

**Drilling Method:** Auger to 2.5m, casing to 29.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 66

**Page No:** 1 of 2

**Date:** 8 July 2022

**Ground Surface Level:** RL66.3m\*

| Depth (m) | Description                                                                                                | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results    |
|-----------|------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|-----------------|
| 0         | <b>FILL</b><br>- pale red-grey, silty clay, with fine to coarse grained sand                               | 66.3   |           |             |                  |                 |
| 1         |                                                                                                            |        |           | S           | 0.5              | 6,6,7<br>N=13   |
|           |                                                                                                            |        |           |             | 0.95             |                 |
|           | - dark grey                                                                                                | 65.0   |           | S           | 1.0              | 4,15,14<br>N=29 |
|           |                                                                                                            |        |           |             | 1.45             |                 |
| 2         | - dark grey, sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand, with coal fines | 64.0   |           | S           | 2.5              | 4,8,7<br>N=15   |
| 3         |                                                                                                            |        |           |             | 2.95             |                 |
| 4         | - dark grey, silty clay                                                                                    | 63.0   |           |             |                  |                 |
|           |                                                                                                            | 62.0   |           | S           | 4.0              | 8,14,12<br>N=26 |
|           |                                                                                                            |        |           |             | 4.45             |                 |
| 5         | - dark grey, gravelly clay, fine to coarse sub-angular gravel, with fine to coarse grained sand            | 61.0   |           | S           | 5.5              | 3,3,3<br>N=6    |
| 6         |                                                                                                            |        |           |             | 5.95             |                 |
|           | - dark grey, silty clay, with fine to coarse grained sand                                                  | 60.0   |           |             |                  |                 |
| 7         |                                                                                                            | 59.0   |           | S           | 7.0              | 3,4,5<br>N=9    |
|           |                                                                                                            |        |           |             | 7.45             |                 |
| 8         | - dark grey with red mottle, silty clay, with fine to coarse grained sand                                  | 58.0   |           | S           | 8.5              | 7,9,13<br>N=22  |
| 9         |                                                                                                            |        |           |             | 8.95             |                 |
| 10        |                                                                                                            | 57.0   |           |             |                  |                 |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** NA

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 66

**Page No:** 2 of 2

**Date:** 8 July 2022

**Ground Surface Level:** RL66.3m\*

| Depth (m) | Description                                                                                                 | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results   |
|-----------|-------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|----------------|
| 11        | <b>FILL</b><br>- dark grey with red mottle, silty clay, with fine to coarse grained sand (possibly natural) | 56.0   |           | S           | 10.0             | 6,9,11<br>N=20 |
|           |                                                                                                             |        |           |             | 10.45            |                |
| 12        | <b>SILTSTONE (XW)</b><br>- extremely low strength, pale grey                                                | 55.0   |           |             | 11.5             | 13,28,30/90mm  |
|           |                                                                                                             |        |           | S           | 11.89            |                |
| 13        | <b>SILTSTONE (HW)</b><br>- low strength, pale grey                                                          | 54.0   |           |             |                  |                |
|           | - extremely low strength, grey                                                                              |        |           |             |                  |                |
| 14        |                                                                                                             | 53.0   |           | S           | 13.0             | 30/120mm       |
|           |                                                                                                             |        |           |             | 13.12            |                |
| 15        | <b>SANDSTONE (HW)</b><br>- very low strength, pale grey                                                     | 52.0   |           | S           | 14.5             | 30/80mm<br>HB  |
|           |                                                                                                             |        |           |             | 14.58            |                |
|           | End of Bore at 14.58 m                                                                                      | 51.0   |           |             |                  |                |
| 16        |                                                                                                             | 50.0   |           |             |                  |                |
| 17        |                                                                                                             | 49.0   |           |             |                  |                |
| 18        |                                                                                                             | 48.0   |           |             |                  |                |
| 19        |                                                                                                             | 47.0   |           |             |                  |                |
| 20        |                                                                                                             |        |           |             |                  |                |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** NA

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021



# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 67

**Page No:** 1 of 3

**Date:** 6 July 2022

**Ground Surface Level:** RL54.4m\*

| Depth (m) | Description                                                                                         | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results     |
|-----------|-----------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|------------------|
| 0         | <b>FILL</b><br>- dark grey, clayey gravel, fine to coarse sub-angular gravel                        | 54.4   |           |             |                  |                  |
| 1         |                                                                                                     |        |           | S           | 0.5              | 4,8,11<br>N=19   |
|           |                                                                                                     |        |           | S           | 0.95             |                  |
|           |                                                                                                     |        |           | S           | 1.0              | 4,13,9<br>N=22   |
| 2         | - orange and brown, sandy clay, fine to coarse grained sand, with fine to coarse sub-angular gravel | 53.0   |           |             | 1.45             |                  |
| 3         |                                                                                                     |        |           | S           | 2.5              | 2,3,1<br>N=4     |
|           |                                                                                                     |        |           |             | 2.95             |                  |
| 4         |                                                                                                     | 51.0   |           |             |                  |                  |
|           |                                                                                                     |        |           | S           | 4.0              | 2,3,3<br>N=6     |
|           |                                                                                                     | 50.0   |           |             | 4.45             |                  |
| 5         | - dark brown                                                                                        |        |           |             |                  |                  |
| 6         |                                                                                                     | 49.0   |           | S           | 5.5              | 3,3,6<br>N=9     |
|           |                                                                                                     |        |           |             | 5.95             |                  |
| 7         |                                                                                                     | 48.0   |           |             |                  |                  |
|           |                                                                                                     |        |           | S           | 7.0              | 3,6,5<br>N=11    |
|           |                                                                                                     | 47.0   |           |             | 7.45             |                  |
| 8         |                                                                                                     |        |           |             |                  |                  |
|           | - dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand     | 46.0   |           | S           | 8.5              | 26,12,14<br>N=26 |
| 9         |                                                                                                     |        |           |             | 8.95             |                  |
| 10        |                                                                                                     | 45.0   |           |             |                  |                  |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** NA

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 67

**Page No:** 2 of 3

**Date:** 6 July 2022

**Ground Surface Level:** RL54.4m\*

| Depth (m) | Description                                                                                                    | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results   |
|-----------|----------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|----------------|
| 11        | <b>FILL</b><br>- dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand | 44.0   |           | S           | 10.0             | 3,10,9<br>N=19 |
|           |                                                                                                                |        |           |             | 10.45            |                |
| 12        |                                                                                                                | 43.0   |           | S           | 11.5             | 2,4,5<br>N=9   |
|           |                                                                                                                |        |           |             | 11.95            |                |
| 13        |                                                                                                                | 42.0   |           |             |                  |                |
|           |                                                                                                                |        |           | S           | 13.0             | 3,8,8<br>N=16  |
|           |                                                                                                                | 41.0   |           |             | 13.45            |                |
| 14        |                                                                                                                | 40.0   |           | S           | 14.5             | 3,2,6<br>N=8   |
| 15        | - dark grey, clayey gravel, fine to coarse sub-angular gravel                                                  |        |           |             | 14.95            |                |
|           |                                                                                                                | 39.0   |           |             |                  |                |
| 16        |                                                                                                                |        |           | S           | 16.0             | 4,4,5<br>N=9   |
|           |                                                                                                                | 38.0   |           |             | 16.45            |                |
| 17        | - brown, silty clay, with fine to medium grained sand                                                          |        |           |             |                  |                |
|           |                                                                                                                | 37.0   |           | S           | 17.5             | 3,7,7<br>N=14  |
| 18        |                                                                                                                |        |           |             | 17.95            |                |
|           |                                                                                                                | 36.0   |           |             |                  |                |
| 19        | - brown, clayey gravel, fine to coarse sub-angular gravel                                                      |        |           | S           | 19.0             | 3,4,5<br>N=9   |
|           |                                                                                                                | 35.0   |           |             | 19.45            |                |
| 20        |                                                                                                                |        |           |             |                  |                |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** NA

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 67

**Page No:** 3 of 3

**Date:** 6 July 2022

**Ground Surface Level:** RL54.4m\*

| Depth (m) | Description                                                  | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results     |
|-----------|--------------------------------------------------------------|--------|-----------|-------------|------------------|------------------|
| 21        | <b>SILTSTONE (XW)</b><br>- extremely low strength, dark grey | 34.0   |           | S           | 20.5<br>20.95    | 10,23,25<br>N=48 |
| 22        | <b>SILTSTONE (HW)</b><br>- very low strength, dark grey      | 33.0   |           | S           | 22.0<br>22.25    | 5,30/100mm       |
| 23        | - low strength, pale grey                                    | 31.0   |           | S           | 23.5<br>23.55    | 30/50mm          |
| 24        | - very low strength                                          | 30.0   |           | S           | 25.0<br>25.09    | 30/90mm          |
| 25        | End of Bore at 25.09 m                                       | 29.0   |           |             |                  |                  |
| 26        |                                                              | 28.0   |           |             |                  |                  |
| 27        |                                                              | 27.0   |           |             |                  |                  |
| 28        |                                                              | 26.0   |           |             |                  |                  |
| 29        |                                                              | 25.0   |           |             |                  |                  |
| 30        |                                                              |        |           |             |                  |                  |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** NA

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 68

**Page No:** 1 of 3

**Date:** 25 July 2022

**Ground Surface Level:** RL66.3m\*

| Depth (m) | Description                                                                                          | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results   |
|-----------|------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|----------------|
| 0         | <b>FILL</b><br>- pale grey, clayey sand, fine to coarse grained sand                                 | 66.3   |           |             |                  |                |
| 0.5       |                                                                                                      |        |           | S           | 0.5              | 3,5,4<br>N=9   |
| 1.0       |                                                                                                      |        |           | S           | 0.95<br>1.0      |                |
| 1.45      | - with brown mottling                                                                                | 65.0   |           | S           | 1.45             | 3,3,4<br>N=7   |
| 2.5       |                                                                                                      | 64.0   |           | S           | 2.5              | 2,3,3<br>N=6   |
| 2.95      |                                                                                                      | 63.0   |           |             | 2.95             |                |
| 4.0       |                                                                                                      | 62.0   |           | S           | 4.0              | 4,5,6<br>N=11  |
| 4.45      |                                                                                                      |        |           |             | 4.45             |                |
| 5.5       | - with fine angular gravel                                                                           | 61.0   |           | S           | 5.5              | 5,8,7<br>N=15  |
| 5.95      |                                                                                                      | 60.0   |           |             | 5.95             |                |
| 7.0       | - brown                                                                                              | 59.0   |           | S           | 7.0              | 5,7,12<br>N=19 |
| 7.45      | - brown, sandy gravelly clay/sandy clayey gravel, fine to medium gravel, fine to coarse grained sand |        |           |             | 7.45             |                |
| 8.5       |                                                                                                      | 58.0   |           | S           | 8.5              | 3,6,8<br>N=14  |
| 8.95      |                                                                                                      | 57.0   |           |             | 8.95             |                |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** CL

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 68

**Page No:** 2 of 3

**Date:** 25 July 2022

**Ground Surface Level:** RL66.3m\*

| Depth (m) | Description                                                                                                         | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results    |
|-----------|---------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|-----------------|
| 11        | <b>FILL</b><br>- brown, sandy gravelly clay/sandy clayey gravel, fine to medium gravel, fine to coarse grained sand | 56.0   |           | S           | 10.0             | 3,3,3<br>N=6    |
|           |                                                                                                                     |        |           |             | 10.45            |                 |
| 12        |                                                                                                                     | 55.0   |           | S           | 11.5             | 4,5,8<br>N=13   |
|           |                                                                                                                     |        |           |             | 11.95            |                 |
| 13        |                                                                                                                     | 54.0   |           |             |                  |                 |
|           | - dark brown                                                                                                        | 53.0   |           | S           | 13.0             | 5,10,10<br>N=20 |
|           |                                                                                                                     |        |           |             | 13.45            |                 |
| 14        |                                                                                                                     | 52.0   |           |             |                  |                 |
| 15        |                                                                                                                     |        |           | S           | 14.5             | 10,9,8<br>N=17  |
|           |                                                                                                                     |        |           |             | 14.95            |                 |
|           | - interbedded layers of coal                                                                                        | 51.0   |           |             |                  |                 |
| 16        |                                                                                                                     | 50.0   |           | S           | 16.0             | 8,23,22<br>N=45 |
|           |                                                                                                                     |        |           |             | 16.45            |                 |
| 17        |                                                                                                                     | 49.0   |           |             |                  |                 |
| 18        |                                                                                                                     |        |           | S           | 17.5             | 3,7,14<br>N=21  |
|           |                                                                                                                     |        |           |             | 17.94            |                 |
| 19        |                                                                                                                     | 48.0   |           |             |                  |                 |
|           |                                                                                                                     | 47.0   |           | S           | 19.0             | 5,9,6<br>N=15   |
|           |                                                                                                                     |        |           |             | 19.45            |                 |
| 20        |                                                                                                                     |        |           |             |                  |                 |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** CL

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 68

**Page No:** 3 of 3

**Date:** 25 July 2022

**Ground Surface Level:** RL66.3m\*

| Depth (m) | Description                                                                            | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|----------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 21        | <b>SILTSTONE (XW)</b><br>- extremely low to very low strength, pale grey, fine grained | 46.0   |           | S           | 20.5<br>10.58    | 30/80mm      |
| 22        | - extremely low strength                                                               | 44.0   |           | S           | 22.0<br>22.09    | 30/90mm      |
| 23        | - medium strength                                                                      | 43.0   |           | S           | 23.5<br>23.9     | 30/20mm      |
| 24        | End of Bore at 23.52 m                                                                 |        |           |             |                  |              |
| 25        |                                                                                        |        |           |             |                  |              |
| 26        |                                                                                        |        |           |             |                  |              |
| 27        |                                                                                        |        |           |             |                  |              |
| 28        |                                                                                        |        |           |             |                  |              |
| 29        |                                                                                        |        |           |             |                  |              |
| 30        |                                                                                        |        |           |             |                  |              |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** CL

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 69

**Page No:** 1 of 3

**Date:** 11 July 2022

**Ground Surface Level:** RL79.8m\*

| Depth (m) | Description                                                                                             | RL (m) | Lithology | Sample Type | Sample Depth (m)           | Test Results                    |
|-----------|---------------------------------------------------------------------------------------------------------|--------|-----------|-------------|----------------------------|---------------------------------|
| 0         | <b>FILL</b><br>- brown, sandy clay, fine to coarse grained sand                                         | 79.8   |           |             |                            |                                 |
| 1         | - dark grey and brown, silty clay, with fine to coarse grained sand                                     | 79.0   |           | S           | 0.5<br>0.95<br>1.0<br>1.45 | 3,9,9<br>N=18<br>7,6,10<br>N=16 |
| 2         |                                                                                                         | 78.0   |           |             |                            |                                 |
| 3         |                                                                                                         | 77.0   |           | S           | 2.5<br>2.95                | 3,4,2<br>N=6                    |
| 4         | - pale grey and brown, silty clay, with fine to medium angular gravel, with fine to coarse grained sand | 76.0   |           | S           | 4.0<br>4.45                | 2,3,3<br>N=6                    |
| 5         |                                                                                                         | 75.0   |           |             |                            |                                 |
| 6         |                                                                                                         | 74.0   |           | S           | 5.5<br>5.95                | 4,4,4<br>N=8                    |
| 7         | - brown mottled grey, sandy clay, fine to coarse grained sand                                           | 73.0   |           | S           | 7.0<br>7.45                | 3,4,4<br>N=8                    |
| 8         | - dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand         | 72.0   |           |             |                            |                                 |
| 9         |                                                                                                         | 71.0   |           | S           | 8.5<br>8.95                | 17,23,12<br>N=35                |
| 10        |                                                                                                         | 70.0   |           |             |                            |                                 |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** NA

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021



# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 69

**Page No:** 2 of 3

**Date:** 11 July 2022

**Ground Surface Level:** RL79.8m\*

| Depth (m) | Description                                                                                                    | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results        |
|-----------|----------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|---------------------|
| 11        | <b>FILL</b><br>- dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand | 69.0   |           | S           | 10.0<br>10.45    | 7,9,9<br>N=18       |
| 12        | - brown and dark grey, sandy clay, fine to coarse grained sand                                                 | 68.0   |           | S           | 11.5<br>11.95    | 5,6,5<br>N=11       |
| 13        |                                                                                                                | 67.0   |           | S           | 13.0<br>13.45    | 6,8,6<br>N=14       |
| 14        |                                                                                                                | 66.0   |           | S           | 14.5<br>14.95    | 2,4,18<br>N=22      |
| 15        | - dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand                | 64.0   |           | S           | 16.0<br>16.45    | 14,6,14<br>N=20     |
| 16        |                                                                                                                | 63.0   |           | S           | 17.5<br>17.94    | 7,24,30/140mm<br>HB |
| 17        | - with coal                                                                                                    | 61.0   |           | S           | 19.0<br>19.45    | 13,22,14<br>N=36    |
| 18        |                                                                                                                | 60.0   |           |             |                  |                     |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** NA

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 69

**Page No:** 3 of 3

**Date:** 11 July 2022

**Ground Surface Level:** RL79.8m\*

| Depth (m) | Description                                                                                                               | RL (m) | Lithology | Sample Type | Sample Depth (m)      | Test Results                   |
|-----------|---------------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|-----------------------|--------------------------------|
| 21        | <b>FILL</b><br>- dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand, with coal | 59.0   |           | S           | 20.5<br>20.95         | 5,10,16<br>N=26                |
| 22        |                                                                                                                           | 58.0   |           |             |                       |                                |
| 23        | <b>SILTSTONE (HW)</b><br>- extremely low strength, dark grey                                                              | 57.0   |           | S           | 22.0<br>22.44         | 9,12,30/140mm<br>HB            |
| 24        | <b>COAL (DW)</b><br>- very low strength, black                                                                            | 56.0   |           | S           | 23.5<br>23.9          | 8,6,30/100mm<br>HB             |
| 25        | <b>SILTSTONE (HW)</b><br>- very low strength, pale grey                                                                   | 55.0   |           |             |                       |                                |
| 25        | <b>SANDSTONE (HW)</b><br>- medium strength, pale grey                                                                     | 55.0   |           | (S)         | 25.0<br>25.03<br>25.6 | 30/30mm<br>HB<br>30/30mm<br>HB |
| 26        | End of Bore at 25.63 m                                                                                                    | 54.0   |           | S           | 25.63                 |                                |
| 27        |                                                                                                                           | 53.0   |           |             |                       |                                |
| 28        |                                                                                                                           | 52.0   |           |             |                       |                                |
| 29        |                                                                                                                           | 51.0   |           |             |                       |                                |
| 30        |                                                                                                                           | 50.0   |           |             |                       |                                |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** NA

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 70

**Page No:** 1 of 4

**Date:** 14 July 2022

**Ground Surface Level:** RL74.2m\*

| Depth (m) | Description                                                                                                           | RL (m) | Lithology | Sample Type | Sample Depth (m)           | Test Results                    |
|-----------|-----------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|----------------------------|---------------------------------|
| 0         | <b>FILL</b><br>- brown, silty clay, with fine to coarse sub-angular gravel                                            | 74.2   |           |             |                            |                                 |
| 1         | - orange-brown, sandy clay, fine to coarse grained sand, with fine to coarse grained sub-angular gravel               | 73.0   |           | S           | 0.5<br>0.95<br>1.0<br>1.45 | 1,6,10<br>N=16<br>4,8,8<br>N=16 |
| 2         | - dark brown                                                                                                          |        |           |             |                            |                                 |
| 3         | - brown-grey, silty clay, with fine to coarse sub-angular gravel                                                      | 72.0   |           | S           | 2.5<br>2.95                | 5,5,4<br>N=9                    |
| 4         | - pale grey-brown                                                                                                     | 71.0   |           |             |                            |                                 |
| 5         | - red-brown                                                                                                           |        |           |             |                            |                                 |
| 6         | - pale grey-orange-brown mottled                                                                                      | 70.0   |           | S           | 4.0<br>4.45                | 7,14,19<br>N=33                 |
| 7         | - pale grey-orange-brown mottled, sandy clayey gravel, fine to medium sub-angular gravel, fine to coarse grained sand | 69.0   |           |             |                            |                                 |
| 8         | - pale grey, sandy clay, fine to coarse grained sand                                                                  | 68.0   |           | S           | 5.5<br>5.95                | 6,6,12<br>N=18                  |
| 9         | - with coal lenses                                                                                                    | 67.0   |           | S           | 7.0<br>7.4                 | 4,14,30/100mm                   |
| 10        | - pale grey-orange-brown, silty clay, with fine to coarse grained sand, with fine to coarse sub-angular gravel        | 66.0   |           | S           | 8.5<br>8.7<br>8.95         | 7,12,11<br>N=23                 |
|           | - dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand                       | 65.0   |           |             |                            |                                 |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** MG

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 70

**Page No:** 2 of 4

**Date:** 14 July 2022

**Ground Surface Level:** RL74.2m\*

| Depth (m) | Description                                                                                                         | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results    |
|-----------|---------------------------------------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|-----------------|
| 11        | <b>FILL</b><br>- dark grey, sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand, with silt | 63.0   |           | S           | 10.0             | 4,12,6<br>N=18  |
|           |                                                                                                                     |        |           |             | 10.45            |                 |
| 12        |                                                                                                                     | 62.0   |           | S           | 11.5             | 5,4,6<br>N=10   |
|           |                                                                                                                     |        |           |             | 11.95            |                 |
| 13        |                                                                                                                     | 61.0   |           | S           | 13.0             | 5,8,11<br>N=19  |
|           |                                                                                                                     |        |           |             | 13.45            |                 |
| 14        |                                                                                                                     | 60.0   |           |             |                  |                 |
|           |                                                                                                                     |        |           |             |                  |                 |
| 15        |                                                                                                                     | 59.0   |           | S           | 14.5             | 3,30/140mm      |
|           |                                                                                                                     |        |           |             | 14.79            |                 |
| 16        |                                                                                                                     | 58.0   |           | S           | 16.0             | 8,11,11<br>N=22 |
|           |                                                                                                                     |        |           |             | 16.45            |                 |
| 17        |                                                                                                                     | 57.0   |           |             |                  |                 |
|           |                                                                                                                     |        |           |             |                  |                 |
| 18        |                                                                                                                     | 56.0   |           | S           | 17.5             | 5,7,7<br>N=14   |
|           |                                                                                                                     |        |           |             | 17.95            |                 |
| 19        |                                                                                                                     | 55.0   |           | S           | 19.0             | 8,10,11<br>N=21 |
|           |                                                                                                                     |        |           |             | 19.45            |                 |
| 20        |                                                                                                                     |        |           |             |                  |                 |
|           |                                                                                                                     |        |           |             |                  |                 |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** MG

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

## BORE 70

**Page No:** 3 of 4

**Date:** 14 July 2022

**Ground Surface Level:** RL74.2m\*

| Depth (m) | Description                                                                            | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results     |
|-----------|----------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|------------------|
| 21        | <b>FILL</b><br>- grey-orange-brown, silty clay, with fine to coarse sub-angular gravel |        |           | S           | 20.5<br>20.95    | 4,6,7<br>N=13    |
|           | - with coal                                                                            | 53.0   |           |             |                  |                  |
| 22        |                                                                                        | 52.0   |           | S           | 22.0<br>22.45    | 6,9,9<br>N=18    |
| 23        | - dark grey, clayey gravel, fine to coarse sub-angular gravel, with silt               | 51.0   |           | S           | 23.5<br>23.95    | 8,9,8<br>N=17    |
| 24        |                                                                                        | 50.0   |           |             |                  |                  |
| 25        |                                                                                        | 49.0   |           | S           | 25.0<br>25.45    | 10,24,29<br>N=53 |
| 26        |                                                                                        | 48.0   |           |             |                  |                  |
| 27        |                                                                                        | 47.0   |           | S           | 26.5<br>26.95    | 2,8,7<br>N=15    |
| 28        |                                                                                        | 46.0   |           |             |                  |                  |
| 29        |                                                                                        | 45.0   |           | S           | 29.5<br>29.95    | 8,20,19<br>N=39  |
| 30        |                                                                                        |        |           |             |                  |                  |

|    |                                    |     |                                        |    |                      |                                     |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|-------------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d) Diametral Test                  |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a) Axial Test                      |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i) Lump Test                       |

**Rig:** Hanjin D8

**Logged by:** MG

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

# BORE REPORT



**Client:** Chum Street Land Evolution Pty Ltd

**Project:** Residential Subdivision

**Location:** Whitwood Road, Ebbw Vale

**Project No:** 022-135A

**BORE 70**

**Page No:** 4 of 4

**Date:** 14 July 2022

**Ground Surface Level:** RL74.2m\*

| Depth (m) | Description                                                                             | RL (m) | Lithology | Sample Type | Sample Depth (m) | Test Results |
|-----------|-----------------------------------------------------------------------------------------|--------|-----------|-------------|------------------|--------------|
| 31        | <b>FILL</b><br>- dark grey, clayey gravel, fine to coarse sub-angular gravel, with silt | 43.0   |           |             |                  |              |
| 32        | End of Bore at 31.5 m                                                                   | 42.0   |           |             |                  |              |
| 33        |                                                                                         | 41.0   |           |             |                  |              |
| 34        |                                                                                         | 40.0   |           |             |                  |              |
| 35        |                                                                                         | 39.0   |           |             |                  |              |
| 36        |                                                                                         | 38.0   |           |             |                  |              |
| 37        |                                                                                         | 37.0   |           |             |                  |              |
| 38        |                                                                                         | 36.0   |           |             |                  |              |
| 39        |                                                                                         | 35.0   |           |             |                  |              |
| 40        |                                                                                         |        |           |             |                  |              |

|    |                                    |     |                                        |    |                      |        |                              |
|----|------------------------------------|-----|----------------------------------------|----|----------------------|--------|------------------------------|
| U  | Undisturbed Tube Sample (50mm dia) | S   | Standard Penetration Test (SPT)        | E  | Environmental Sample | Is(50) | Point Load Test Result (MPa) |
| D  | Disturbed Sample                   | HB  | SPT Hammer Bouncing                    | Up | Pushtube Sample      | (d)    | Diametral Test               |
| B  | Bulk Sample                        | ( ) | No Sample Recovery                     | C  | NMLC Coring          | (a)    | Axial Test                   |
| pp | Pocket Penetrometer Test (kPa)     | V   | Vane Shear Strength, Uncorrected (kPa) | SO | Sonic Coring         | (i)    | Lump Test                    |

**Rig:** Hanjin D8

**Logged by:** MG

**Drilling Method:** Auger to 2.5m, casing to 2.5m, then washbore

**Groundwater:** No free groundwater encountered during auger drilling

**Remarks:** \*Approximate ground surface level interpolated from Bennett + Bennett's 'Verification Plot' Dwg No. 210051\_001\_VER, Rev B, dated 12/03/2021

## Notes on Description and Classification of Soil

The methods of description and classification of soils used in this report are generally based on Australian Standard AS1726-1993 Geotechnical Site Investigations.

Soil description is based on an assessment of disturbed samples, as recovered from bores and excavations, or from undisturbed materials as seen in excavations and exposures or in undisturbed samples. Descriptions given on report sheets are an interpretation of the conditions encountered at the time of investigation.

In the case of cone or piezocone penetrometer tests, actual soil samples are not recovered and soil description is inferred based on published correlations, past experience and comparison with bore and/or test pit data (if available).

Soil classification is based on the particle size distribution of the soil and the plasticity of the portion of the material finer than 0.425mm. The description of particle size distribution and plasticity is based on the results of visual field estimation, laboratory testing or both. When assessed in the field, the properties of the soil are estimated; precise description will always require laboratory testing to define soil properties.

Where soil can be clearly identified as FILL this will be noted as the main soil type followed by a description of the composition of the fill (e.g. FILL – yellow-brown, fine to coarse grained gravelly clay fill with concrete rubble). If the soil is assessed as possibly being fill this will be noted as an additional observation.

Soils are generally described using the following sequence of terms. In certain instances, not all of the terms will be included in the soil description.

### MAIN SOIL TYPE (CLASSIFICATION GROUP SYMBOL)

- strength/density, colour, structure/grain size, secondary and minor components, additional observations

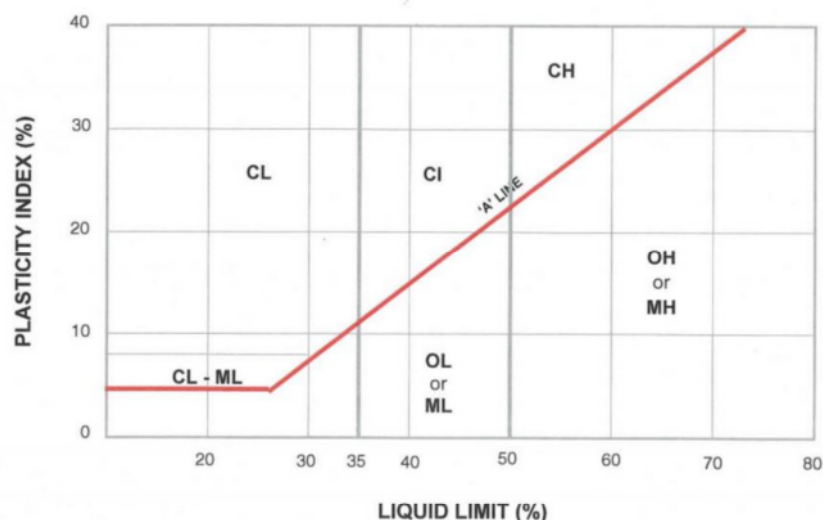
Information on the definition of descriptive and classification terms follows.

### SOIL TYPE and CLASSIFICATION GROUP SYMBOLS

|                                                                             | Major Divisions                                                      | Particle Size                                                      | Classification Group Symbol | Typical Names                                                                                     |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------|
| COARSE GRAINED SOILS<br>(more than half of material is larger than 0.075mm) | BOULDERS                                                             | >200mm                                                             |                             |                                                                                                   |
|                                                                             | COBBLES                                                              | 63 – 200mm                                                         |                             |                                                                                                   |
|                                                                             | GRAVELS<br>(more than half of coarse fraction is larger than 2.36mm) | Coarse: 20 – 63mm<br>Medium: 6 – 20mm<br>Fine: 2.36 – 6mm          | GW                          | Well graded gravels, gravel-sand mixtures, little or no fines.                                    |
|                                                                             |                                                                      |                                                                    | GP                          | Poorly graded gravels and gravel-sand mixtures, little or no fines, uniform gravels.              |
|                                                                             |                                                                      |                                                                    | GM                          | Silty gravels, gravel-sand-silt mixtures.                                                         |
|                                                                             |                                                                      |                                                                    | GC                          | Clayey gravels, gravel-sand-clay mixtures.                                                        |
|                                                                             | SANDS<br>(more than half of coarse fraction is smaller than 2.36mm)  | Coarse: 0.6 – 2.36mm<br>Medium: 0.2 – 0.6mm<br>Fine: 0.075 – 0.2mm | SW                          | Well graded sands, gravelly sands, little or no fines.                                            |
|                                                                             |                                                                      |                                                                    | SP                          | Poorly graded sands and gravelly sands; little or no fines, uniform sands.                        |
|                                                                             |                                                                      |                                                                    | SM                          | Silty sands, sand-silt mixtures.                                                                  |
|                                                                             |                                                                      |                                                                    | SC                          | Clayey sands, sand-clay mixtures.                                                                 |
| FINE GRAINED SOILS<br>(more than half of material is smaller than 0.075mm)  | SILTS & CLAYS<br>(liquid limit <50%)                                 |                                                                    | ML                          | Inorganic silts and very fine sands, silty/clayey fine sands or clayey silts with low plasticity. |
|                                                                             |                                                                      |                                                                    | CL and CI                   | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.            |
|                                                                             |                                                                      |                                                                    | OL                          | Organic silts and organic silty clays of low plasticity.                                          |
|                                                                             | SILTS & CLAYS<br>(liquid limit >50%)                                 |                                                                    | MH                          | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils.                             |
|                                                                             |                                                                      |                                                                    | CH                          | Inorganic clays of high plasticity.                                                               |
|                                                                             |                                                                      |                                                                    | OH                          | Organic clays of medium to high plasticity, organic silts.                                        |
|                                                                             | HIGHLY ORGANIC SOILS                                                 |                                                                    | Pt                          | Peat and other highly organic soils.                                                              |



#### PLASTICITY CHART FOR CLASSIFICATION OF FINE GRAINED SOILS



(Reference: Australian Standard AS1726-1993 Geotechnical site investigations)

#### DESCRIPTIVE TERMS FOR MATERIAL PROPORTIONS

| Coarse Grained Soils |                                             | Fine Grained Soils |                                                |
|----------------------|---------------------------------------------|--------------------|------------------------------------------------|
| % Fines              | Modifier                                    | % Coarse           | Modifier                                       |
| <5                   | Omit, or use 'trace'                        | <15                | Omit, or use trace.                            |
| 5 – 12               | Describe as 'with clay/silt' as applicable. | 15 – 30            | Describe as 'with sand/gravel' as applicable.  |
| >12                  | Prefix soil as 'silty/clayey' as applicable | >30                | Prefix soil as 'sandy/gravelly' as applicable. |

#### STRENGTH TERMS – COHESIVE SOILS

| Strength Term | Undrained Shear Strength | Field Guide to Strength                                 |
|---------------|--------------------------|---------------------------------------------------------|
| Very soft     | <12kPa                   | Exudes between the fingers when squeezed in hand.       |
| Soft          | 12 – 25kPa               | Can be moulded by light finger pressure.                |
| Firm          | 25 – 50kPa               | Can be moulded by strong finger pressure.               |
| Stiff         | 50 – 100kPa              | Cannot be moulded by fingers, can be indented by thumb. |
| Very stiff    | 100 – 200kPa             | Can be indented by thumb nail.                          |
| Hard          | >200kPa                  | Can be indented with difficulty by thumb nail.          |

#### DENSITY TERMS – NON COHESIVE SOILS

| Density Term | Density Index | SPT "N" | CPT Cone Resistance |
|--------------|---------------|---------|---------------------|
| Very loose   | <15%          | 0 – 5   | 0 – 2MPa            |
| Loose        | 15 – 35%      | 5 – 10  | 2 – 5MPa            |
| Medium dense | 35 – 65%      | 10 – 30 | 5 – 15MPa           |
| Dense        | 65 – 85%      | 30 – 50 | 15 – 25MPa          |
| Very dense   | >85%          | >50     | >25MPa              |

#### COLOUR

The colour of a soil will generally be described in a 'moist' condition using simple colour terms (e.g. black, grey, red, brown etc.) modified as necessary by "pale", "dark", "light" or "mottled". Borderline colours will be described as a combination of colours (e.g. grey-brown).

#### EXAMPLE

e.g. CLAYEY SAND (SC) – medium dense, grey-brown, fine to medium grained with silt.

Indicates a medium dense, grey-brown, fine to medium grained clayey sand with silt.

## Notes on Description and Classification of Rock

The methods of description and classification of rock used in this report are generally based on Australian Standard AS1726-1993 *Geotechnical site investigations*.

Rock description is based on an assessment of disturbed samples, as recovered from bores and excavations, or from undisturbed materials as seen in excavations and exposures, or in core samples. Descriptions given on report sheets are an interpretation of the conditions encountered at the time of investigation.

Notes outlining the method and terminology adopted for the description of rock defects are given below, however, detailed information on defects can generally only be determined where rock core is taken, or excavations or exposures allow detailed observation and measurement.

Rocks are generally described using the following sequence of terms. In certain instances not all of the terms will be included in the rock description.

ROCK TYPE (WEATHERING SYMBOL), strength, colour, grain size, defect frequency

Information on the definition of descriptive and classification terms follows.

### ROCK TYPE

In general, simple rock names are used rather than precise geological classifications.

### ROCK MATERIALS WEATHERING CLASSIFICATION

| Term                   | Weathering Symbol | Definition                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Residual soil          | RS                | Soil developed from extremely weathered rock; the mass structure and substance fabrics are no longer evident; there is a large change in volume but the soil has not been significantly transported.                                                                                                                                                                                                                           |
| Extremely weathered    | XW                | Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded in water.                                                                                                                                                                                                                                                                                                  |
| Distinctly weathered * | DW                | Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.                                                                                                                                                                                                        |
| - Highly weathered     | HW                | Rock substance affected by weathering to the extent that limonite staining or bleaching affects the whole of the rock substance and other signs of chemical or physical decomposition are evident. Porosity and strength may be increased or decreased compared to the fresh rock, usually as a result of iron leaching or deposition. The colour and strength of the original fresh rock substance is no longer recognisable. |
| - Moderately weathered | MW                | Rock substance affected by weathering to the extent that staining extends throughout the whole of the rock substance and the original colour of the fresh rock may be no longer recognisable.                                                                                                                                                                                                                                  |
| Slightly weathered     | SW                | Rock is slightly discoloured but shows little or no change of strength from fresh rock.                                                                                                                                                                                                                                                                                                                                        |
| Fresh                  | FR                | Rock shows no sign of decomposition or staining.                                                                                                                                                                                                                                                                                                                                                                               |

\* Subdivision of this weathering grade into highly and moderately may be used where applicable.

### STRENGTH OF ROCK MATERIAL

| Term           | Symbol | Point Load Index<br>$I_s$ (50) | Field Guide To Strength                                                                                                                                                                                                                                                |
|----------------|--------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Extremely low  | EL     | <0.03MPa                       | Easily remoulded by hand to a material with soil properties.                                                                                                                                                                                                           |
| Very low       | VL     | 0.03 – 0.1MPa                  | Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.                                                                              |
| Low            | L      | 0.1 – 0.3MPa                   | Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling. |
| Medium         | M      | 0.3 – 1.0MPa                   | Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.                                                                                                                                                        |
| High           | H      | 1.0 – 3.0MPa                   | A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.                                                                                                                     |
| Very high      | VH     | 3.0 – 10.0MPa                  | Hand specimen breaks with pick after more than one blow; rock rings under hammer.                                                                                                                                                                                      |
| Extremely high | EH     | >10MPa                         | Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.                                                                                                                                                           |

Notes:

- These terms refer to the strength of the rock material and not to the strength of the rock mass which may be considerably weaker due to the effect of rock defects.
- The field guide visual assessment for rock strength may be used for preliminary assessment or when point load testing is not available.
- Anisotropy of rock may affect the field assessment of strength.

### COLOUR

The colour of a rock will generally be described in a 'moist' condition using simple colour terms (e.g. black, grey, red, brown, etc) modified as necessary by 'pale', 'dark', 'light' or 'mottled'. Borderline colours will be described as a combination of colours (e.g. grey-brown).

### GRAIN SIZE

| Descriptive Term | Particle Size Range |
|------------------|---------------------|
| Coarse grained   | 0.6 – 2.0mm         |
| Medium grained   | 0.2 – 0.6mm         |
| Fine grained     | 0.06 – 0.2mm        |

### DEFECT FREQUENCY

Where appropriate, a defect frequency may be recorded as part of the rock description and will be expressed as the number of natural (or interpreted natural) defects present in an equivalent one metre length of core; by use of the following defect frequency descriptive terms; or both. The descriptive terms refer to the spacing of all types of natural defects along which the rock is discontinuous and include, bedding plane partings, joints and other rock defects, but excludes known artificial fractures such as drilling breaks.

| Defect Frequency                | Description                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Fragmented                      | Rock core is comprised primarily of fragments of length less than 20mm, and mostly of width less than the core diameter. |
| Highly Fractured                | Core lengths are generally less than 20mm to 40mm with occasional fragments.                                             |
| Fractured                       | Core lengths are mainly 30mm to 100mm with occasional shorter and longer sections.                                       |
| Fractured to Slightly Fractured | Core lengths are mainly 100mm to 300mm with occasional shorter to longer sections.                                       |
| Slightly Fractured              | Core lengths are generally 300mm to 1,000mm with occasional longer sections and occasional sections of 100mm to 300mm.   |
| Unbroken                        | The core does not contain any fractures.                                                                                 |

### EXAMPLE

e.g. SANDSTONE (XW) – low strength, pale brown, fine to coarse grained, slightly fractured.

### ROCK DEFECT LOGGING

Defects are discontinuities in the rock mass and include joints, sheared zones, cleavages and bedding partings. The ability to observe and log defects will depend on the investigation methodology. Defects logged in core are described using the abbreviations noted in the following tables.

The *depth* noted in the description is measured in metres from the ground surface, the *defect angle* is measured in degrees from horizontal, and the defect *thickness* is measured normal to the plane of the defect and is in millimetres (unless otherwise noted).

Defects are generally described using the following sequence of terms:

*Depth, Defect Type, Defect Angle (dip), Surface Roughness, Infill, Thickness*

### DEFECT TYPE

|   |                |
|---|----------------|
| B | – Bedding      |
| J | – Joint        |
| S | – Shear Zone   |
| C | – Crushed Zone |

### SURFACE ROUGHNESS

|      |                                  |
|------|----------------------------------|
| i    | - rough or irregular, stepped    |
| ii   | - smooth, stepped                |
| iii  | - slickensided, stepped          |
| iv   | - rough or irregular, undulating |
| v    | - smooth, undulating             |
| vi   | - slickensided, undulating       |
| vii  | - rough or irregular, planar     |
| viii | - smooth planar                  |
| ix   | - slickensided, planar           |

### INFILL

Infill refers to secondary minerals or other materials formed on the surface of the defect and some common descriptions are given in the following table together with their abbreviations.

|       |                      |
|-------|----------------------|
| Ls    | - limonite staining  |
| Fe    | - iron staining      |
| Cl    | - clay               |
| Mn    | - manganese staining |
| Qtz   | - quartz             |
| Ca    | - calcite            |
| Clean | - no visible infill  |

### EXAMPLE

3.59m, J, 90, vii, Ls, 1mm

indicates a joint at 3.59m depth that is at 90° to horizontal (i.e. vertical), is rough or irregular and planar, limonite stained and 1mm thick.

# **APPENDIX B**

## **LABORATORY TEST REPORT SHEETS**

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259C  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 2 , Depth: 1.0 - 1.2m



Ground Testing Services Pty Ltd  
Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

Email: enquiries@groundtestingservices.com.au

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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 1          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 1.0 - 1.2m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 4.2        |     |     |
| Electrical Conductivity (µS/cm)                       | 605        |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 19.3 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259D  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 3 , Depth: 0.6 - 0.7m



Ground Testing Services Pty Ltd  
Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |                     | Min | Max |
|------------------------------------------------|---------------------|-----|-----|
| Emerson Class                                  | 2                   |     |     |
| Soil Description                               | Gravelly Silty Clay |     |     |
| Nature of Water                                | Distilled           |     |     |
| Temperature of Water (°C)                      | 22                  |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 0.6 - 0.7m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 3.7        |     |     |
| Electrical Conductivity (µS/cm)                       | 247.8      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 11.6 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259F  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 5 , Depth: 0.5 - 0.7m



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Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 2          |     |     |
| Soil Description                               | Sandy Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 0.5 - 0.7m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 3.6        |     |     |
| Electrical Conductivity (µS/cm)                       | 288.4      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 17.1 |



# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259I  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 7 , Depth: 1.2 - 1.5m



Ground Testing Services Pty Ltd  
Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 3          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 1.2 - 1.5m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 6.9        |     |     |
| Electrical Conductivity (µS/cm)                       | 231.4      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 20.0 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259K  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 14 , Depth: 0.2 - 0.4m



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Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 2          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 0.2 - 0.4m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 3.7        |     |     |
| Electrical Conductivity (µS/cm)                       | 659        |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 15.1 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259L  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 16 , Depth: 0.4 - 0.8m



Ground Testing Services Pty Ltd  
Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
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Email: enquiries@groundtestingservices.com.au

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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |                   | Min | Max |
|------------------------------------------------|-------------------|-----|-----|
| Emerson Class                                  | 2                 |     |     |
| Soil Description                               | Fill - silty sand |     |     |
| Nature of Water                                | Distilled         |     |     |
| Temperature of Water (°C)                      | 22                |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 0.4 - 0.8m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 6.0        |     |     |
| Electrical Conductivity (µS/cm)                       | 26         |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 15.7 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259M  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 16 , Depth: 2.7 - 2.9m



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Gold Coast Laboratory  
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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |                   | Min | Max |
|------------------------------------------------|-------------------|-----|-----|
| Emerson Class                                  | 2                 |     |     |
| Soil Description                               | Fill - silty clay |     |     |
| Nature of Water                                | Distilled         |     |     |
| Temperature of Water (°C)                      | 22                |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 2.7 - 2.9m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 5.2        |     |     |
| Electrical Conductivity (µS/cm)                       | 336        |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 20.6 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259N  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 17 , Depth: 2.9 - 3.0m



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Gold Coast Laboratory  
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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 5          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 2.9 - 3.0m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 3.3        |     |     |
| Electrical Conductivity (µS/cm)                       | 984        |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 26.9 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259R  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 27 , Depth: 2.4 - 2.6m



Ground Testing Services Pty Ltd  
Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

Email: enquiries@groundtestingservices.com.au

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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |                            | Min | Max |
|------------------------------------------------|----------------------------|-----|-----|
| Emerson Class                                  | 1                          |     |     |
| Soil Description                               | Fill - sandy clayey gravel |     |     |
| Nature of Water                                | Distilled                  |     |     |
| Temperature of Water (°C)                      | 22                         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 2.4 - 2.6m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 6.3        |     |     |
| Electrical Conductivity (µS/cm)                       | 186.4      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 13.8 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259S  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 29 , Depth: 1.1 - 1.3m



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Gold Coast Laboratory  
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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 1          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 1.1 - 1.3m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 3.6        |     |     |
| Electrical Conductivity (µS/cm)                       | 146.3      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 13.3 |



# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259T  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 31 , Depth: 1.7 - 1.9m



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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |                            | Min | Max |
|------------------------------------------------|----------------------------|-----|-----|
| Emerson Class                                  | 2                          |     |     |
| Soil Description                               | Fill - sandy clayey gravel |     |     |
| Nature of Water                                | Distilled                  |     |     |
| Temperature of Water (°C)                      | 22                         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 1.7 - 1.9m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 4.6        |     |     |
| Electrical Conductivity (µS/cm)                       | 144.2      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 10.1 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259Z  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 39 , Depth: 1.3 - 1.5m



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Gold Coast Laboratory  
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Phone: (07) 5535 2539

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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 6          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 1.3 - 1.5m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 4.9        |     |     |
| Electrical Conductivity (µS/cm)                       | 905        |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 21.6 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AA  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 39 , Depth: 2.5 - 2.7m



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Gold Coast Laboratory  
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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 6          |     |     |
| Soil Description                               | Sandy Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 2.5 - 2.7m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 4.4        |     |     |
| Electrical Conductivity (µS/cm)                       | 478.8      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 12.1 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AB  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 40 , Depth: 2.2 - 2.4m



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Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 2          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 2.2 - 2.4m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 5.3        |     |     |
| Electrical Conductivity (µS/cm)                       | 727        |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 29.2 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AC  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 41 , Depth: 1.4 - 1.6m



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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 2          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 1.4 - 1.6m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 5.2        |     |     |
| Electrical Conductivity (µS/cm)                       | 2042       |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 27.6 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AF  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 43 , Depth: 0.9 - 1.1m



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Email: enquiries@groundtestingservices.com.au

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Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 5          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 0.9 - 1.1m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 4.6        |     |     |
| Electrical Conductivity (µS/cm)                       | 2161       |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 28.3 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AH  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 43 , Depth: 2.8 - 3.1m



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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 3          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 2.8 - 3.1m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 4.0        |     |     |
| Electrical Conductivity (µS/cm)                       | 2076       |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 30.7 |



# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AK  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 46 , Depth: 0.5 - 0.6m



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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Emerson Class                                  | 5          |     |     |
| Soil Description                               | Silty Clay |     |     |
| Nature of Water                                | Distilled  |     |     |
| Temperature of Water (°C)                      | 22         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 0.5 - 0.6m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 4.3        |     |     |
| Electrical Conductivity (µS/cm)                       | 690        |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 33.3 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AP  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 48 , Depth: 2.0 - 2.2m



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Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

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Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |                    | Min | Max |
|------------------------------------------------|--------------------|-----|-----|
| Emerson Class                                  | 6                  |     |     |
| Soil Description                               | Sandy Silty Gravel |     |     |
| Nature of Water                                | Distilled          |     |     |
| Temperature of Water (°C)                      | 22                 |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 22         |     |     |
| Distilled Water pH                                    | 5.24       |     |     |
| Depth                                                 | 2.0 - 2.2m |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 4.2        |     |     |
| Electrical Conductivity (µS/cm)                       | 501        |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 12.1 |

# Material Test Report

**Report Number:** 022-135A-1A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AQ  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 49 , Depth: 1.2 - 1.4m



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2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

Email: enquiries@groundtestingservices.com.au

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Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1)        |                            | Min | Max |
|-------------------------------------------------------|----------------------------|-----|-----|
| Emerson Class                                         | 2                          |     |     |
| Soil Description                                      | Fill - sandy clayey gravel |     |     |
| Nature of Water                                       | Distilled                  |     |     |
| Temperature of Water (°C)                             | 22                         |     |     |
| pH Value of Soil (AS 1289 4.3.1)                      |                            | Min | Max |
| Air Temp (°C)                                         | 22                         |     |     |
| Distilled Water pH                                    | 5.24                       |     |     |
| Depth                                                 | 1.2 - 1.4m                 |     |     |
| Moisture Condition                                    | Air-dried                  |     |     |
| pH                                                    | 7.3                        |     |     |
| Electrical Conductivity (µS/cm)                       | 445.6                      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |                            |     |     |
| Electrical Conductivity not covered by accreditation. |                            |     |     |
| Moisture Content (AS 1289 2.1.1)                      |                            |     |     |
| Moisture Content (%)                                  |                            | 7.0 |     |

# Material Test Report

**Report Number:** 022-135A-2A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327C  
**Date Sampled:** 05/07/2022  
**Dates Tested:** 21/07/2022 - 25/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 63 , Depth: 4.0 - 4.45m



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Gold Coast Laboratory

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Phone: (07) 5535 2539

Email: enquiries@groundtestingservices.com.au

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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |                            | Min | Max |
|------------------------------------------------|----------------------------|-----|-----|
| Emerson Class                                  | 2                          |     |     |
| Soil Description                               | Fill - sandy clayey gravel |     |     |
| Nature of Water                                | Distilled                  |     |     |
| Temperature of Water (°C)                      | 21                         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 21         |     |     |
| Distilled Water pH                                    | 5.94       |     |     |
| Depth                                                 | 4.0 - 4.45 |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 4.1        |     |     |
| Electrical Conductivity (µS/cm)                       | 113.7      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 18.3 |

# Material Test Report

**Report Number:** 022-135A-2A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327F  
**Date Sampled:** 12/07/2022  
**Dates Tested:** 21/07/2022 - 25/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 65 , Depth: 4.0 - 4.45m



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Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |                            | Min | Max |
|------------------------------------------------|----------------------------|-----|-----|
| Emerson Class                                  | 1                          |     |     |
| Soil Description                               | Fill - sandy clayey gravel |     |     |
| Nature of Water                                | Distilled                  |     |     |
| Temperature of Water (°C)                      | 21                         |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 21         |     |     |
| Distilled Water pH                                    | 5.94       |     |     |
| Depth                                                 | 4.0 - 4.45 |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 6.9        |     |     |
| Electrical Conductivity (µS/cm)                       | 176.8      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 17.0 |

# Material Test Report

**Report Number:** 022-135A-2A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327I  
**Date Sampled:** 06/07/2022  
**Dates Tested:** 21/07/2022 - 25/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 67 , Depth: 2.5 - 2.95m



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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |                   | Min | Max |
|------------------------------------------------|-------------------|-----|-----|
| Emerson Class                                  | 2                 |     |     |
| Soil Description                               | Fill - sandy clay |     |     |
| Nature of Water                                | Distilled         |     |     |
| Temperature of Water (°C)                      | 21                |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 21         |     |     |
| Distilled Water pH                                    | 5.94       |     |     |
| Depth                                                 | 2.5 - 2.95 |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 4.4        |     |     |
| Electrical Conductivity (µS/cm)                       | 97.4       |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 14.6 |

# Material Test Report

**Report Number:** 022-135A-2A  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327N  
**Date Sampled:** 11/07/2022  
**Dates Tested:** 21/07/2022 - 25/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 69 , Depth: 7.0 - 7.45m



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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Emerson Class Number of a Soil (AS 1289 3.8.1) |                   | Min | Max |
|------------------------------------------------|-------------------|-----|-----|
| Emerson Class                                  | 2                 |     |     |
| Soil Description                               | Fill - sandy clay |     |     |
| Nature of Water                                | Distilled         |     |     |
| Temperature of Water (°C)                      | 21                |     |     |

| pH Value of Soil (AS 1289 4.3.1)                      |            | Min | Max |
|-------------------------------------------------------|------------|-----|-----|
| Air Temp (°C)                                         | 21         |     |     |
| Distilled Water pH                                    | 5.94       |     |     |
| Depth                                                 | 7.0 - 7.45 |     |     |
| Moisture Condition                                    | Air-dried  |     |     |
| pH                                                    | 3.8        |     |     |
| Electrical Conductivity (µS/cm)                       | 443.3      |     |     |
| For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm      |            |     |     |
| Electrical Conductivity not covered by accreditation. |            |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 17.6 |



# Material Test Report

**Report Number:** 022-135A-1B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259E  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 3 , Depth: 2.7 - 2.8m



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Gold Coast Laboratory

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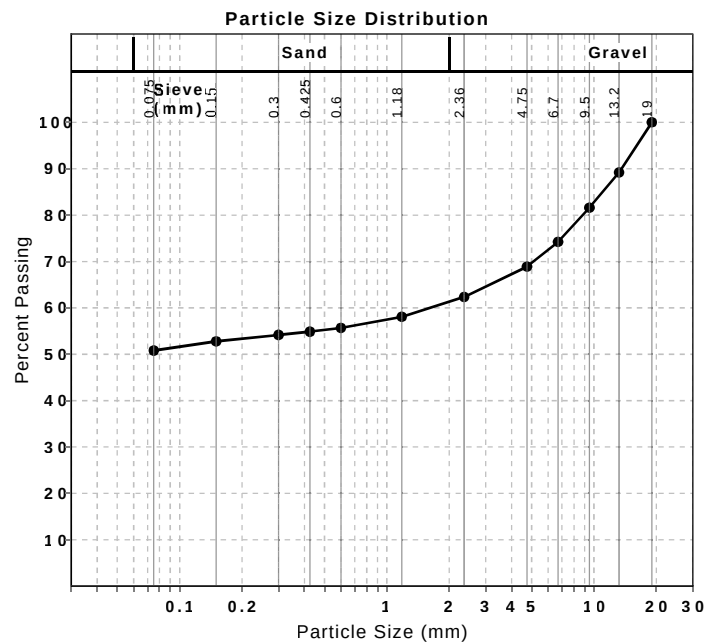
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 19 mm                                     | 100      |                | 0          |                 |
| 13.2 mm                                   | 89       |                | 11         |                 |
| 9.5 mm                                    | 82       |                | 8          |                 |
| 6.7 mm                                    | 74       |                | 7          |                 |
| 4.75 mm                                   | 69       |                | 5          |                 |
| 2.36 mm                                   | 62       |                | 7          |                 |
| 1.18 mm                                   | 58       |                | 4          |                 |
| 0.6 mm                                    | 56       |                | 2          |                 |
| 0.425 mm                                  | 55       |                | 1          |                 |
| 0.3 mm                                    | 54       |                | 1          |                 |
| 0.15 mm                                   | 53       |                | 1          |                 |
| 0.075 mm                                  | 51       |                | 2          |                 |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |
| Moisture Content (%)                      |          |                |            | 12.1            |



# Material Test Report

**Report Number:** 022-135A-1B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259G  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 5 , Depth: 2.2 - 2.4m



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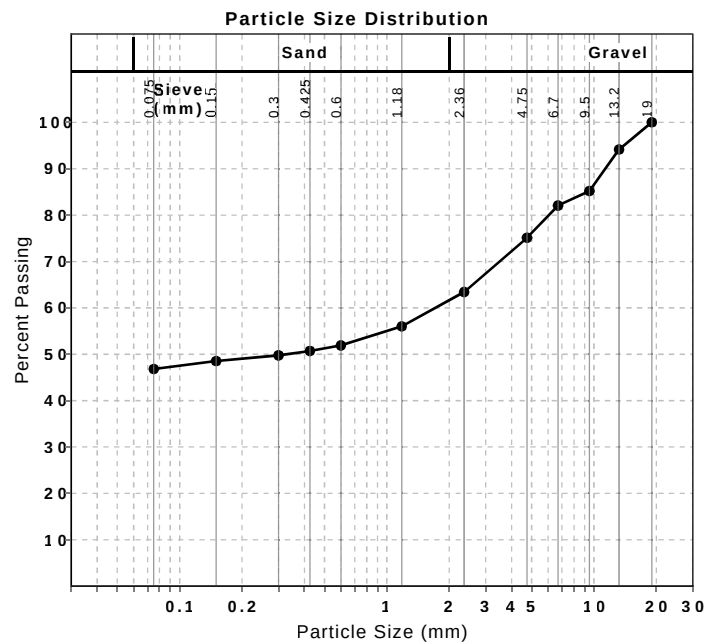
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 19 mm                                     | 100      |                | 0          |                 |
| 13.2 mm                                   | 94       |                | 6          |                 |
| 9.5 mm                                    | 85       |                | 9          |                 |
| 6.7 mm                                    | 82       |                | 3          |                 |
| 4.75 mm                                   | 75       |                | 7          |                 |
| 2.36 mm                                   | 63       |                | 12         |                 |
| 1.18 mm                                   | 56       |                | 7          |                 |
| 0.6 mm                                    | 52       |                | 4          |                 |
| 0.425 mm                                  | 51       |                | 1          |                 |
| 0.3 mm                                    | 50       |                | 1          |                 |
| 0.15 mm                                   | 49       |                | 1          |                 |
| 0.075 mm                                  | 47       |                | 2          |                 |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |
| Moisture Content (%)                      |          |                | 14.9       |                 |



# Material Test Report

**Report Number:** 022-135A-1B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259U  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 32 , Depth: 0.3 - 0.5m



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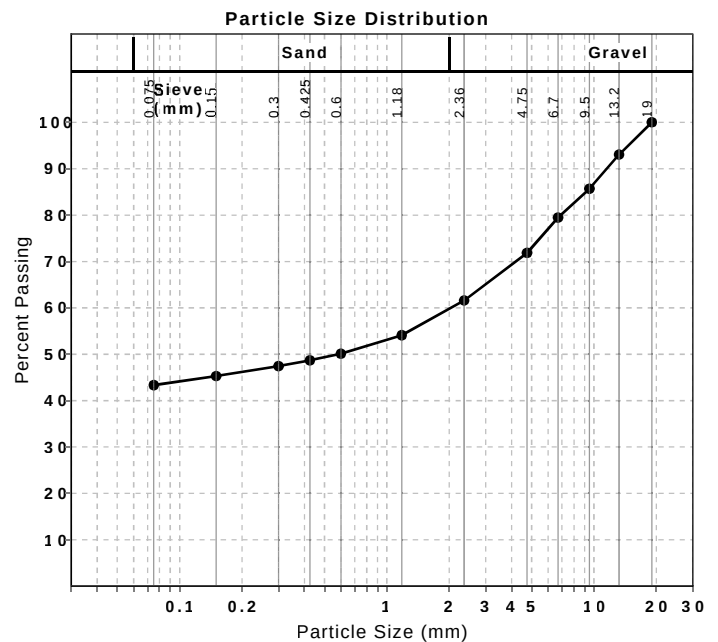
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |  |
|-------------------------------------------|----------|----------------|------------|-----------------|--|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |  |
| 19 mm                                     | 100      |                | 0          |                 |  |
| 13.2 mm                                   | 93       |                | 7          |                 |  |
| 9.5 mm                                    | 86       |                | 7          |                 |  |
| 6.7 mm                                    | 79       |                | 6          |                 |  |
| 4.75 mm                                   | 72       |                | 8          |                 |  |
| 2.36 mm                                   | 62       |                | 10         |                 |  |
| 1.18 mm                                   | 54       |                | 7          |                 |  |
| 0.6 mm                                    | 50       |                | 4          |                 |  |
| 0.425 mm                                  | 49       |                | 1          |                 |  |
| 0.3 mm                                    | 47       |                | 1          |                 |  |
| 0.15 mm                                   | 45       |                | 2          |                 |  |
| 0.075 mm                                  | 43       |                | 2          |                 |  |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |  |
| Moisture Content (%)                      |          |                |            | 15.8            |  |



# Material Test Report

**Report Number:** 022-135A-1B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259Y  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 38 , Depth: 2.4 - 2.6m



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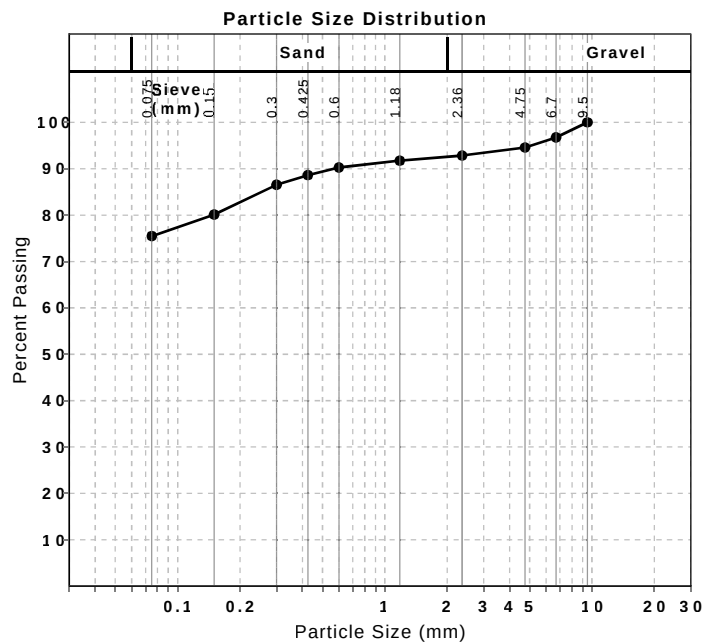


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 9.5 mm                                    | 100      |                | 0          |                 |
| 6.7 mm                                    | 97       |                | 3          |                 |
| 4.75 mm                                   | 95       |                | 2          |                 |
| 2.36 mm                                   | 93       |                | 2          |                 |
| 1.18 mm                                   | 92       |                | 1          |                 |
| 0.6 mm                                    | 90       |                | 1          |                 |
| 0.425 mm                                  | 89       |                | 2          |                 |
| 0.3 mm                                    | 87       |                | 2          |                 |
| 0.15 mm                                   | 80       |                | 6          |                 |
| 0.075 mm                                  | 75       |                | 5          |                 |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |
| Moisture Content (%)                      |          |                | 28.3       |                 |



# Material Test Report

**Report Number:** 022-135A-1B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AD  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 08/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 41 , Depth: 2.2 - 2.4m



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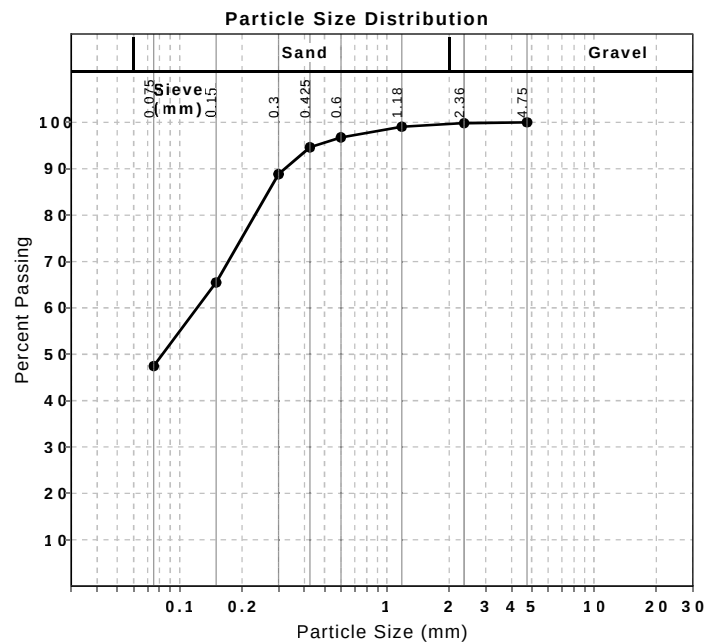
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |  |
|-------------------------------------------|----------|----------------|------------|-----------------|--|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |  |
| 4.75 mm                                   | 100      |                | 0          |                 |  |
| 2.36 mm                                   | 100      |                | 0          |                 |  |
| 1.18 mm                                   | 99       |                | 1          |                 |  |
| 0.6 mm                                    | 97       |                | 2          |                 |  |
| 0.425 mm                                  | 95       |                | 2          |                 |  |
| 0.3 mm                                    | 89       |                | 6          |                 |  |
| 0.15 mm                                   | 65       |                | 23         |                 |  |
| 0.075 mm                                  | 47       |                | 18         |                 |  |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |  |
| Moisture Content (%)                      |          |                |            | 9.4             |  |



# Material Test Report

**Report Number:** 022-135A-1B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AE  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 10/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 42 , Depth: 0.9 - 1.0m



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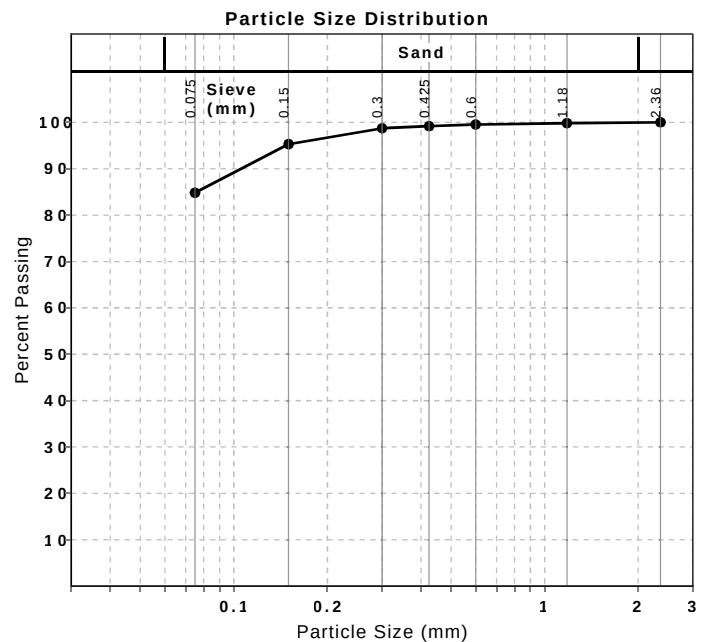
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 2.36 mm                                   | 100      |                | 0          |                 |
| 1.18 mm                                   | 100      |                | 0          |                 |
| 0.6 mm                                    | 100      |                | 0          |                 |
| 0.425 mm                                  | 99       |                | 0          |                 |
| 0.3 mm                                    | 99       |                | 0          |                 |
| 0.15 mm                                   | 95       |                | 3          |                 |
| 0.075 mm                                  | 85       |                | 10         |                 |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |
| Moisture Content (%)                      |          |                |            | 16.2            |



# Material Test Report

**Report Number:** 022-135A-1B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AJ  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 10/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 45 , Depth: 2.8 - 3.0m



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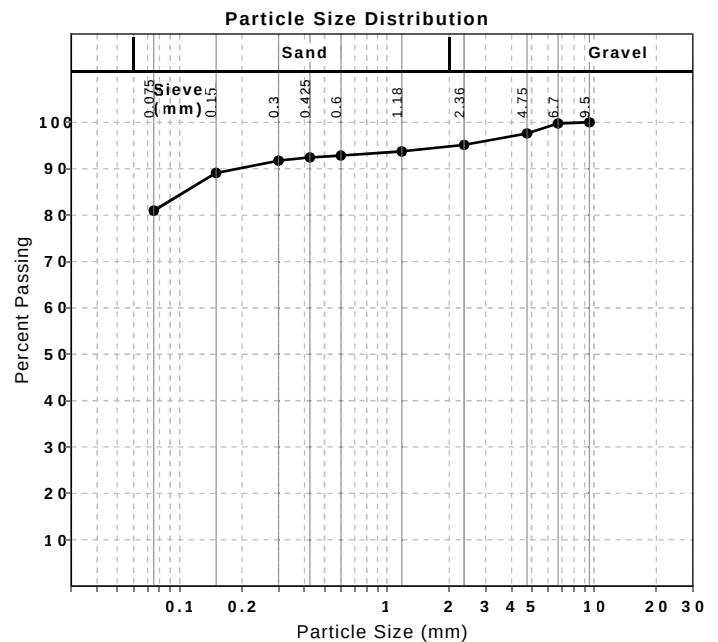
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |  |
|-------------------------------------------|----------|----------------|------------|-----------------|--|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |  |
| 9.5 mm                                    | 100      |                | 0          |                 |  |
| 6.7 mm                                    | 100      |                | 0          |                 |  |
| 4.75 mm                                   | 98       |                | 2          |                 |  |
| 2.36 mm                                   | 95       |                | 2          |                 |  |
| 1.18 mm                                   | 94       |                | 1          |                 |  |
| 0.6 mm                                    | 93       |                | 1          |                 |  |
| 0.425 mm                                  | 92       |                | 0          |                 |  |
| 0.3 mm                                    | 92       |                | 1          |                 |  |
| 0.15 mm                                   | 89       |                | 3          |                 |  |
| 0.075 mm                                  | 81       |                | 8          |                 |  |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |  |
| Moisture Content (%)                      |          |                |            | 22.6            |  |





# Material Test Report

**Report Number:** 022-135A-1B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AM  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 46 , Depth: 1.9 - 2.1m



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Gold Coast Laboratory

2/23 Traders Way Currumbin QLD 4223

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*R. Irwin*

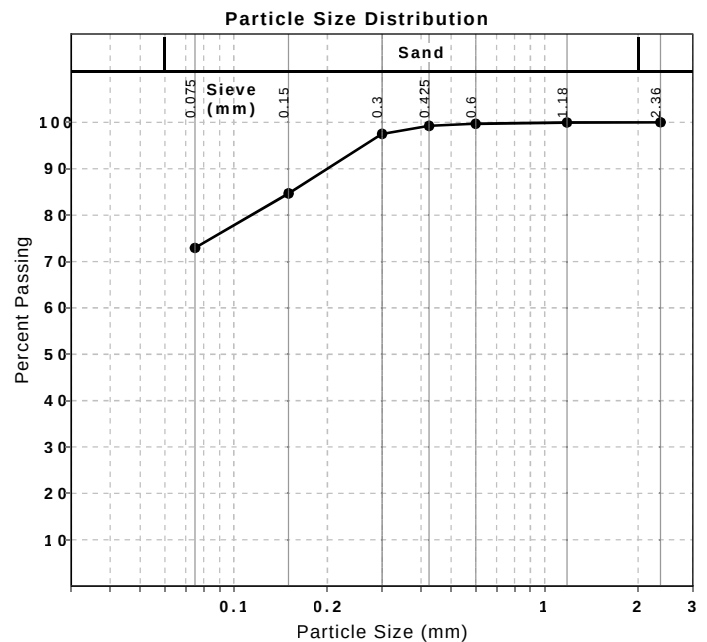
Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 2.36 mm                                   | 100      |                | 0          |                 |
| 1.18 mm                                   | 100      |                | 0          |                 |
| 0.6 mm                                    | 100      |                | 0          |                 |
| 0.425 mm                                  | 99       |                | 0          |                 |
| 0.3 mm                                    | 97       |                | 2          |                 |
| 0.15 mm                                   | 85       |                | 13         |                 |
| 0.075 mm                                  | 73       |                | 12         |                 |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 16.1 |



# Material Test Report

**Report Number:** 022-135A-1B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AR  
**Date Sampled:** 25/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 52 , Depth: 0.7 - 0.9m



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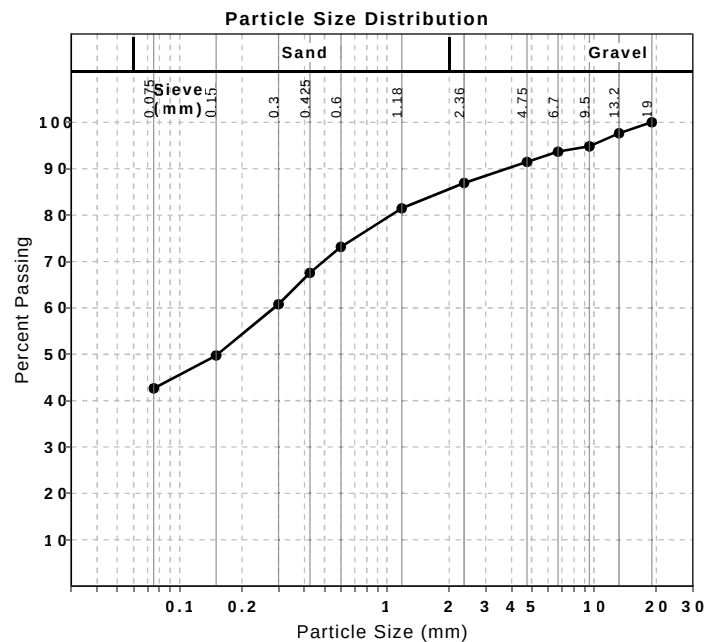
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 19 mm                                     | 100      |                | 0          |                 |
| 13.2 mm                                   | 98       |                | 2          |                 |
| 9.5 mm                                    | 95       |                | 3          |                 |
| 6.7 mm                                    | 94       |                | 1          |                 |
| 4.75 mm                                   | 91       |                | 2          |                 |
| 2.36 mm                                   | 87       |                | 5          |                 |
| 1.18 mm                                   | 81       |                | 5          |                 |
| 0.6 mm                                    | 73       |                | 8          |                 |
| 0.425 mm                                  | 68       |                | 6          |                 |
| 0.3 mm                                    | 61       |                | 7          |                 |
| 0.15 mm                                   | 50       |                | 11         |                 |
| 0.075 mm                                  | 43       |                | 7          |                 |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |
| Moisture Content (%)                      |          |                | 14.3       |                 |



# Material Test Report

**Report Number:** 022-135A-2B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327B  
**Date Sampled:** 05/07/2022  
**Dates Tested:** 21/07/2022 - 25/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 63 , Depth: 2.5 - 2.95m



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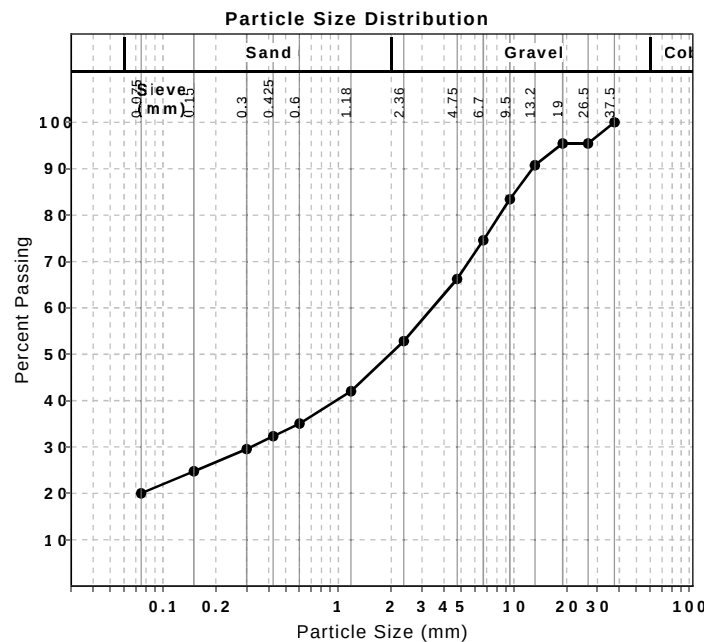


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Approved Signatory: Rede Irwin  
 Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1)                              |          |                |            |                 |
|------------------------------------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                                                  | Passed % | Passing Limits | Retained % | Retained Limits |
| 37.5 mm                                                                | 100      |                | 0          |                 |
| 26.5 mm                                                                | 95       |                | 5          |                 |
| 19 mm                                                                  | 95       |                | 0          |                 |
| 13.2 mm                                                                | 91       |                | 5          |                 |
| 9.5 mm                                                                 | 83       |                | 7          |                 |
| 6.7 mm                                                                 | 75       |                | 9          |                 |
| 4.75 mm                                                                | 66       |                | 8          |                 |
| 2.36 mm                                                                | 53       |                | 13         |                 |
| 1.18 mm                                                                | 42       |                | 11         |                 |
| 0.6 mm                                                                 | 35       |                | 7          |                 |
| 0.425 mm                                                               | 32       |                | 3          |                 |
| 0.3 mm                                                                 | 30       |                | 3          |                 |
| 0.15 mm                                                                | 25       |                | 5          |                 |
| 0.075 mm                                                               | 20       |                | 5          |                 |
| Testing deviates from test method. Sample washed at larger sieve size. |          |                |            |                 |
| Moisture Content (AS 1289 2.1.1)                                       |          |                |            |                 |
| Moisture Content (%)                                                   |          |                | 15.9       |                 |



# Material Test Report

**Report Number:** 022-135A-2B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327D  
**Date Sampled:** 06/07/2022  
**Dates Tested:** 21/07/2022 - 26/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 64 , Depth: 5.5 - 5.95m



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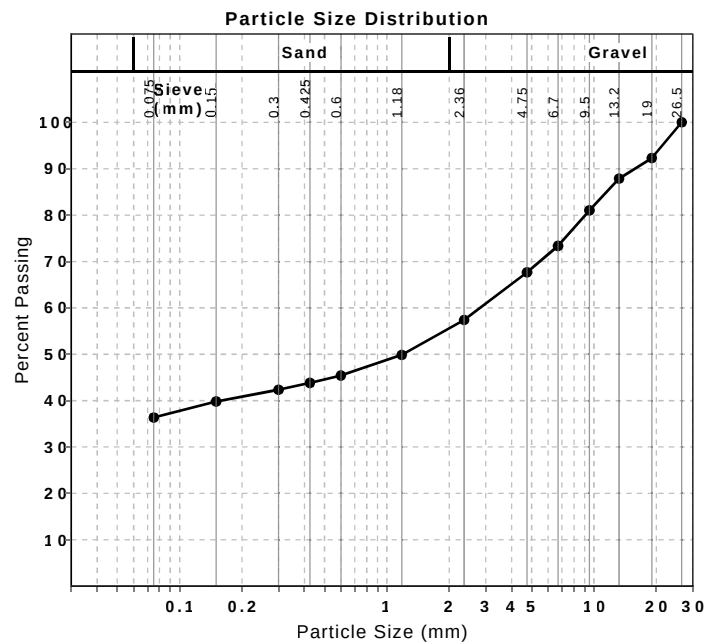
Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1)                              |          |                |            |                 |  |
|------------------------------------------------------------------------|----------|----------------|------------|-----------------|--|
| Sieve                                                                  | Passed % | Passing Limits | Retained % | Retained Limits |  |
| 26.5 mm                                                                | 100      |                | 0          |                 |  |
| 19 mm                                                                  | 92       |                | 8          |                 |  |
| 13.2 mm                                                                | 88       |                | 4          |                 |  |
| 9.5 mm                                                                 | 81       |                | 7          |                 |  |
| 6.7 mm                                                                 | 73       |                | 8          |                 |  |
| 4.75 mm                                                                | 68       |                | 6          |                 |  |
| 2.36 mm                                                                | 57       |                | 10         |                 |  |
| 1.18 mm                                                                | 50       |                | 8          |                 |  |
| 0.6 mm                                                                 | 45       |                | 4          |                 |  |
| 0.425 mm                                                               | 44       |                | 2          |                 |  |
| 0.3 mm                                                                 | 42       |                | 1          |                 |  |
| 0.15 mm                                                                | 40       |                | 3          |                 |  |
| 0.075 mm                                                               | 36       |                | 3          |                 |  |
| Testing deviates from test method. Sample washed at larger sieve size. |          |                |            |                 |  |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 14.9 |



# Material Test Report

**Report Number:** 022-135A-2B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327E  
**Date Sampled:** 12/07/2022  
**Dates Tested:** 21/07/2022 - 27/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 65 , Depth: 1.0 - 1.45m



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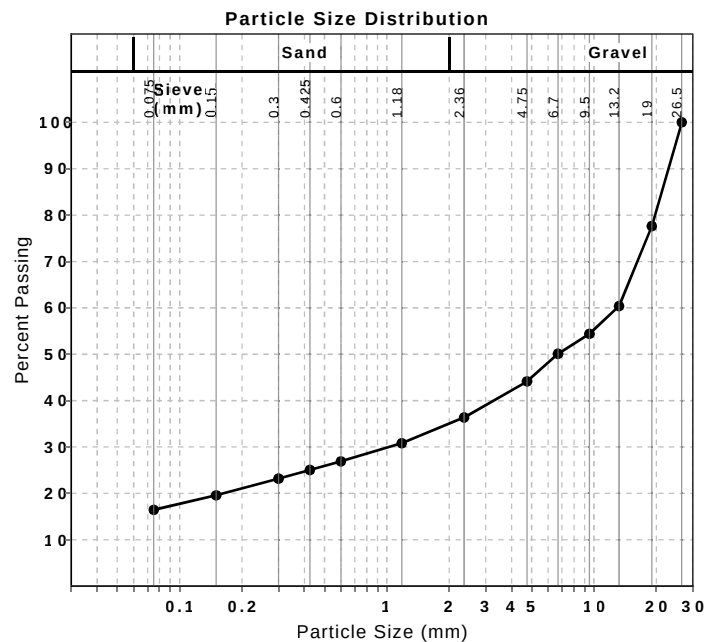
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 26.5 mm                                   | 100      |                | 0          |                 |
| 19 mm                                     | 78       |                | 22         |                 |
| 13.2 mm                                   | 60       |                | 17         |                 |
| 9.5 mm                                    | 54       |                | 6          |                 |
| 6.7 mm                                    | 50       |                | 4          |                 |
| 4.75 mm                                   | 44       |                | 6          |                 |
| 2.36 mm                                   | 36       |                | 8          |                 |
| 1.18 mm                                   | 31       |                | 6          |                 |
| 0.6 mm                                    | 27       |                | 4          |                 |
| 0.425 mm                                  | 25       |                | 2          |                 |
| 0.3 mm                                    | 23       |                | 2          |                 |
| 0.15 mm                                   | 20       |                | 4          |                 |
| 0.075 mm                                  | 16       |                | 3          |                 |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |
| Moisture Content (%)                      |          |                | 6.7        |                 |



# Material Test Report

**Report Number:** 022-135A-2B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327H  
**Date Sampled:** 08/07/2022  
**Dates Tested:** 21/07/2022 - 26/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 66 , Depth: 8.5 - 8.95m



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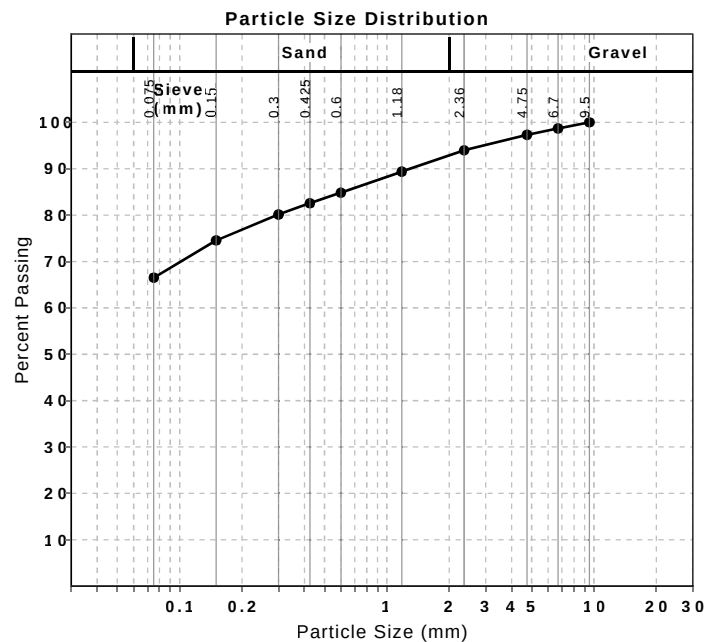
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |  |
|-------------------------------------------|----------|----------------|------------|-----------------|--|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |  |
| 9.5 mm                                    | 100      |                | 0          |                 |  |
| 6.7 mm                                    | 99       |                | 1          |                 |  |
| 4.75 mm                                   | 97       |                | 1          |                 |  |
| 2.36 mm                                   | 94       |                | 3          |                 |  |
| 1.18 mm                                   | 89       |                | 5          |                 |  |
| 0.6 mm                                    | 85       |                | 5          |                 |  |
| 0.425 mm                                  | 83       |                | 2          |                 |  |
| 0.3 mm                                    | 80       |                | 2          |                 |  |
| 0.15 mm                                   | 75       |                | 6          |                 |  |
| 0.075 mm                                  | 67       |                | 8          |                 |  |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |  |
| Moisture Content (%)                      |          |                |            | 20.9            |  |



# Material Test Report

**Report Number:** 022-135A-2B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327J  
**Date Sampled:** 05/07/2022  
**Dates Tested:** 21/07/2022 - 01/08/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 68 , Depth: 7.0 - 7.45m



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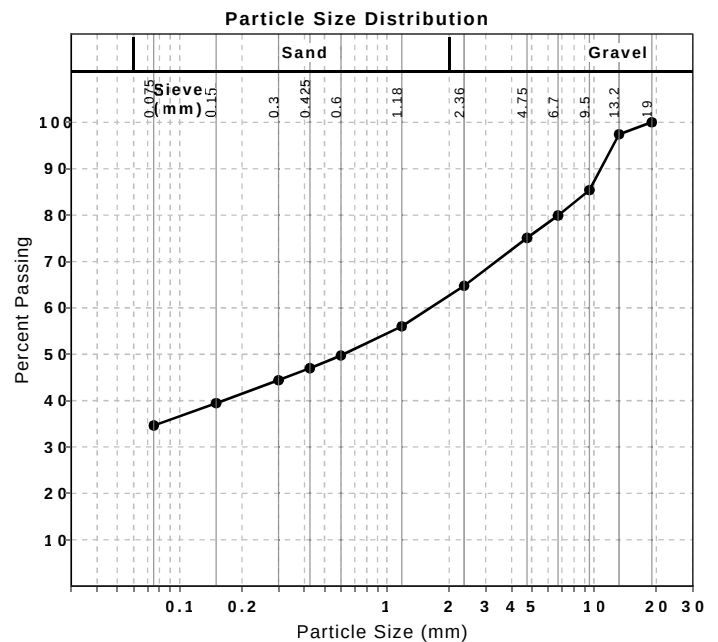
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 19 mm                                     | 100      |                | 0          |                 |
| 13.2 mm                                   | 97       |                | 3          |                 |
| 9.5 mm                                    | 85       |                | 12         |                 |
| 6.7 mm                                    | 80       |                | 5          |                 |
| 4.75 mm                                   | 75       |                | 5          |                 |
| 2.36 mm                                   | 65       |                | 10         |                 |
| 1.18 mm                                   | 56       |                | 9          |                 |
| 0.6 mm                                    | 50       |                | 6          |                 |
| 0.425 mm                                  | 47       |                | 3          |                 |
| 0.3 mm                                    | 44       |                | 3          |                 |
| 0.15 mm                                   | 39       |                | 5          |                 |
| 0.075 mm                                  | 35       |                | 5          |                 |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |
| Moisture Content (%)                      |          |                | 17.1       |                 |





# Material Test Report

**Report Number:** 022-135A-2B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327M  
**Date Sampled:** 11/07/2022  
**Dates Tested:** 21/07/2022 - 26/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 69 , Depth: 4.0 - 4.45m



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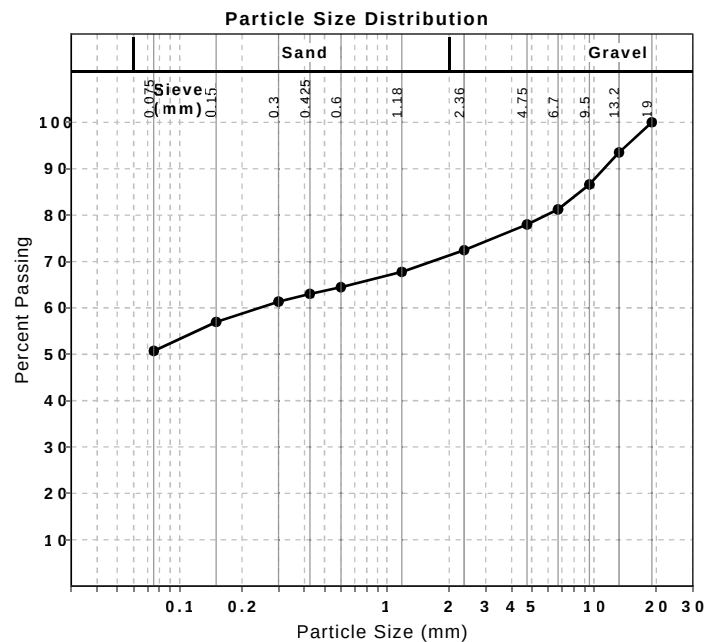
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 19 mm                                     | 100      |                | 0          |                 |
| 13.2 mm                                   | 94       |                | 6          |                 |
| 9.5 mm                                    | 87       |                | 7          |                 |
| 6.7 mm                                    | 81       |                | 5          |                 |
| 4.75 mm                                   | 78       |                | 3          |                 |
| 2.36 mm                                   | 72       |                | 6          |                 |
| 1.18 mm                                   | 68       |                | 5          |                 |
| 0.6 mm                                    | 64       |                | 3          |                 |
| 0.425 mm                                  | 63       |                | 1          |                 |
| 0.3 mm                                    | 61       |                | 2          |                 |
| 0.15 mm                                   | 57       |                | 4          |                 |
| 0.075 mm                                  | 51       |                | 6          |                 |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |
| Moisture Content (%)                      |          |                | 26.6       |                 |



# Material Test Report

**Report Number:** 022-135A-2B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327O  
**Date Sampled:** 14/07/2022  
**Dates Tested:** 21/07/2022 - 26/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 70 , Depth: 5.5 - 5.95m



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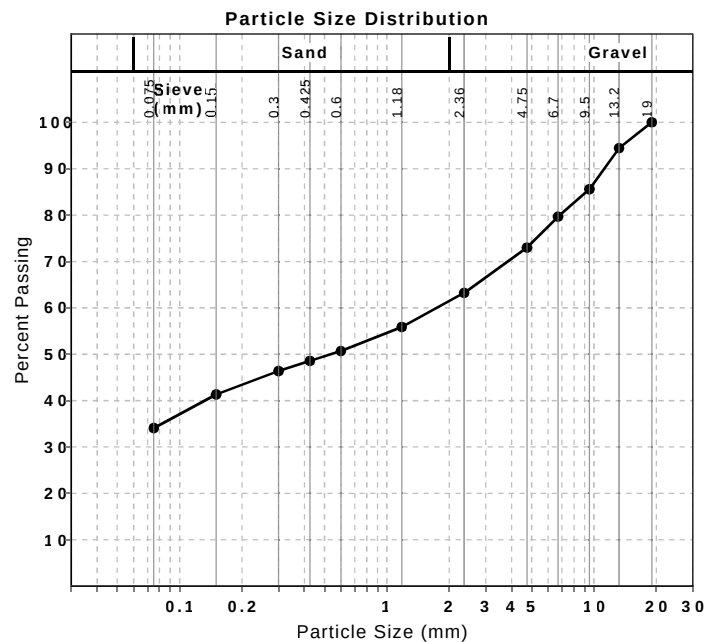
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 19 mm                                     | 100      |                | 0          |                 |
| 13.2 mm                                   | 94       |                | 6          |                 |
| 9.5 mm                                    | 86       |                | 9          |                 |
| 6.7 mm                                    | 80       |                | 6          |                 |
| 4.75 mm                                   | 73       |                | 7          |                 |
| 2.36 mm                                   | 63       |                | 10         |                 |
| 1.18 mm                                   | 56       |                | 7          |                 |
| 0.6 mm                                    | 51       |                | 5          |                 |
| 0.425 mm                                  | 49       |                | 2          |                 |
| 0.3 mm                                    | 46       |                | 2          |                 |
| 0.15 mm                                   | 41       |                | 5          |                 |
| 0.075 mm                                  | 34       |                | 7          |                 |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |
| Moisture Content (%)                      |          |                | 12.1       |                 |



# Material Test Report

**Report Number:** 022-135A-2B  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327Q  
**Date Sampled:** 14/07/2022  
**Dates Tested:** 21/07/2022 - 26/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 70 , Depth: 10.0 - 10.45m



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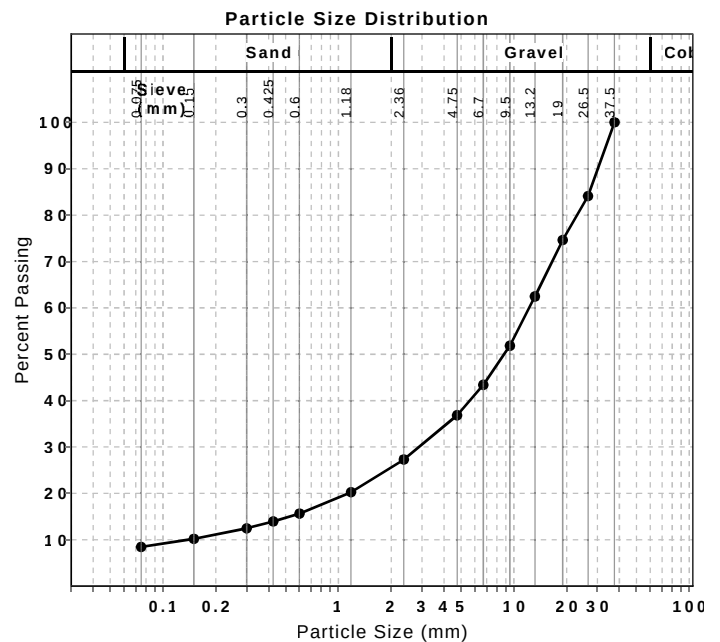
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Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Particle Size Distribution (AS1289 3.6.1) |          |                |            |                 |
|-------------------------------------------|----------|----------------|------------|-----------------|
| Sieve                                     | Passed % | Passing Limits | Retained % | Retained Limits |
| 37.5 mm                                   | 100      |                | 0          |                 |
| 26.5 mm                                   | 84       |                | 16         |                 |
| 19 mm                                     | 75       |                | 9          |                 |
| 13.2 mm                                   | 62       |                | 12         |                 |
| 9.5 mm                                    | 52       |                | 11         |                 |
| 6.7 mm                                    | 43       |                | 8          |                 |
| 4.75 mm                                   | 37       |                | 7          |                 |
| 2.36 mm                                   | 27       |                | 10         |                 |
| 1.18 mm                                   | 20       |                | 7          |                 |
| 0.6 mm                                    | 16       |                | 5          |                 |
| 0.425 mm                                  | 14       |                | 2          |                 |
| 0.3 mm                                    | 12       |                | 1          |                 |
| 0.15 mm                                   | 10       |                | 2          |                 |
| 0.075 mm                                  | 8        |                | 2          |                 |
| Moisture Content (AS 1289 2.1.1)          |          |                |            |                 |
| Moisture Content (%)                      |          |                | 11.2       |                 |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259B  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 2 , Depth: 0.3 - 0.8m



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*R. Irwin*

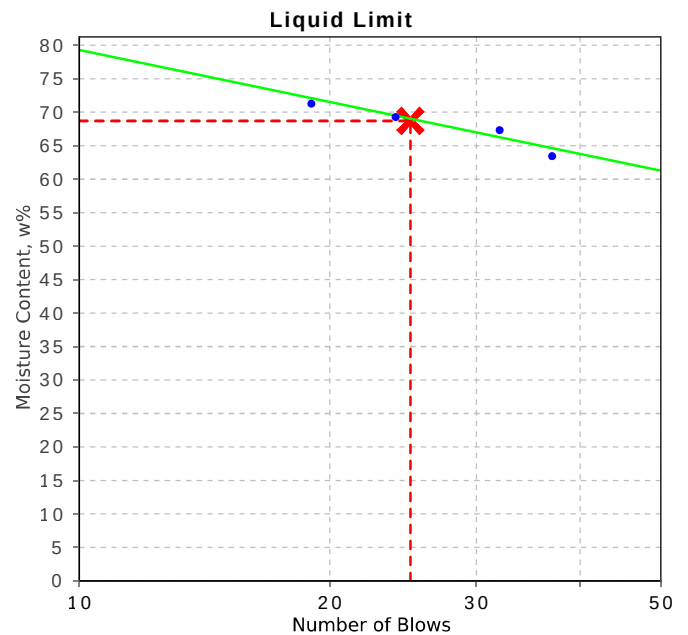
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 69         |     |     |
| Plastic Limit (%)                              | 18         |     |     |
| Plasticity Index (%)                           | 51         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 13.0          |     |     |
| Cracking Crumbling Curling       | Curling       |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 20.3 |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259F  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 5 , Depth: 0.5 - 0.7m



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Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

Email: enquiries@groundtestingservices.com.au

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*R. Irwin*

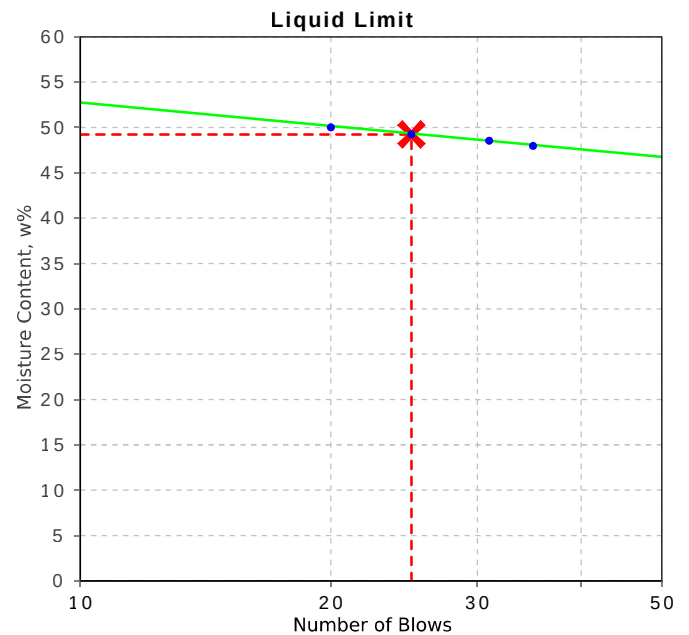
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 49         |     |     |
| Plastic Limit (%)                              | 17         |     |     |
| Plasticity Index (%)                           | 32         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 13.0          |     |     |
| Cracking Crumbling Curling       | None          |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 17.1 |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259K  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 14 , Depth: 0.2 - 0.4m



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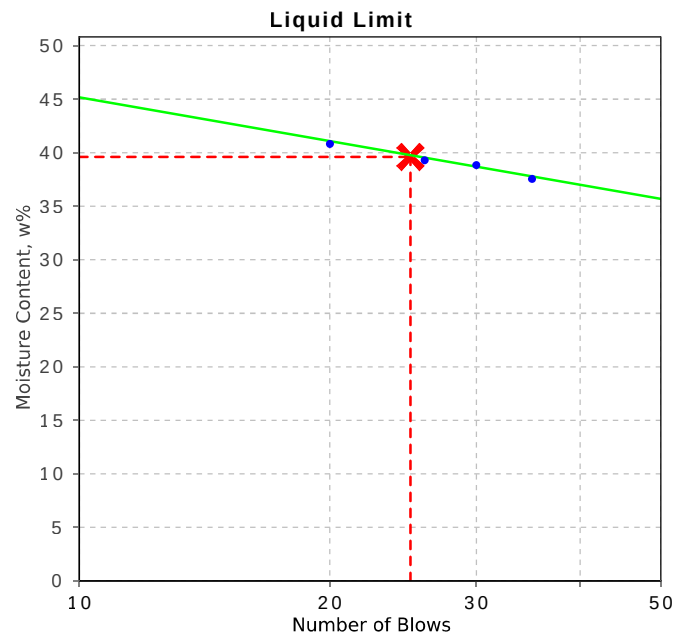


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 40            |      |     |
| Plastic Limit (%)                              | 20            |      |     |
| Plasticity Index (%)                           | 20            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 9.0           |      |     |
| Cracking Crumbling Curling                     | None          |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 15.1 |     |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259N  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 17 , Depth: 2.9 - 3.0m



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*R. Irwin*

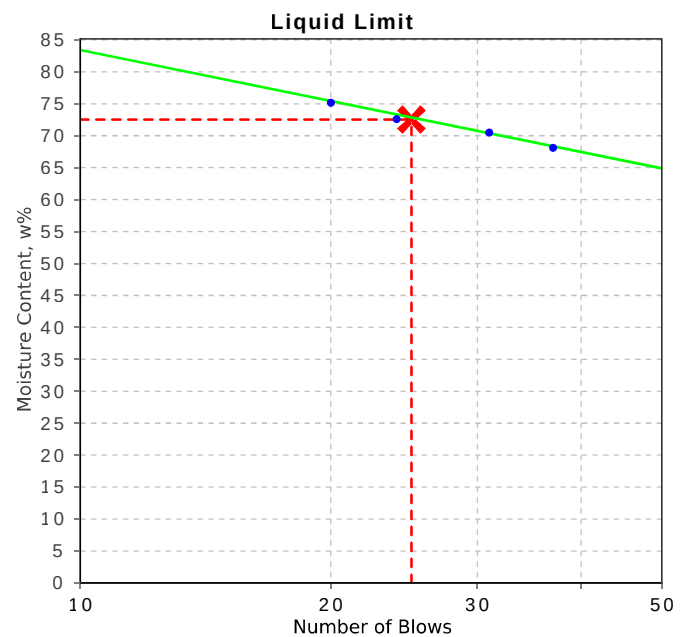
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 73         |     |     |
| Plastic Limit (%)                              | 18         |     |     |
| Plasticity Index (%)                           | 55         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 20.0          |     |     |
| Cracking Crumbling Curling       | Curling       |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 26.9 |





# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259O  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 20 , Depth: 1.2 - 1.4m



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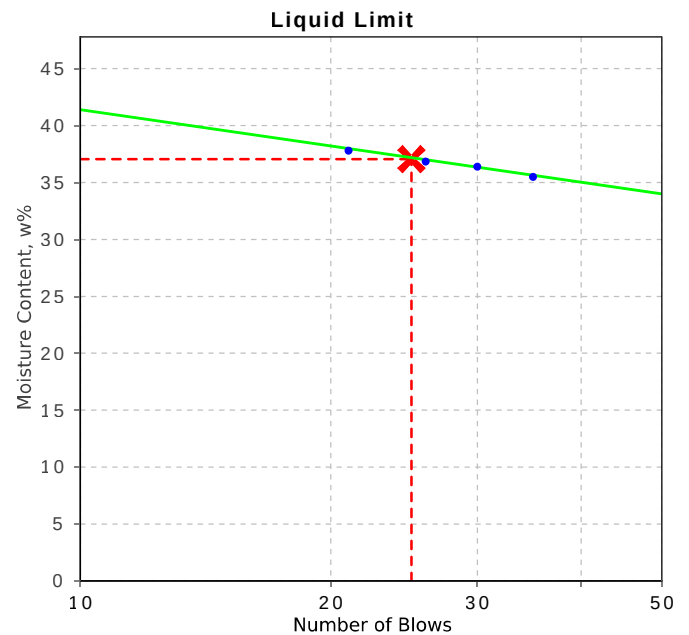


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 37            |      |     |
| Plastic Limit (%)                              | 15            |      |     |
| Plasticity Index (%)                           | 22            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 11.0          |      |     |
| Cracking Crumbling Curling                     | None          |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 15.6 |     |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259P  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 24 , Depth: 2.1 - 2.3m



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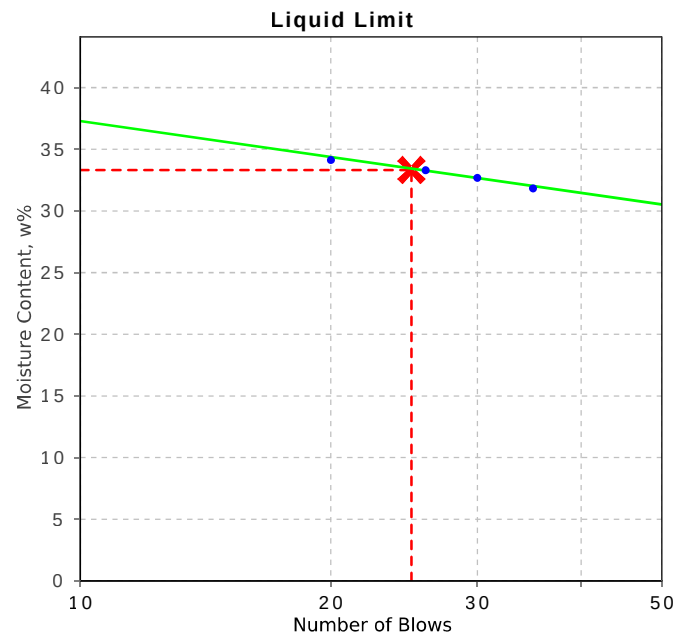
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 33         |     |     |
| Plastic Limit (%)                              | 17         |     |     |
| Plasticity Index (%)                           | 16         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 8.5           |     |     |
| Cracking Crumbling Curling       | None          |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 18.3 |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259Q  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 26 , Depth: 2.8 - 3.0m



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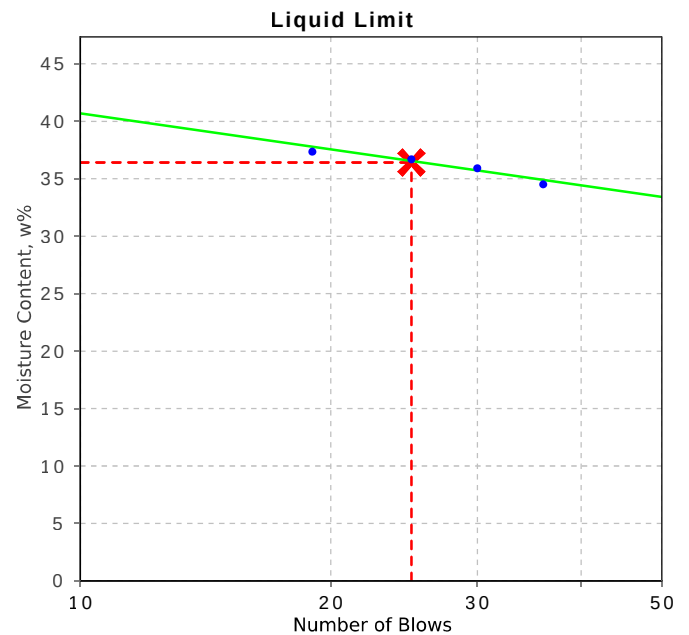


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 36            |      |     |
| Plastic Limit (%)                              | 17            |      |     |
| Plasticity Index (%)                           | 19            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 7.5           |      |     |
| Cracking Crumbling Curling                     | None          |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 13.1 |     |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259S  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 29 , Depth: 1.1 - 1.3m



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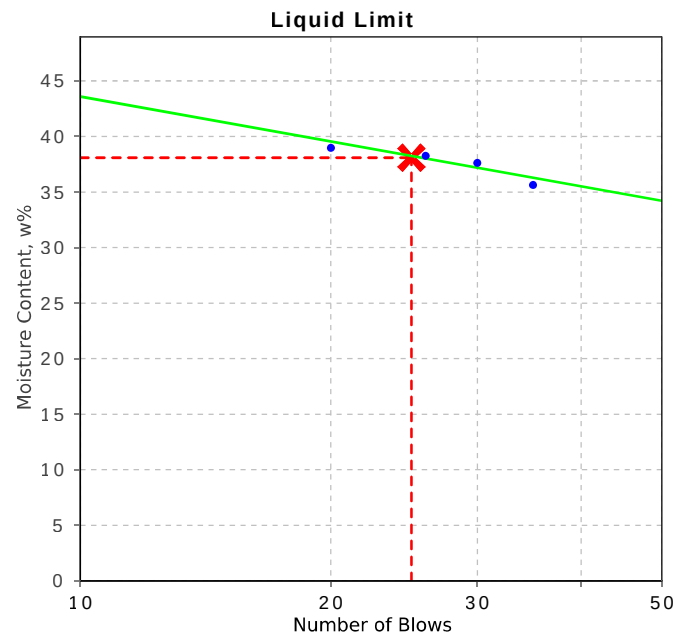


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 38            |      |     |
| Plastic Limit (%)                              | 18            |      |     |
| Plasticity Index (%)                           | 20            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 8.5           |      |     |
| Cracking Crumbling Curling                     | None          |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 13.3 |     |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259U  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 32 , Depth: 0.3 - 0.5m



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*R. Irwin*

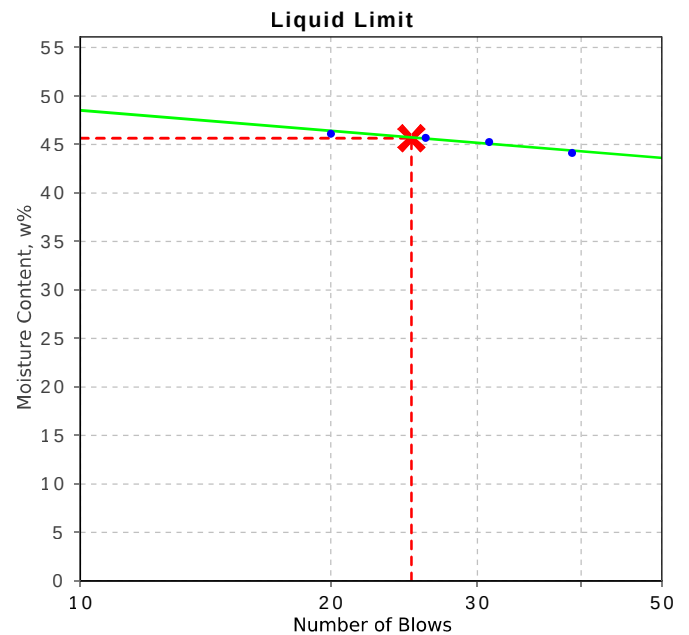
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 46         |     |     |
| Plastic Limit (%)                              | 20         |     |     |
| Plasticity Index (%)                           | 26         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 10.5          |     |     |
| Cracking Crumbling Curling       | None          |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 15.8 |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259W  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 34 , Depth: 1.8 - 2.0m



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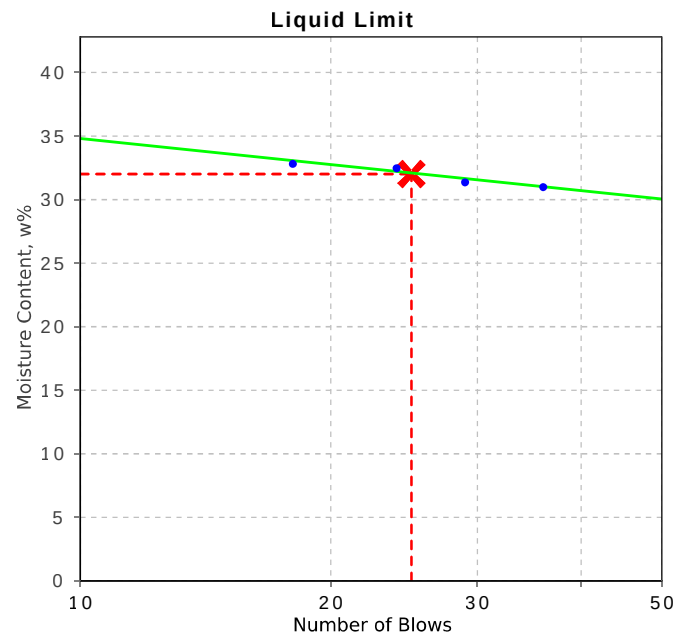


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 32            |      |     |
| Plastic Limit (%)                              | 19            |      |     |
| Plasticity Index (%)                           | 13            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 7.0           |      |     |
| Cracking Crumbling Curling                     | None          |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 14.1 |     |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259Y  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 14/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 38 , Depth: 2.4 - 2.6m



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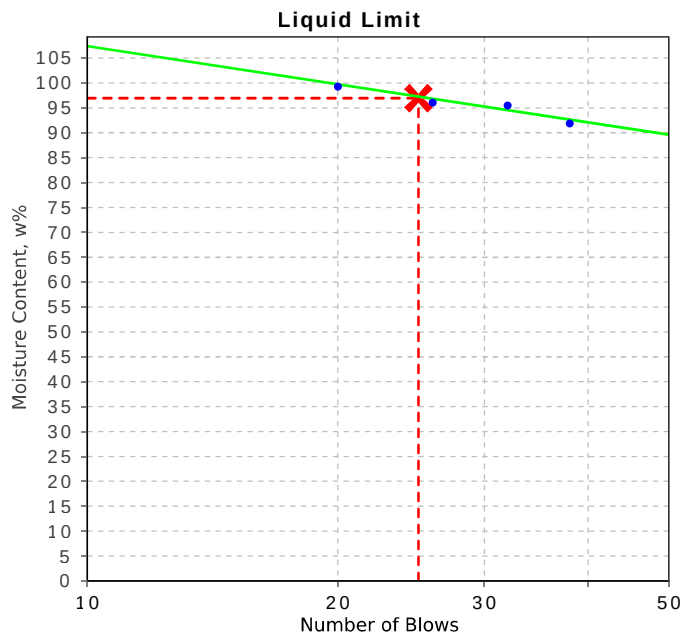


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |                    | Min  | Max |
|------------------------------------------------|--------------------|------|-----|
| Sample History                                 | Oven Dried         |      |     |
| Preparation Method                             | Dry Sieve          |      |     |
| Liquid Limit (%)                               | 97                 |      |     |
| Plastic Limit (%)                              | 21                 |      |     |
| Plasticity Index (%)                           | 76                 |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |                    | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1      |      |     |
| Linear Shrinkage (%)                           | 28.0               |      |     |
| Cracking Crumbling Curling                     | Cracking & Curling |      |     |
| Moisture Content (AS 1289 2.1.1)               |                    |      |     |
| Moisture Content (%)                           |                    | 28.3 |     |





# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259Z  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 14/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 39 , Depth: 1.3 - 1.5m



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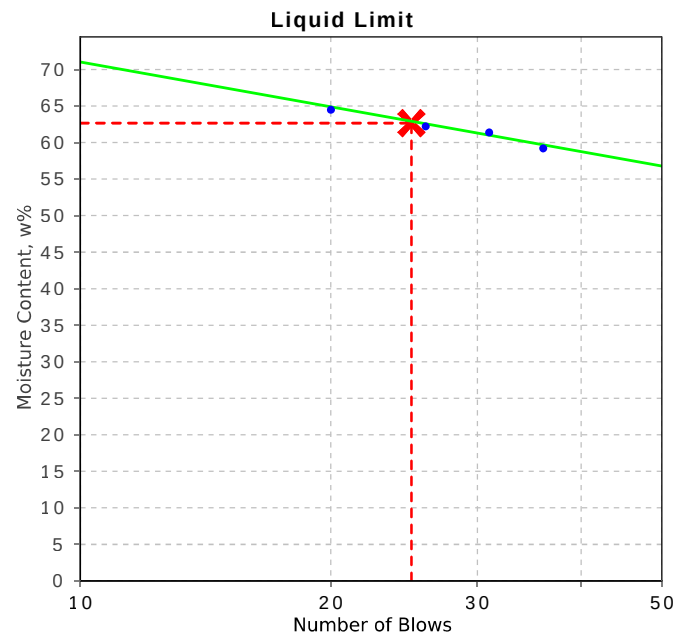


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 63            |      |     |
| Plastic Limit (%)                              | 18            |      |     |
| Plasticity Index (%)                           | 45            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 11.5          |      |     |
| Cracking Crumbling Curling                     | None          |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 21.6 |     |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AB  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 14/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 40 , Depth: 2.2 - 2.4m



Ground Testing Services Pty Ltd  
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 Phone: (07) 5535 2539

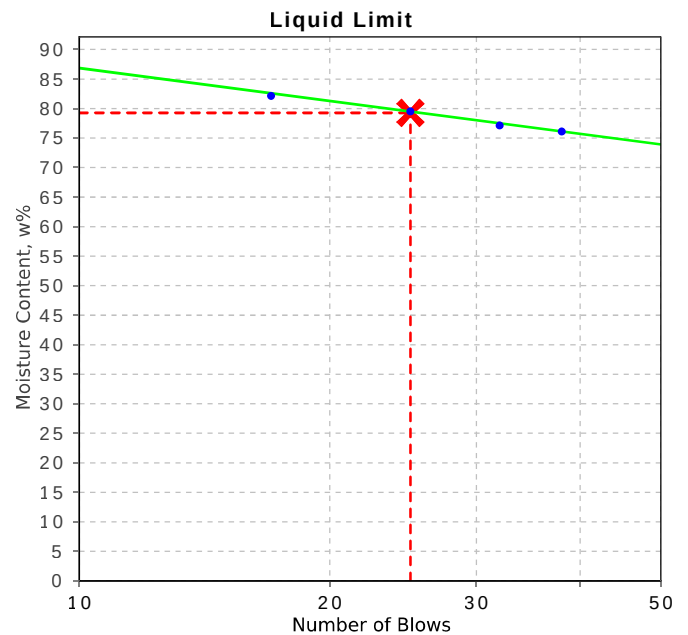
Email: enquiries@groundtestingservices.com.au



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Approved Signatory: *Rede Irwin*  
 Rede Irwin  
 Laboratory Manager  
 NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |                    | Min  | Max |
|------------------------------------------------|--------------------|------|-----|
| Sample History                                 | Oven Dried         |      |     |
| Preparation Method                             | Dry Sieve          |      |     |
| Liquid Limit (%)                               | 79                 |      |     |
| Plastic Limit (%)                              | 16                 |      |     |
| Plasticity Index (%)                           | 63                 |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |                    | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1      |      |     |
| Linear Shrinkage (%)                           | 14.0               |      |     |
| Cracking Crumbling Curling                     | Cracking & Curling |      |     |
| Moisture Content (AS 1289 2.1.1)               |                    |      |     |
| Moisture Content (%)                           |                    | 29.2 |     |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AC  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 15/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 41 , Depth: 1.4 - 1.6m



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Gold Coast Laboratory  
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Phone: (07) 5535 2539

Email: enquiries@groundtestingservices.com.au

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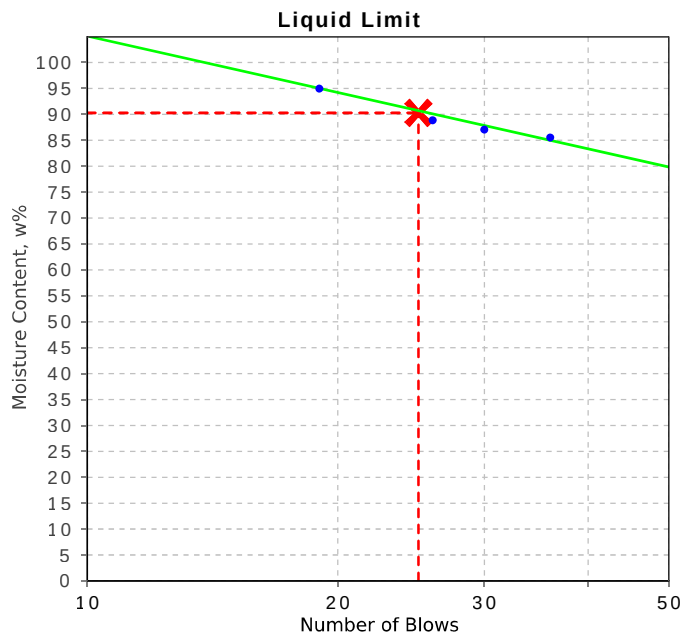


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 90            |      |     |
| Plastic Limit (%)                              | 21            |      |     |
| Plasticity Index (%)                           | 69            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 25.5          |      |     |
| Cracking Crumbling Curling                     | Curling       |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 27.6 |     |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AE  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 15/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 42 , Depth: 0.9 - 1.0m



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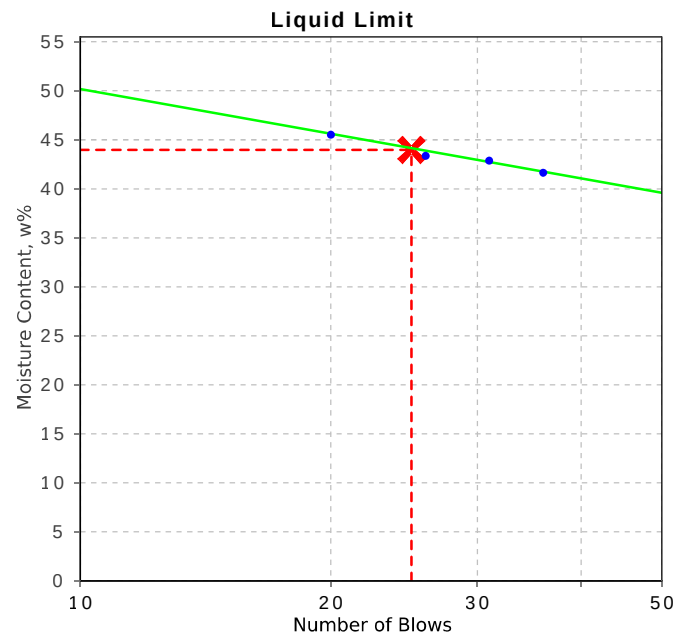
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 44         |     |     |
| Plastic Limit (%)                              | 17         |     |     |
| Plasticity Index (%)                           | 27         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 10.0          |     |     |
| Cracking Crumbling Curling       | None          |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 16.2 |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AG  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 15/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 43 , Depth: 1.6 - 1.9m



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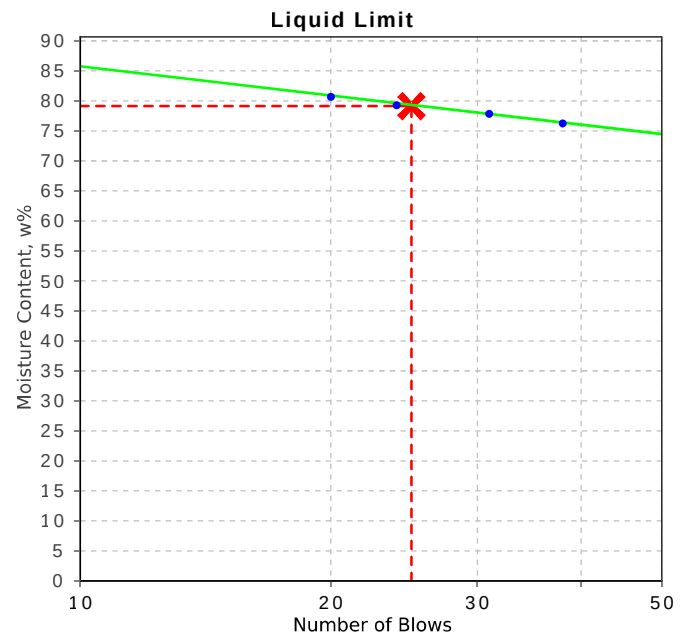
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 79         |     |     |
| Plastic Limit (%)                              | 25         |     |     |
| Plasticity Index (%)                           | 54         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 22.0          |     |     |
| Cracking Crumbling Curling       | Curling       |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 32.1 |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AH  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 15/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 43 , Depth: 2.8 - 3.1m



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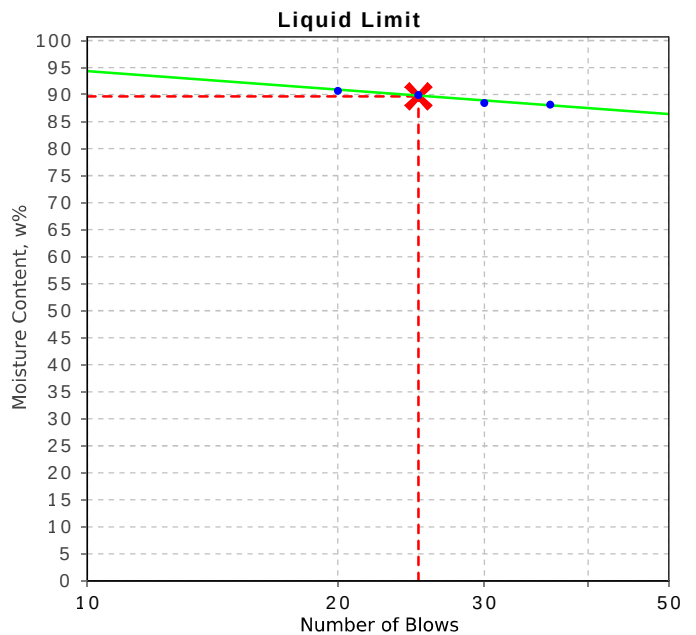


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 90            |      |     |
| Plastic Limit (%)                              | 22            |      |     |
| Plasticity Index (%)                           | 68            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 26.5          |      |     |
| Cracking Crumbling Curling                     | Curling       |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 30.7 |     |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AJ  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 15/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 45 , Depth: 2.8 - 3.0m



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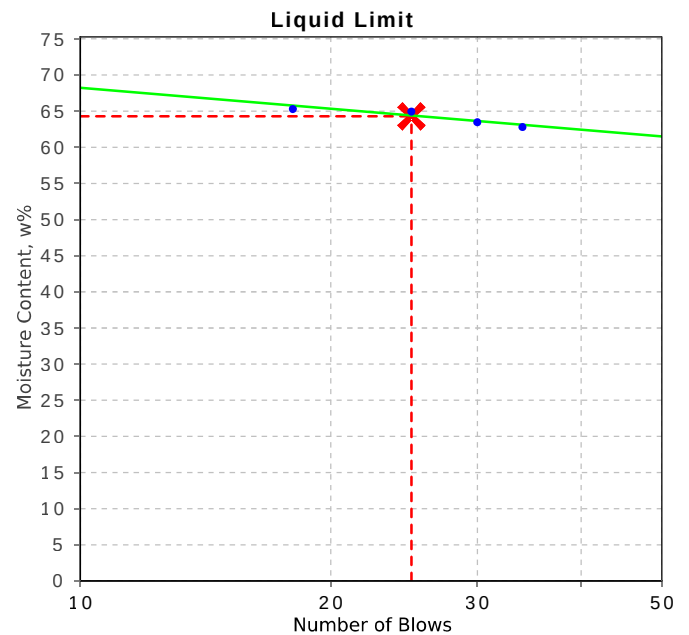
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 64         |     |     |
| Plastic Limit (%)                              | 14         |     |     |
| Plasticity Index (%)                           | 50         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 20.0          |     |     |
| Cracking Crumbling Curling       | Curling       |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 22.6 |





# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AM  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 15/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 46 , Depth: 1.9 - 2.1m



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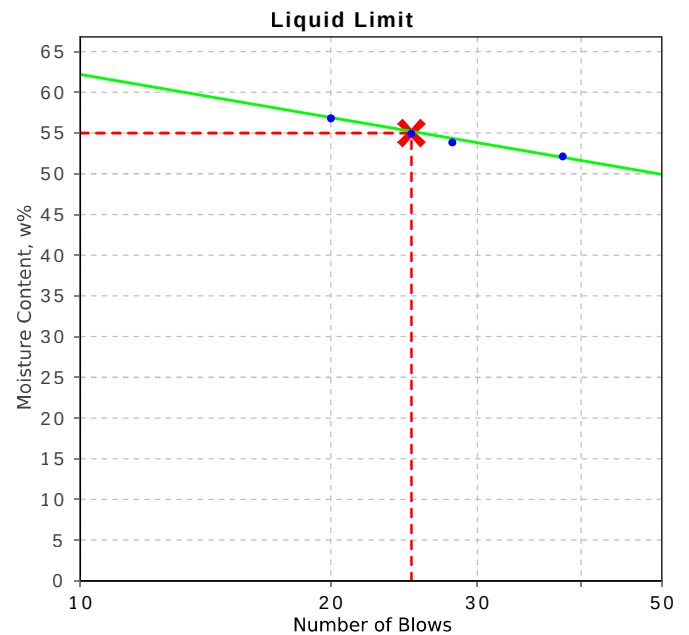
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 55         |     |     |
| Plastic Limit (%)                              | 14         |     |     |
| Plasticity Index (%)                           | 41         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 14.0          |     |     |
| Cracking Crumbling Curling       | Curling       |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 16.1 |



# Material Test Report

**Report Number:** 022-135A-1C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AS  
**Date Sampled:** 25/05/2022  
**Dates Tested:** 30/05/2022 - 15/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 53 , Depth: 1.2 - 1.3m



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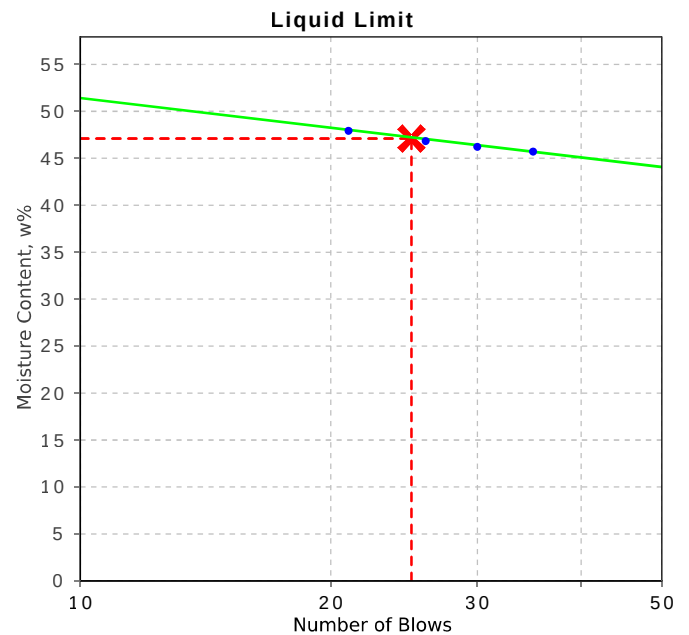


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 47            |      |     |
| Plastic Limit (%)                              | 13            |      |     |
| Plasticity Index (%)                           | 34            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 13.0          |      |     |
| Cracking Crumbling Curling                     | None          |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 16.6 |     |



# Material Test Report

**Report Number:** 022-135A-2C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327A  
**Date Sampled:** 05/07/2022  
**Dates Tested:** 21/07/2022 - 26/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 62 , Depth: 2.5 - 2.95m



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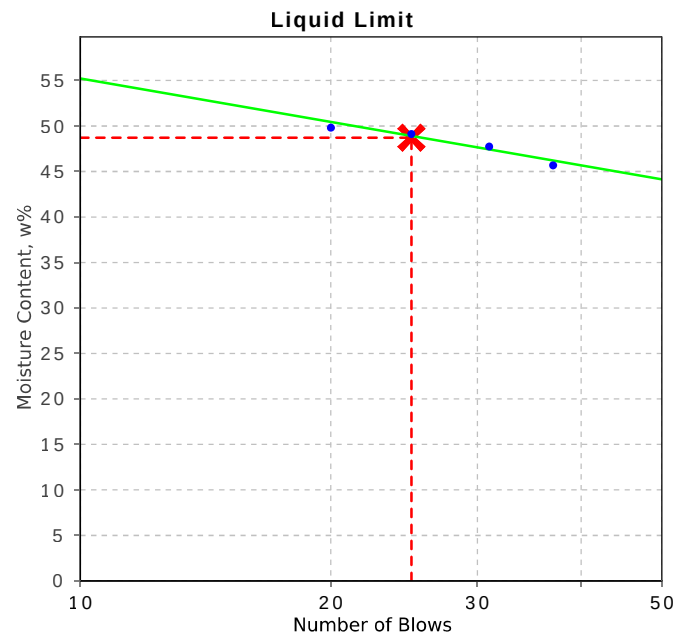
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 49         |     |     |
| Plastic Limit (%)                              | 17         |     |     |
| Plasticity Index (%)                           | 32         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 14.0          |     |     |
| Cracking Crumbling Curling       | None          |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 19.5 |



# Material Test Report

**Report Number:** 022-135A-2C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327G  
**Date Sampled:** 08/07/2022  
**Dates Tested:** 21/07/2022 - 26/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 66 , Depth: 7.0 - 7.45m

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 29         |     |     |
| Plastic Limit (%)                              | 20         |     |     |
| Plasticity Index (%)                           | 9          |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 6.0           |     |     |
| Cracking Crumbling Curling       | None          |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 23.1 |



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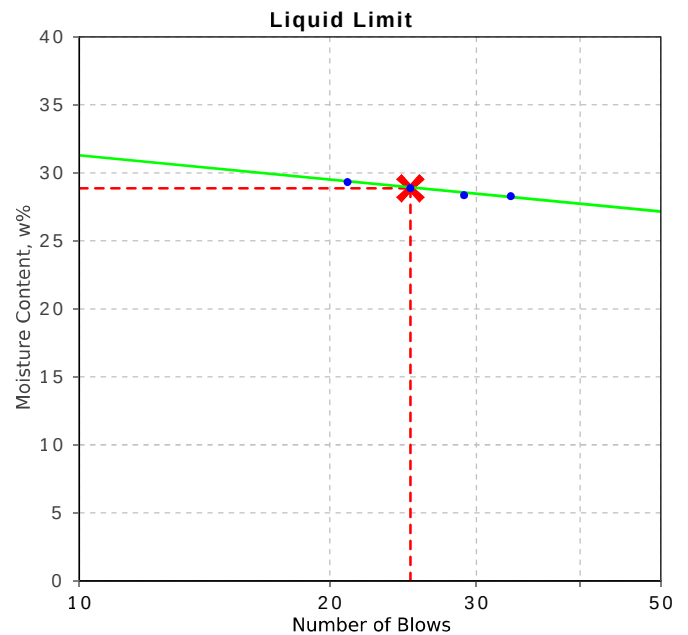
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*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820



# Material Test Report

**Report Number:** 022-135A-2C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327K  
**Date Sampled:** 05/07/2022  
**Dates Tested:** 21/07/2022 - 28/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 68 , Depth: 11.5 - 11.95m



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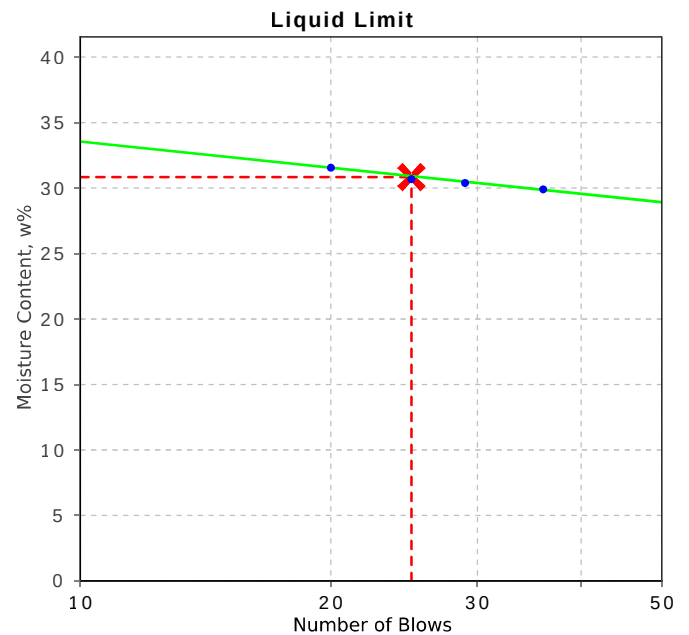


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 31            |      |     |
| Plastic Limit (%)                              | 16            |      |     |
| Plasticity Index (%)                           | 15            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 8.0           |      |     |
| Cracking Crumbling Curling                     | None          |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 17.7 |     |



# Material Test Report

**Report Number:** 022-135A-2C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327L  
**Date Sampled:** 11/07/2022  
**Dates Tested:** 21/07/2022 - 26/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 69 , Depth: 1.0 - 1.45m



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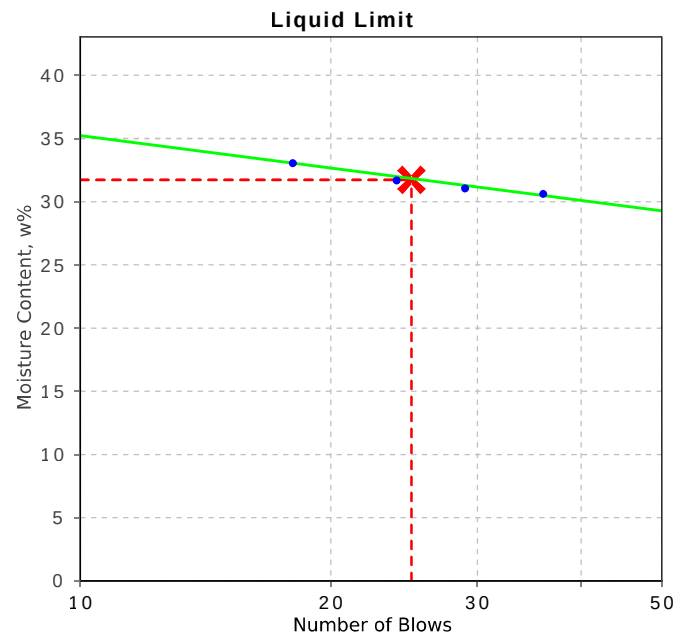


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |               | Min  | Max |
|------------------------------------------------|---------------|------|-----|
| Sample History                                 | Oven Dried    |      |     |
| Preparation Method                             | Dry Sieve     |      |     |
| Liquid Limit (%)                               | 32            |      |     |
| Plastic Limit (%)                              | 16            |      |     |
| Plasticity Index (%)                           | 16            |      |     |
| Linear Shrinkage (AS1289 3.4.1)                |               | Min  | Max |
| Moisture Condition Determined By               | AS 1289.3.1.1 |      |     |
| Linear Shrinkage (%)                           | 8.0           |      |     |
| Cracking Crumbling Curling                     | None          |      |     |
| Moisture Content (AS 1289 2.1.1)               |               |      |     |
| Moisture Content (%)                           |               | 10.2 |     |



# Material Test Report

**Report Number:** 022-135A-2C  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2327  
**Sample Number:** G22-2327P  
**Date Sampled:** 14/07/2022  
**Dates Tested:** 21/07/2022 - 26/07/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** Bore 70 , Depth: 7.0 - 7.4m



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*R. Irwin*

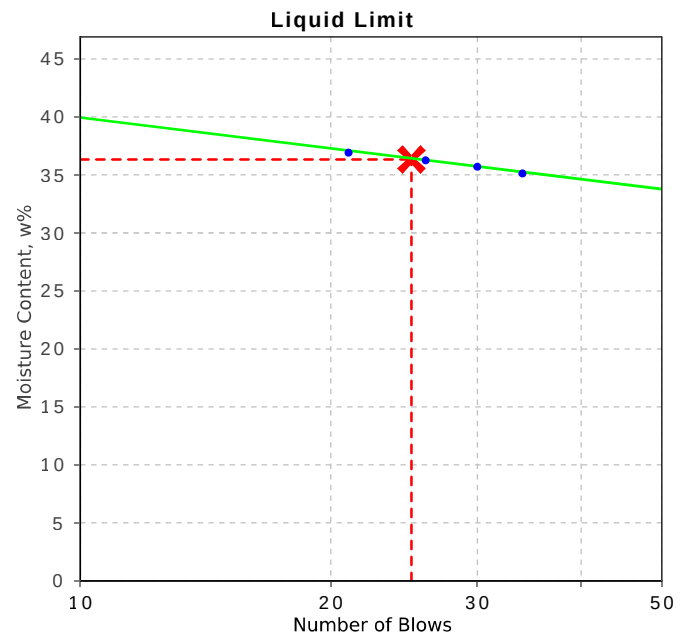
Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1) |            | Min | Max |
|------------------------------------------------|------------|-----|-----|
| Sample History                                 | Oven Dried |     |     |
| Preparation Method                             | Dry Sieve  |     |     |
| Liquid Limit (%)                               | 36         |     |     |
| Plastic Limit (%)                              | 14         |     |     |
| Plasticity Index (%)                           | 22         |     |     |

| Linear Shrinkage (AS1289 3.4.1)  |               | Min | Max |
|----------------------------------|---------------|-----|-----|
| Moisture Condition Determined By | AS 1289.3.1.1 |     |     |
| Linear Shrinkage (%)             | 10.0          |     |     |
| Cracking Crumbling Curling       | None          |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 12.2 |





# Material Test Report

**Report Number:** 022-135A-1D  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd



Ground Testing Services Pty Ltd  
Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 15/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Location:** Whitwood Road, Ebbw Vale

Email: enquiries@groundtestingservices.com.au



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Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Shrink Swell Index AS 1289 7.1.1 & 2.1.1 |                            |                            |                              |                             |                             |
|------------------------------------------|----------------------------|----------------------------|------------------------------|-----------------------------|-----------------------------|
| Sample Number                            | G22-2259A                  | G22-2259H                  | G22-2259X                    | G22-2259AI                  | G22-2259AL                  |
| Date Sampled                             | 23/05/2022                 | 24/05/2022                 | 27/05/2022                   | 26/05/2022                  | 26/05/2022                  |
| Date Tested                              | 02/06/2022                 | 02/06/2022                 | 02/06/2022                   | 08/06/2022                  | 08/06/2022                  |
| Material Source                          | Insitu                     | Insitu                     | Insitu                       | Insitu                      | Insitu                      |
| Sample Location                          | Test Pit 1<br>(0.8 - 1.1m) | Test Pit 7<br>(1.2 - 1.5m) | Test Pit 38<br>(1.1 - 1.45m) | Test Pit 45<br>(0.4 - 0.8m) | Test Pit 46<br>(1.2 - 1.4m) |
| Inert Material Estimate (%)              | 0                          | 0                          | 0                            | 0                           | 0                           |
| Pocket Penetrometer before (kPa)         | **                         | **                         | **                           | **                          | **                          |
| Pocket Penetrometer after (kPa)          | **                         | **                         | **                           | **                          | **                          |
| Shrinkage Moisture Content (%)           | 18.7                       | 19.1                       | 34.7                         | 33.9                        | 31.2                        |
| Shrinkage (%)                            | 2.0                        | 4.6                        | 9.4                          | 8.5                         | 7.7                         |
| Swell Moisture Content Before (%)        | 18.5                       | 16.3                       | 31.8                         | 40.7                        | 29.1                        |
| Swell Moisture Content After (%)         | 22.6                       | 20.4                       | 41.6                         | 45.2                        | 36.2                        |
| Swell (%)                                | -0.0                       | 0.8                        | 7.6                          | 4.2                         | 6.1                         |
| Shrink Swell Index Iss (%)               | 1.1                        | 2.8                        | 7.3                          | 5.9                         | 6.0                         |
| Visual Description                       | Silty Clay                 | Silty Clay                 | Silty Clay                   | Silty Clay                  | Silty Clay                  |
| Cracking                                 | HC                         | SC                         | SC                           | HC                          | HC                          |
| Crumbling                                | No                         | No                         | No                           | No                          | **                          |
| Remarks                                  | **                         | **                         | **                           | **                          | **                          |

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

# Material Test Report

**Report Number:** 022-135A-1D  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd



Ground Testing Services Pty Ltd  
Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 15/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Location:** Whitwood Road, Ebbw Vale

Email: enquiries@groundtestingservices.com.au



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Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Shrink Swell Index AS 1289 7.1.1 & 2.1.1 |                              |  |  |  |  |
|------------------------------------------|------------------------------|--|--|--|--|
| Sample Number                            | G22-2259AO                   |  |  |  |  |
| Date Sampled                             | 27/05/2022                   |  |  |  |  |
| Date Tested                              | 15/06/2022                   |  |  |  |  |
| Material Source                          | Insitu                       |  |  |  |  |
| Sample Location                          | Test Pit 48<br>(0.6 - 0.85m) |  |  |  |  |
| Inert Material Estimate (%)              | 10                           |  |  |  |  |
| Pocket Penetrometer before (kPa)         | **                           |  |  |  |  |
| Pocket Penetrometer after (kPa)          | **                           |  |  |  |  |
| Shrinkage Moisture Content (%)           | 27.1                         |  |  |  |  |
| Shrinkage (%)                            | 2.9                          |  |  |  |  |
| Swell Moisture Content Before (%)        | 19.6                         |  |  |  |  |
| Swell Moisture Content After (%)         | 23.0                         |  |  |  |  |
| Swell (%)                                | 1.9                          |  |  |  |  |
| Shrink Swell Index Iss (%)               | 2.1                          |  |  |  |  |
| Visual Description                       | Silty Clay                   |  |  |  |  |
| Cracking                                 | MC                           |  |  |  |  |
| Crumbling                                | No                           |  |  |  |  |
| Remarks                                  | **                           |  |  |  |  |

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

# Material Test Report

**Report Number:** 022-135A-1E  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259C  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 06/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 2 , Depth: 1.0 - 1.2m



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Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

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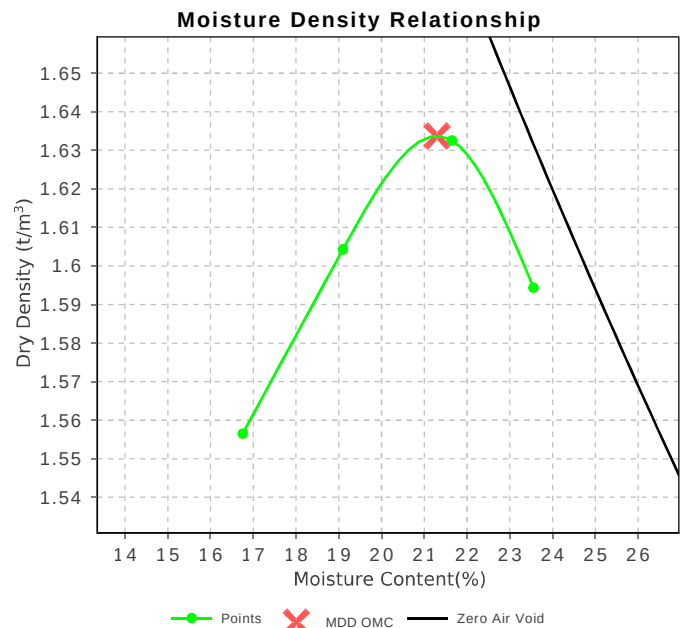


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1) |                 | Min  | Max |
|-------------------------------------------------------------|-----------------|------|-----|
| Mould Type                                                  | 1 LITRE MOULD A |      |     |
| Compaction                                                  | Standard        |      |     |
| Maximum Dry Density (t/m <sup>3</sup> )                     | 1.63            |      |     |
| Optimum Moisture Content (%)                                | 21.5            |      |     |
| Oversize Sieve (mm)                                         | 19.0            |      |     |
| Oversize Material Wet (%)                                   | 0               |      |     |
| Method used to Determine Plasticity                         | Visual          |      |     |
| Curing Hours (h)                                            | 117.2           |      |     |
| Moisture Content (AS 1289 2.1.1)                            |                 |      |     |
| Moisture Content (%)                                        |                 | 19.3 |     |



# Material Test Report

**Report Number:** 022-135A-1E  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259O  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 06/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 20 , Depth: 1.2 - 1.4m



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Gold Coast Laboratory  
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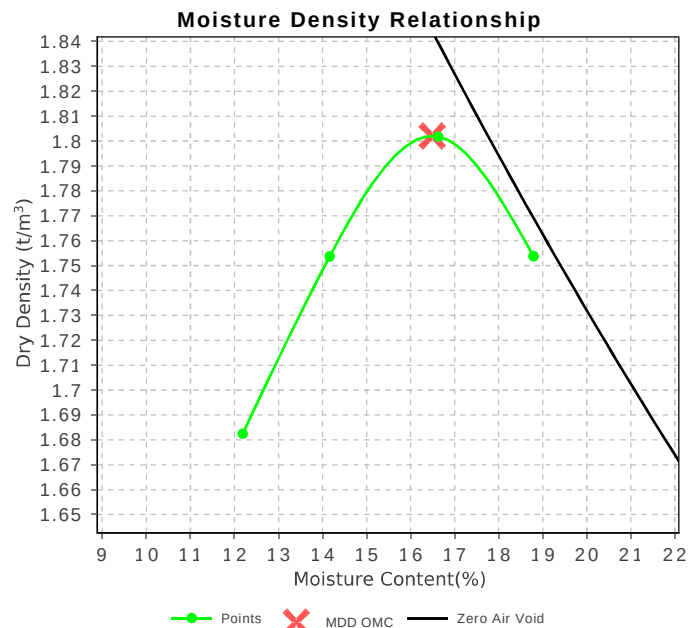


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1) |                 | Min  | Max |
|-------------------------------------------------------------|-----------------|------|-----|
| Mould Type                                                  | 1 LITRE MOULD A |      |     |
| Compaction                                                  | Standard        |      |     |
| Maximum Dry Density (t/m <sup>3</sup> )                     | 1.80            |      |     |
| Optimum Moisture Content (%)                                | 16.5            |      |     |
| Oversize Sieve (mm)                                         | 19.0            |      |     |
| Oversize Material Wet (%)                                   | 4               |      |     |
| Method used to Determine Plasticity                         | Visual          |      |     |
| Curing Hours (h)                                            | 117.0           |      |     |
| Moisture Content (AS 1289 2.1.1)                            |                 |      |     |
| Moisture Content (%)                                        |                 | 15.6 |     |



# Material Test Report

**Report Number:** 022-135A-1E  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259P  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 06/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 24 , Depth: 2.1 - 2.3m



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Gold Coast Laboratory  
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Phone: (07) 5535 2539

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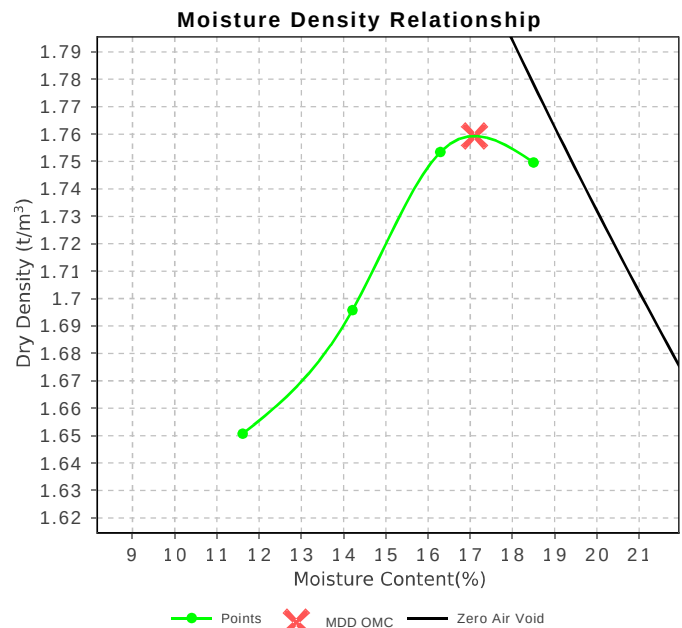
*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1) |                 | Min | Max |
|-------------------------------------------------------------|-----------------|-----|-----|
| Mould Type                                                  | 1 LITRE MOULD A |     |     |
| Compaction                                                  | Standard        |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )                     | 1.76            |     |     |
| Optimum Moisture Content (%)                                | 17.0            |     |     |
| Oversize Sieve (mm)                                         | 19.0            |     |     |
| Oversize Material Wet (%)                                   | 7               |     |     |
| Method used to Determine Plasticity                         | Visual          |     |     |
| Curing Hours (h)                                            | 117.0           |     |     |

| Moisture Content (AS 1289 2.1.1) |      |
|----------------------------------|------|
| Moisture Content (%)             | 18.3 |



# Material Test Report

**Report Number:** 022-135A-1E  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259V  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 06/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 34 , Depth: 0.6 - 0.9m



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Gold Coast Laboratory  
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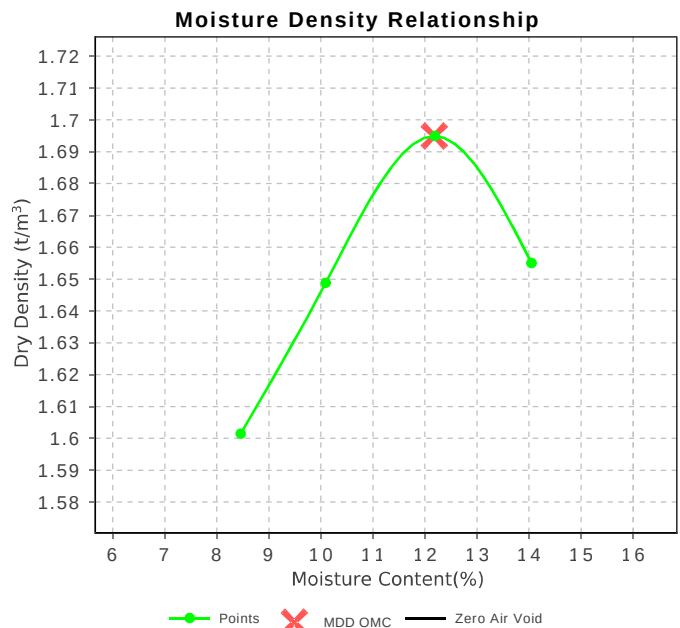


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1) |                 | Min  | Max |
|-------------------------------------------------------------|-----------------|------|-----|
| Mould Type                                                  | 1 LITRE MOULD A |      |     |
| Compaction                                                  | Standard        |      |     |
| Maximum Dry Density (t/m <sup>3</sup> )                     | 1.69            |      |     |
| Optimum Moisture Content (%)                                | 12.0            |      |     |
| Oversize Sieve (mm)                                         | 19.0            |      |     |
| Oversize Material Wet (%)                                   | 13              |      |     |
| Method used to Determine Plasticity                         | Visual          |      |     |
| Curing Hours (h)                                            | 117.4           |      |     |
| Moisture Content (AS 1289 2.1.1)                            |                 |      |     |
| Moisture Content (%)                                        |                 | 10.5 |     |



# Material Test Report

**Report Number:** 022-135A-1E  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AA  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 06/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 39 , Depth: 2.5 - 2.7m



Ground Testing Services Pty Ltd  
Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
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Email: enquiries@groundtestingservices.com.au

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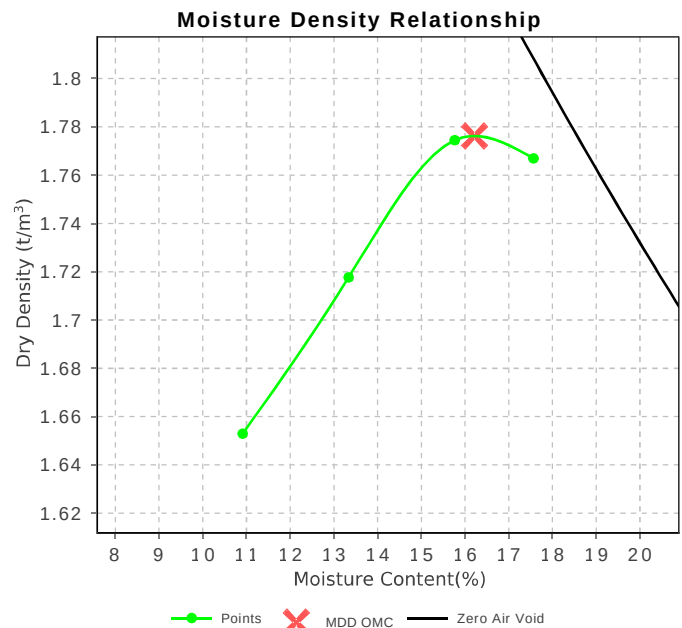


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1) |                 | Min  | Max |
|-------------------------------------------------------------|-----------------|------|-----|
| Mould Type                                                  | 1 LITRE MOULD A |      |     |
| Compaction                                                  | Standard        |      |     |
| Maximum Dry Density (t/m <sup>3</sup> )                     | 1.78            |      |     |
| Optimum Moisture Content (%)                                | 16.0            |      |     |
| Oversize Sieve (mm)                                         | 19.0            |      |     |
| Oversize Material Wet (%)                                   | 0               |      |     |
| Method used to Determine Plasticity                         | Visual          |      |     |
| Curing Hours (h)                                            | 117.2           |      |     |
| Moisture Content (AS 1289 2.1.1)                            |                 |      |     |
| Moisture Content (%)                                        |                 | 12.1 |     |



# Material Test Report

**Report Number:** 022-135A-1E  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AF  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 07/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 43 , Depth: 0.9 - 1.1m



Ground Testing Services Pty Ltd  
Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

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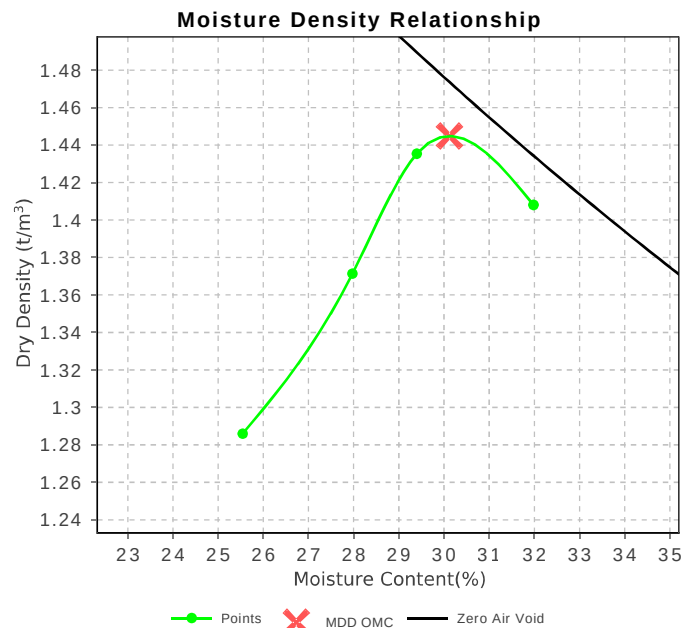


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1) |                 | Min  | Max |
|-------------------------------------------------------------|-----------------|------|-----|
| Mould Type                                                  | 1 LITRE MOULD A |      |     |
| Compaction                                                  | Standard        |      |     |
| Maximum Dry Density (t/m <sup>3</sup> )                     | 1.44            |      |     |
| Optimum Moisture Content (%)                                | 30.0            |      |     |
| Oversize Sieve (mm)                                         | 19.0            |      |     |
| Oversize Material Wet (%)                                   | 5               |      |     |
| Method used to Determine Plasticity                         | Visual          |      |     |
| Curing Hours (h)                                            | 135.6           |      |     |
| Moisture Content (AS 1289 2.1.1)                            |                 |      |     |
| Moisture Content (%)                                        |                 | 28.3 |     |





# Material Test Report

**Report Number:** 022-135A-1E  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AN  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 06/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 47 , Depth: 2.4 - 2.7m



Ground Testing Services Pty Ltd  
Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
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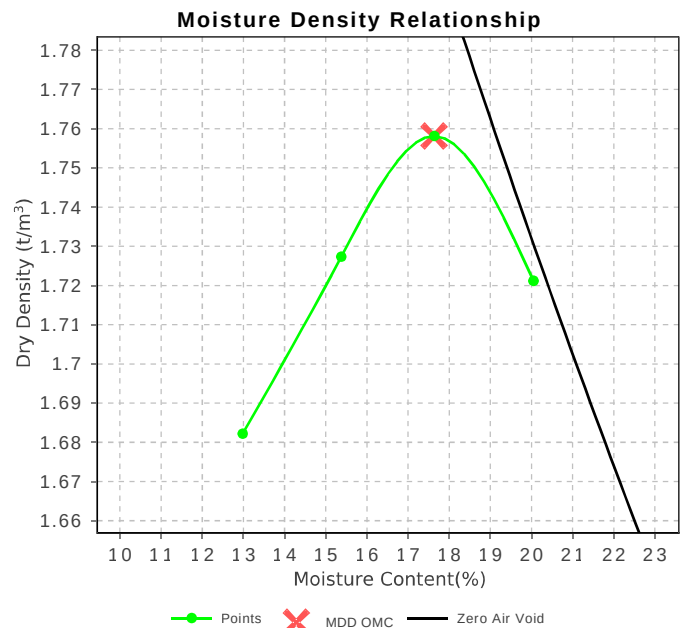


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1) |                 | Min  | Max |
|-------------------------------------------------------------|-----------------|------|-----|
| Mould Type                                                  | 1 LITRE MOULD A |      |     |
| Compaction                                                  | Standard        |      |     |
| Maximum Dry Density (t/m <sup>3</sup> )                     | 1.76            |      |     |
| Optimum Moisture Content (%)                                | 17.5            |      |     |
| Oversize Sieve (mm)                                         | 19.0            |      |     |
| Oversize Material Wet (%)                                   | 6               |      |     |
| Method used to Determine Plasticity                         | Visual          |      |     |
| Curing Hours (h)                                            | 117.2           |      |     |
| Moisture Content (AS 1289 2.1.1)                            |                 |      |     |
| Moisture Content (%)                                        |                 | 18.3 |     |



# Material Test Report

**Report Number:** 022-135A-1E  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AP  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 06/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 48 , Depth: 2.0 - 2.2m



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Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

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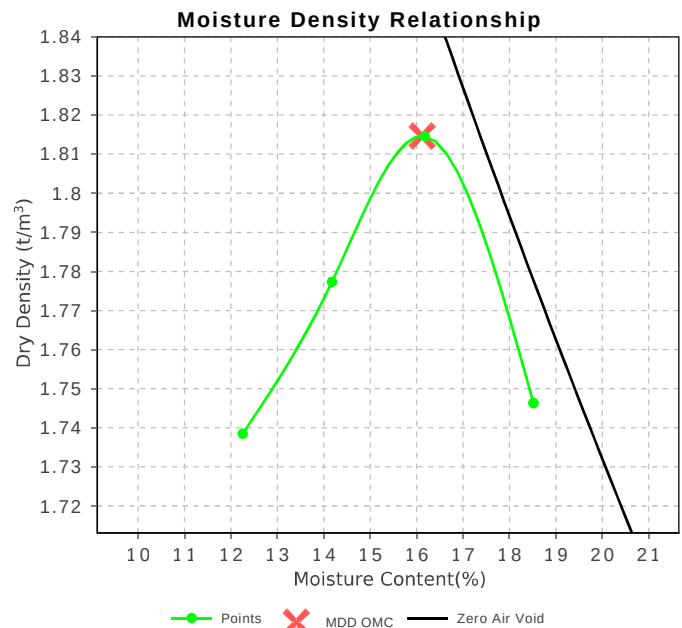


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1) |                 | Min  | Max |
|-------------------------------------------------------------|-----------------|------|-----|
| Mould Type                                                  | 1 LITRE MOULD A |      |     |
| Compaction                                                  | Standard        |      |     |
| Maximum Dry Density (t/m <sup>3</sup> )                     | 1.81            |      |     |
| Optimum Moisture Content (%)                                | 16.0            |      |     |
| Oversize Sieve (mm)                                         | 19.0            |      |     |
| Oversize Material Wet (%)                                   | 6               |      |     |
| Method used to Determine Plasticity                         | Visual          |      |     |
| Curing Hours (h)                                            | 118.0           |      |     |
| Moisture Content (AS 1289 2.1.1)                            |                 |      |     |
| Moisture Content (%)                                        |                 | 12.1 |     |



# Material Test Report

**Report Number:** 022-135A-1E  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AR  
**Date Sampled:** 25/05/2022  
**Dates Tested:** 30/05/2022 - 06/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 52 , Depth: 0.7 - 0.9m



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Gold Coast Laboratory  
2/23 Traders Way Currumbin QLD 4223  
Phone: (07) 5535 2539

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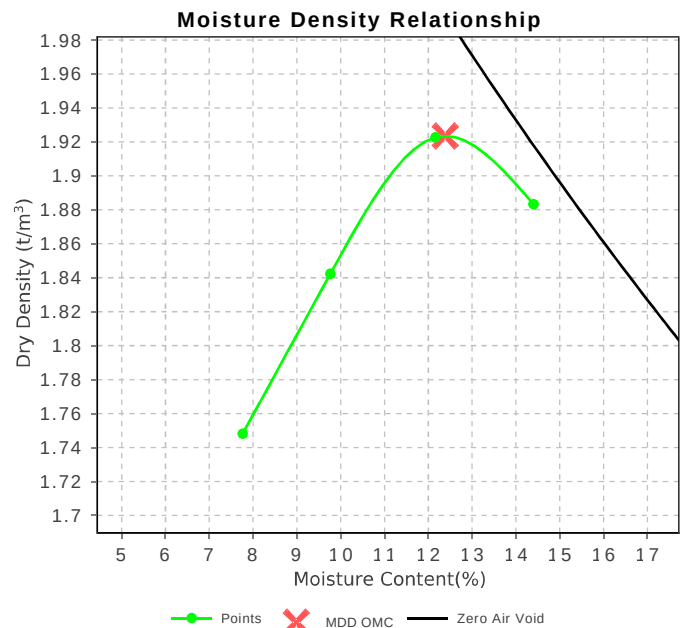


*R. Irwin*

Approved Signatory: Rede Irwin  
Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1) |                 | Min  | Max |
|-------------------------------------------------------------|-----------------|------|-----|
| Mould Type                                                  | 1 LITRE MOULD A |      |     |
| Compaction                                                  | Standard        |      |     |
| Maximum Dry Density (t/m <sup>3</sup> )                     | 1.92            |      |     |
| Optimum Moisture Content (%)                                | 12.5            |      |     |
| Oversize Sieve (mm)                                         | 19.0            |      |     |
| Oversize Material Wet (%)                                   | 19              |      |     |
| Method used to Determine Plasticity                         | Visual          |      |     |
| Curing Hours (h)                                            | 117.5           |      |     |
| Moisture Content (AS 1289 2.1.1)                            |                 |      |     |
| Moisture Content (%)                                        |                 | 14.3 |     |



# Material Test Report

**Report Number:** 022-135A-1E  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AT  
**Date Sampled:** 25/05/2022  
**Dates Tested:** 30/05/2022 - 06/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 57 , Depth: 2.3 - 2.6m



Ground Testing Services Pty Ltd

Gold Coast Laboratory

2/23 Traders Way Currumbin QLD 4223

Phone: (07) 5535 2539

Email: enquiries@groundtestingservices.com.au

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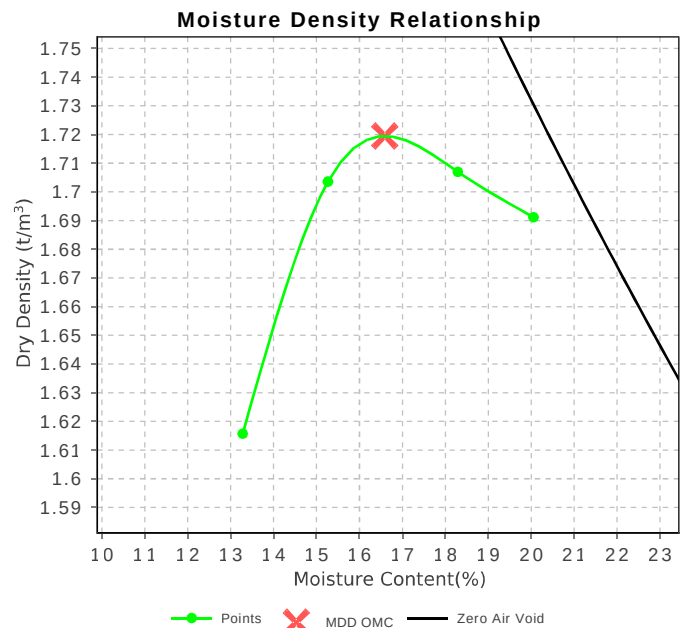
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1) |                 | Min  | Max |
|-------------------------------------------------------------|-----------------|------|-----|
| Mould Type                                                  | 1 LITRE MOULD A |      |     |
| Compaction                                                  | Standard        |      |     |
| Maximum Dry Density (t/m <sup>3</sup> )                     | 1.72            |      |     |
| Optimum Moisture Content (%)                                | 16.5            |      |     |
| Oversize Sieve (mm)                                         | 19.0            |      |     |
| Oversize Material Wet (%)                                   | 10              |      |     |
| Method used to Determine Plasticity                         | Visual          |      |     |
| Curing Hours (h)                                            | 116.4           |      |     |
| Moisture Content (AS 1289 2.1.1)                            |                 |      |     |
| Moisture Content (%)                                        |                 | 17.0 |     |



# Material Test Report

**Report Number:** 022-135A-1F  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259C  
**Date Sampled:** 23/05/2022  
**Dates Tested:** 30/05/2022 - 13/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 2 , Depth: 1.0 - 1.2m



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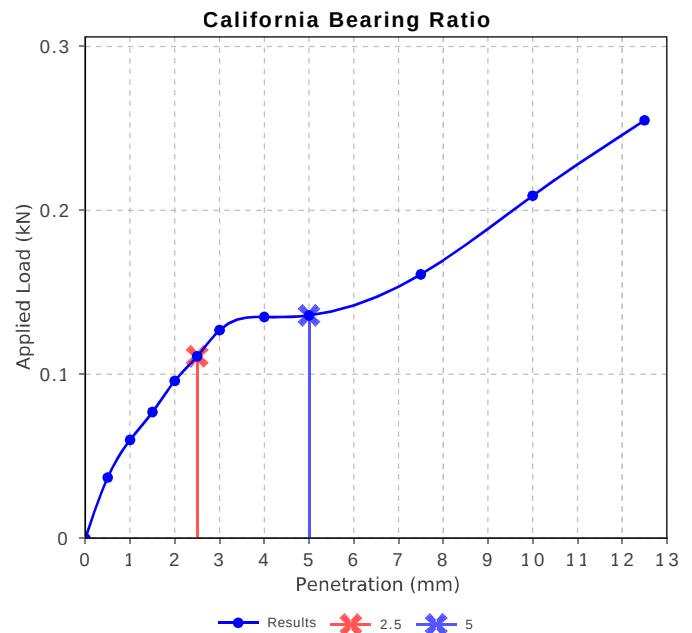
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*R. Irwin*

Approved Signatory: Rede Irwin  
 Laboratory Manager

NATA Accredited Laboratory Number: 18820

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--------------------------------------------------|-----------------------|-----|-----|
| CBR taken at                                     | 2.5 mm                |     |     |
| CBR %                                            | 1.0                   |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual                |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.63                  |     |     |
| Optimum Moisture Content (%)                     | 21.5                  |     |     |
| Laboratory Density Ratio (%)                     | 99.5                  |     |     |
| Laboratory Moisture Ratio (%)                    | 100.5                 |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.55                  |     |     |
| Field Moisture Content (%)                       | 19.3                  |     |     |
| Moisture Content at Placement (%)                | 21.4                  |     |     |
| Moisture Content Top 30mm (%)                    | 32.6                  |     |     |
| Moisture Content Rest of Sample (%)              | 24.8                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 195.5                 |     |     |
| Swell (%)                                        | 5.0                   |     |     |
| Over-size Material (mm)                          | 19                    |     |     |
| Over-size Material Included                      | Excluded              |     |     |
| Over-size Material (%)                           | 0.0                   |     |     |



# Material Test Report

**Report Number:** 022-135A-1F  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259O  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 09/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 20 , Depth: 1.2 - 1.4m



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Gold Coast Laboratory

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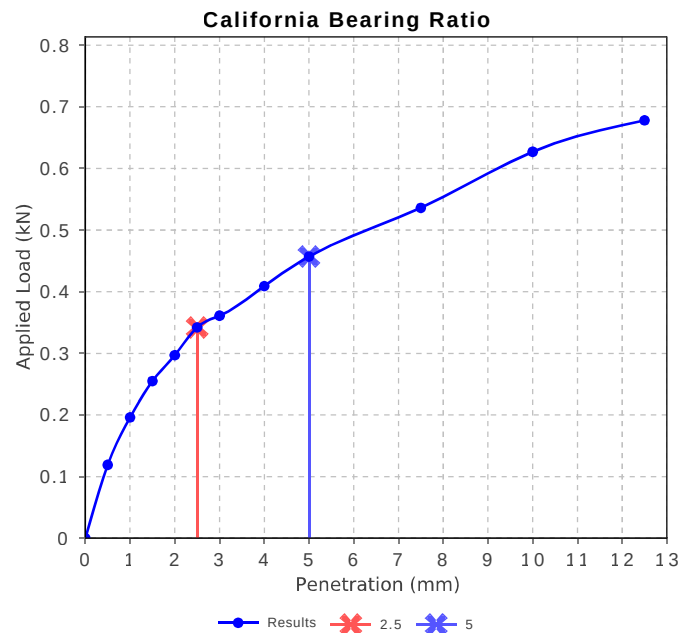
*R. Irwin*

Approved Signatory: Rede Irwin

Laboratory Manager

NATA Accredited Laboratory Number: 18820

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--------------------------------------------------|-----------------------|-----|-----|
| CBR taken at                                     | 2.5 mm                |     |     |
| CBR %                                            | 2.5                   |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual                |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.80                  |     |     |
| Optimum Moisture Content (%)                     | 16.5                  |     |     |
| Laboratory Density Ratio (%)                     | 97.5                  |     |     |
| Laboratory Moisture Ratio (%)                    | 114.5                 |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.75                  |     |     |
| Field Moisture Content (%)                       | 15.6                  |     |     |
| Moisture Content at Placement (%)                | 18.9                  |     |     |
| Moisture Content Top 30mm (%)                    | 21.4                  |     |     |
| Moisture Content Rest of Sample (%)              | 19.5                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 195.2                 |     |     |
| Swell (%)                                        | 0.5                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 4.5                   |     |     |



# Material Test Report

**Report Number:** 022-135A-1F  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259P  
**Date Sampled:** 24/05/2022  
**Dates Tested:** 30/05/2022 - 09/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 24 , Depth: 2.1 - 2.3m



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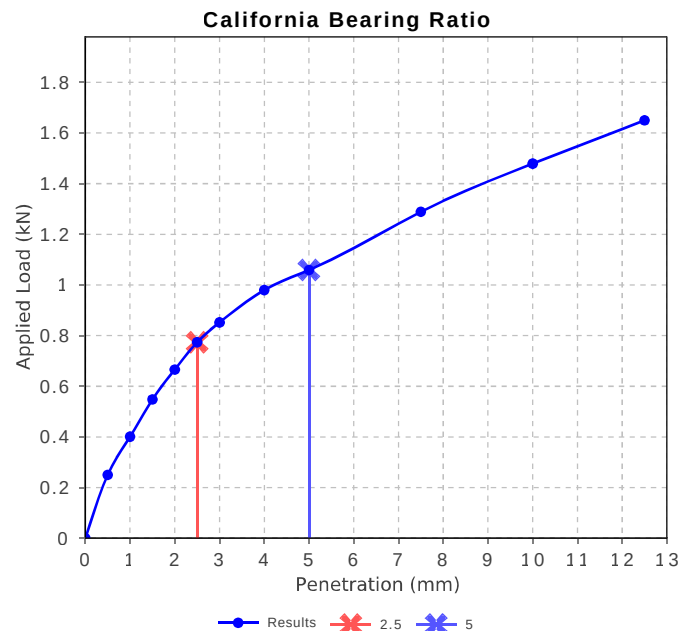
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*R. Irwin*

Approved Signatory: Rede Irwin  
 Laboratory Manager

NATA Accredited Laboratory Number: 18820

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--------------------------------------------------|-----------------------|-----|-----|
| CBR taken at                                     | 2.5 mm                |     |     |
| CBR %                                            | 6                     |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual                |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.76                  |     |     |
| Optimum Moisture Content (%)                     | 17.0                  |     |     |
| Laboratory Density Ratio (%)                     | 100.5                 |     |     |
| Laboratory Moisture Ratio (%)                    | 94.5                  |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.76                  |     |     |
| Field Moisture Content (%)                       | 23.9                  |     |     |
| Moisture Content at Placement (%)                | 16.1                  |     |     |
| Moisture Content Top 30mm (%)                    | 21.0                  |     |     |
| Moisture Content Rest of Sample (%)              | 17.9                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 195.4                 |     |     |
| Swell (%)                                        | 0.5                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 7.0                   |     |     |



# Material Test Report

**Report Number:** 022-135A-1F  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259V  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 09/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 34 , Depth: 0.6 - 0.9m



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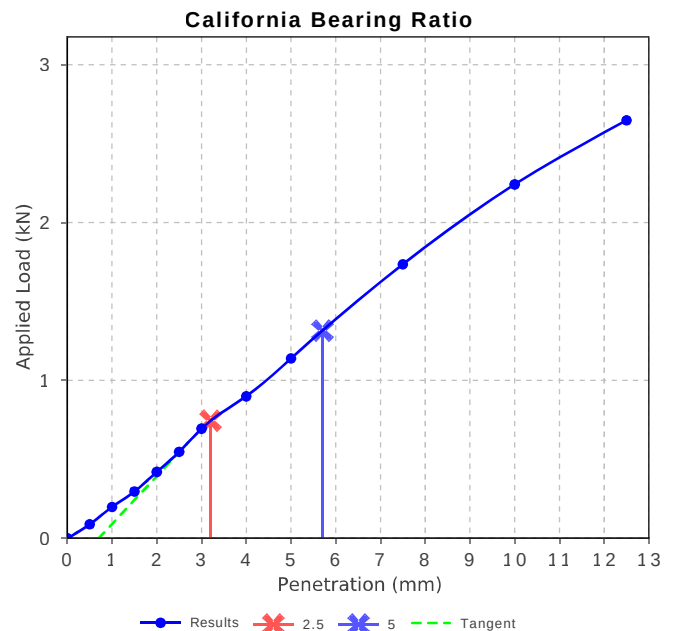
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Approved Signatory: *Rede Irwin*  
 Rede Irwin  
 Laboratory Manager  
 NATA Accredited Laboratory Number: 18820

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--------------------------------------------------|-----------------------|-----|-----|
| CBR taken at                                     | 5 mm                  |     |     |
| CBR %                                            | 7                     |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual                |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.70                  |     |     |
| Optimum Moisture Content (%)                     | 12.0                  |     |     |
| Laboratory Density Ratio (%)                     | 100.5                 |     |     |
| Laboratory Moisture Ratio (%)                    | 94.5                  |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.70                  |     |     |
| Field Moisture Content (%)                       | 10.5                  |     |     |
| Moisture Content at Placement (%)                | 11.5                  |     |     |
| Moisture Content Top 30mm (%)                    | 13.4                  |     |     |
| Moisture Content Rest of Sample (%)              | 12.5                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 195.2                 |     |     |
| Swell (%)                                        | 0.0                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 12.7                  |     |     |





# Material Test Report

**Report Number:** 022-135A-1F  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AA  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 09/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 39 , Depth: 2.5 - 2.7m



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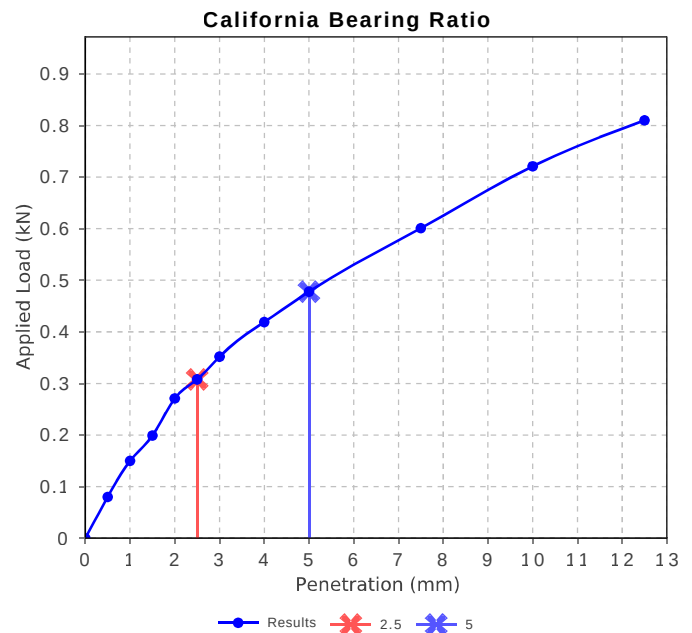
Email: enquiries@groundtestingservices.com.au



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Approved Signatory: Rede Irwin  
 Laboratory Manager  
 NATA Accredited Laboratory Number: 18820

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--------------------------------------------------|-----------------------|-----|-----|
| CBR taken at                                     | 5 mm                  |     |     |
| CBR %                                            | 2.5                   |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual                |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.78                  |     |     |
| Optimum Moisture Content (%)                     | 16.0                  |     |     |
| Laboratory Density Ratio (%)                     | 100.0                 |     |     |
| Laboratory Moisture Ratio (%)                    | 95.5                  |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.73                  |     |     |
| Field Moisture Content (%)                       | 12.1                  |     |     |
| Moisture Content at Placement (%)                | 15.4                  |     |     |
| Moisture Content Top 30mm (%)                    | 23.6                  |     |     |
| Moisture Content Rest of Sample (%)              | 18.4                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 194.2                 |     |     |
| Swell (%)                                        | 3.0                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 0.0                   |     |     |



# Material Test Report

**Report Number:** 022-135A-1F  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AF  
**Date Sampled:** 26/05/2022  
**Dates Tested:** 30/05/2022 - 12/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 43 , Depth: 0.9 - 1.1m



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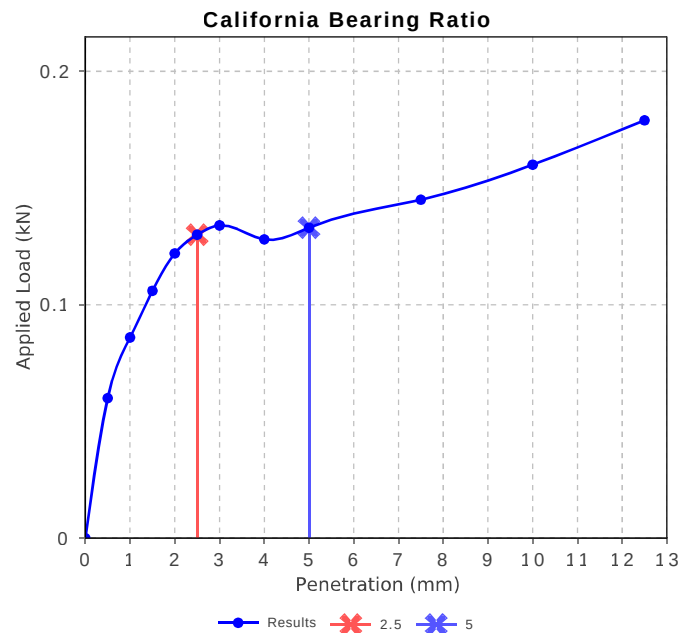
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Approved Signatory: *Rede Irwin*  
 Rede Irwin  
 Laboratory Manager  
 NATA Accredited Laboratory Number: 18820

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--------------------------------------------------|-----------------------|-----|-----|
| CBR taken at                                     | 2.5 mm                |     |     |
| CBR %                                            | 1.0                   |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual                |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.44                  |     |     |
| Optimum Moisture Content (%)                     | 30.0                  |     |     |
| Laboratory Density Ratio (%)                     | 100.5                 |     |     |
| Laboratory Moisture Ratio (%)                    | 96.5                  |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.35                  |     |     |
| Field Moisture Content (%)                       | 28.3                  |     |     |
| Moisture Content at Placement (%)                | 29.0                  |     |     |
| Moisture Content Top 30mm (%)                    | 55.4                  |     |     |
| Moisture Content Rest of Sample (%)              | 31.2                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 123.6                 |     |     |
| Swell (%)                                        | 8.0                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 5.2                   |     |     |



# Material Test Report

**Report Number:** 022-135A-1F  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AN  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 09/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 47 , Depth: 2.4 - 2.7m



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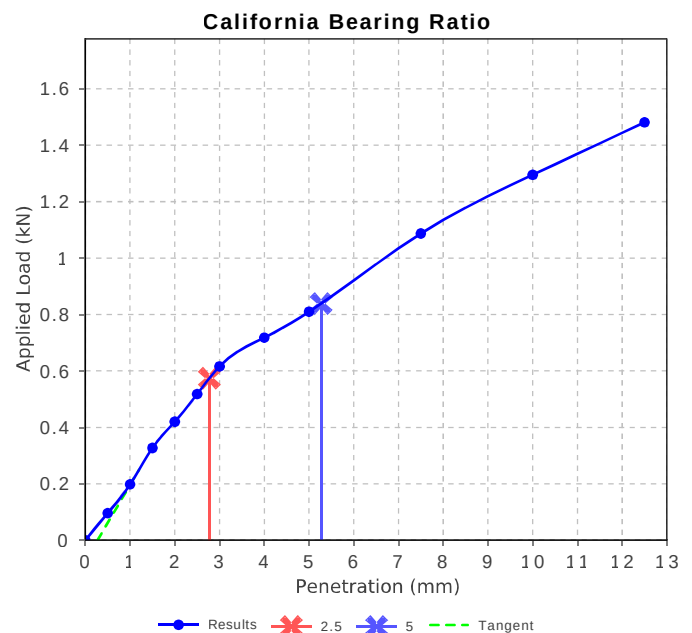


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Approved Signatory: *Rede Irwin*  
 Rede Irwin  
 Laboratory Manager

NATA Accredited Laboratory Number: 18820

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--------------------------------------------------|-----------------------|-----|-----|
| CBR taken at                                     | 2.5 mm                |     |     |
| CBR %                                            | 4.5                   |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual                |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.76                  |     |     |
| Optimum Moisture Content (%)                     | 17.5                  |     |     |
| Laboratory Density Ratio (%)                     | 99.5                  |     |     |
| Laboratory Moisture Ratio (%)                    | 102.5                 |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.72                  |     |     |
| Field Moisture Content (%)                       | 18.3                  |     |     |
| Moisture Content at Placement (%)                | 18.0                  |     |     |
| Moisture Content Top 30mm (%)                    | 24.3                  |     |     |
| Moisture Content Rest of Sample (%)              | 20.1                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 194.0                 |     |     |
| Swell (%)                                        | 2.0                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 5.6                   |     |     |



# Material Test Report

**Report Number:** 022-135A-1F  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AP  
**Date Sampled:** 27/05/2022  
**Dates Tested:** 30/05/2022 - 09/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 48 , Depth: 2.0 - 2.2m



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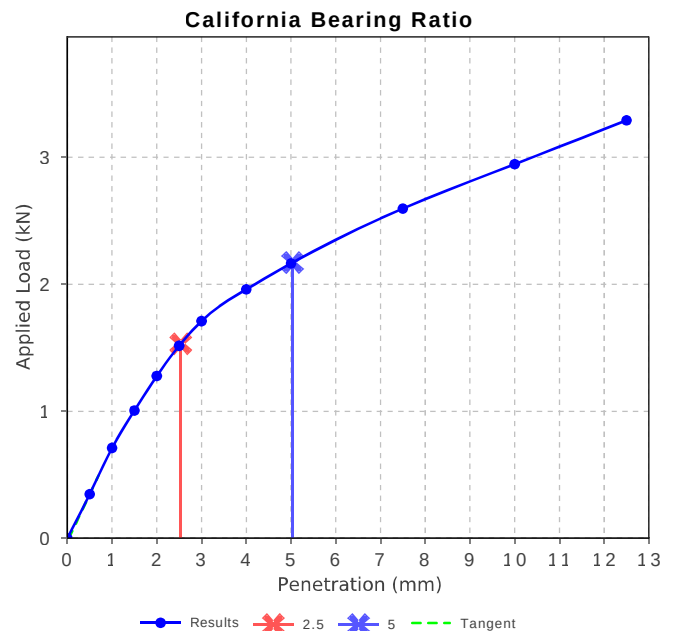
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Approved Signatory: *Rede Irwin*  
 Rede Irwin  
 Laboratory Manager  
 NATA Accredited Laboratory Number: 18820

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--------------------------------------------------|-----------------------|-----|-----|
| CBR taken at                                     | 2.5 mm                |     |     |
| CBR %                                            | 12                    |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual                |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.81                  |     |     |
| Optimum Moisture Content (%)                     | 16.0                  |     |     |
| Laboratory Density Ratio (%)                     | 100.0                 |     |     |
| Laboratory Moisture Ratio (%)                    | 98.5                  |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.81                  |     |     |
| Field Moisture Content (%)                       | 12.1                  |     |     |
| Moisture Content at Placement (%)                | 15.9                  |     |     |
| Moisture Content Top 30mm (%)                    | 19.2                  |     |     |
| Moisture Content Rest of Sample (%)              | 16.3                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 193.8                 |     |     |
| Swell (%)                                        | 0.5                   |     |     |
| Over-size Material (mm)                          | 19                    |     |     |
| Over-size Material Included                      | Excluded              |     |     |
| Over-size Material (%)                           | 6.3                   |     |     |



# Material Test Report

**Report Number:** 022-135A-1F  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AR  
**Date Sampled:** 25/05/2022  
**Dates Tested:** 30/05/2022 - 09/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 52 , Depth: 0.7 - 0.9m



Ground Testing Services Pty Ltd  
 Gold Coast Laboratory  
 2/23 Traders Way Currumbin QLD 4223  
 Phone: (07) 5535 2539

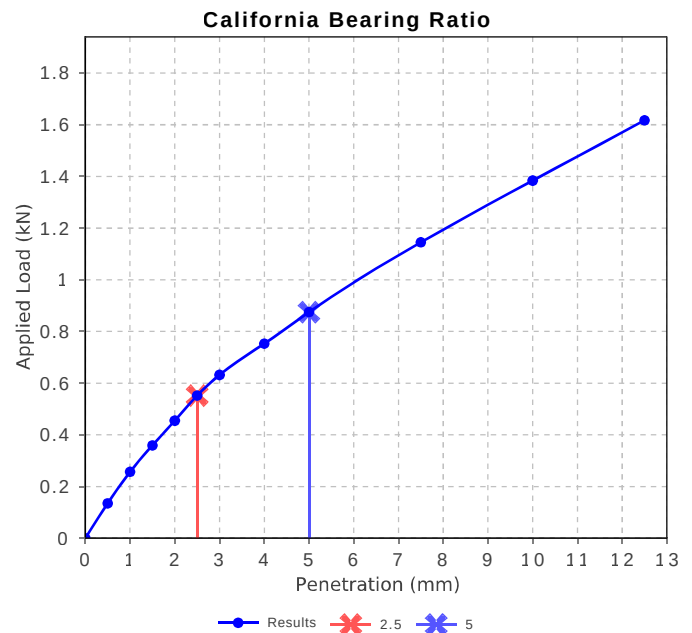
Email: enquiries@groundtestingservices.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Rede Irwin  
 Laboratory Manager  
 NATA Accredited Laboratory Number: 18820

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--------------------------------------------------|-----------------------|-----|-----|
| CBR taken at                                     | 5 mm                  |     |     |
| CBR %                                            | 4.5                   |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual                |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.92                  |     |     |
| Optimum Moisture Content (%)                     | 12.5                  |     |     |
| Laboratory Density Ratio (%)                     | 100.0                 |     |     |
| Laboratory Moisture Ratio (%)                    | 95.0                  |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.90                  |     |     |
| Field Moisture Content (%)                       | 14.3                  |     |     |
| Moisture Content at Placement (%)                | 11.8                  |     |     |
| Moisture Content Top 30mm (%)                    | 16.4                  |     |     |
| Moisture Content Rest of Sample (%)              | 13.9                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 169.8                 |     |     |
| Swell (%)                                        | 1.5                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 19.0                  |     |     |



# Material Test Report

**Report Number:** 022-135A-1F  
**Issue Number:** 1  
**Date Issued:** 19/10/2022  
**Client:** Chum Street Land Evolution Pty Ltd

**Contact:** accounts@qldpropertygroup.com.au  
**Project Number:** 022-135A  
**Project Name:** Residential Subdivision  
**Project Location:** Whitwood Road, Ebbw Vale  
**Work Request:** 2259  
**Sample Number:** G22-2259AT  
**Date Sampled:** 25/05/2022  
**Dates Tested:** 30/05/2022 - 09/06/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.4 - Machine excavated pit or trench  
**Sample Location:** Test Pit 57 , Depth: 2.3 - 2.6m



Ground Testing Services Pty Ltd  
 Gold Coast Laboratory  
 2/23 Traders Way Currumbin QLD 4223  
 Phone: (07) 5535 2539

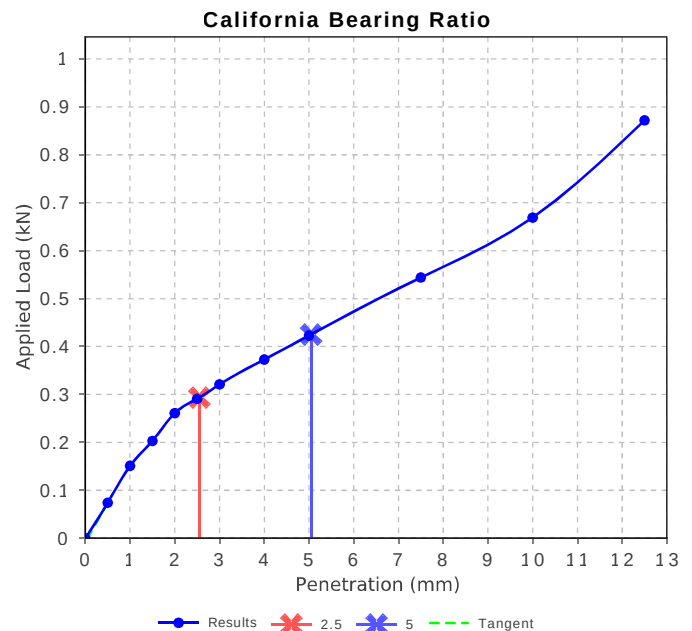
Email: enquiries@groundtestingservices.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: *Rede Irwin*  
 Rede Irwin  
 Laboratory Manager  
 NATA Accredited Laboratory Number: 18820

| California Bearing Ratio (AS 1289 6.1.1 & 2.1.1) |                       | Min | Max |
|--------------------------------------------------|-----------------------|-----|-----|
| CBR taken at                                     | 2.5 mm                |     |     |
| CBR %                                            | 2.0                   |     |     |
| Method of Compactive Effort                      | Standard              |     |     |
| Method used to Determine MDD                     | AS 1289 5.1.1 & 2.1.1 |     |     |
| Method used to Determine Plasticity              | Visual                |     |     |
| Maximum Dry Density (t/m <sup>3</sup> )          | 1.72                  |     |     |
| Optimum Moisture Content (%)                     | 16.5                  |     |     |
| Laboratory Density Ratio (%)                     | 101.0                 |     |     |
| Laboratory Moisture Ratio (%)                    | 96.0                  |     |     |
| Dry Density after Soaking (t/m <sup>3</sup> )    | 1.67                  |     |     |
| Field Moisture Content (%)                       | 17.0                  |     |     |
| Moisture Content at Placement (%)                | 15.9                  |     |     |
| Moisture Content Top 30mm (%)                    | 23.8                  |     |     |
| Moisture Content Rest of Sample (%)              | 18.7                  |     |     |
| Mass Surcharge (kg)                              | 4.5                   |     |     |
| Soaking Period (days)                            | 4                     |     |     |
| Curing Hours                                     | 195.2                 |     |     |
| Swell (%)                                        | 4.0                   |     |     |
| Oversize Material (mm)                           | 19                    |     |     |
| Oversize Material Included                       | Excluded              |     |     |
| Oversize Material (%)                            | 10.0                  |     |     |



# **APPENDIX C**

## **MINING REPORTS PROVIDED BY CHUM STREET LAND EVOLUTION**

# MORETON GEOTECHNICAL SERVICES PTY. LTD.

PO Box 915 Ipswich 4305

Telephone (07) 3294 6988

Facsimile (07) 3294 6988

Email [mgs@gil.com.au](mailto:mgs@gil.com.au)

A.C.N. 055 833 120  
A.B.N. 24 055 833 120

Ref. 2010/91  
7 December 2010

Claypave P/L  
P.O. Box 142  
Booval  
4304

Att. Mr. Fred Wehl

Re: **BROADSCALE MINING STUDY AT EBBW VALE**

## **1.0 INTRODUCTION**

The work in this study was carried out at your request (Email of 11 November 2010) and in general accordance with the details in our Email of 5 November 2010.

It is understood that this study is required to establish the extent to which the site has been impacted on by past coal mining activities, also the extent to which any past mining activities will constrain the site to potential residential or industrial subdivision applications.

Work in this study has included a limited site inspection, researching available maps, reports and publications, preparation of plans, analysis and reporting by the undersigned Engineering Geologist. Taylor Mining Services P/L have assisted in this work.

The following 1:5,000 scale plans are attached to this report:

1. a site plan
2. an aerial photograph
3. a 1955 geology plan
- 4A. a mine features plan
- 4B. an underground mine plan - Bluff Seam
- 4C. an underground mine plan - Four Foot Top Seam
- 4D. an underground mine plan - Four Foot Seam
- 4E. an underground mine plan - Bergin's Seam
- 4F. an underground mine plan - Striped Bacon Seam



- 4G. an underground mine plan - Rob Roy Seam
- 4H. an underground mine plan - Cochrane Seam
- 5. a composite open cut plan
- 6. a mining lease plan
- 7. a mine constraints plan

## **2.0 INVESTIGATION RESULTS**

### **2.1 SITE**

Plan 1 attached shows details of the site which includes Lot 2 on SP207444, Lot 25 on SP 220030 and Lot 27 on SP 220033. The site is broadly bounded by the Cunningham Highway in the east, High Street in the west and the southern ends of Railway and Jordan Streets and Whitwood Road in the north.

The site has a Powerlink electricity transmission easement corridor sub-parallel to and adjacent to the highway. A water pipeline easement also forms the western boundary of the site adjacent to High Street. Railway Street, Jordan Street, Whitwood Road and a private Cunningham Highway underpass provide access points onto the site.

Plan 2 attached shows that the site is mainly covered by trees and is currently used for the extraction of sandstone, shale, clay and coal fines tailings at various locations, for the manufacture of pavers.

The site inspection revealed extensive disturbed areas including clay, coal fines and other pits, small mullock heaps and a massive amount of old open cut overburden material which makes up most of the prominent elevated land along the eastern side of the site. Most of the tree cover is relatively recent regrowth, whereas localised and isolated patches of old eucalypt tree growth exists e.g. near the southern end of Whitwood Road along the Cunningham Highway boundary etc.

### **2.2 GEOLOGY**

Plan 3 attached (1955) shows the bedrock geology prior to the surface disturbances including extensive open cut mining activity. The plan shows that the site was truncated by a north to south trending drainage line, also that three main geological formations exist on the site. The bedrock formations, in increasing age, include the Tertiary sedimentary rocks (orange)

in the extreme north, the Blackstone Stage (dark blue) of the Ipswich Coal Measures in a band across the northern sector and the Cooneana Stage (crosshatched) of the Ipswich Coal Measures across most of the site.

The Bundamba Anticline is a significant feature in the Ipswich area that has affected the geology on this site. This feature extends roughly in a north to south direction. The crest of the anticline (i.e. where beds are nearly level) extends to the near west of the elevated section of High Street. East of the crest (the site) the beds generally dip to the east, whereas west of the crest the beds dip to the west. The stresses generated by the Bundamba Anticline have however caused significant faulting and dislocation of the beds in the bedrocks. Faults of interest to this site are shown on Plans 3 and 4A attached.

Gilliver's Fault is one of about 10 major faults of about 200 known faults in the Ipswich area. This fault extends in a north west/south east direction through the site. The fault is steep angled and the rocks to the south are upthrown. Denmead indicates that a throw of not less than 350 feet (106.7m) to 400 feet (122m) occurs in the area of this site. The Rylance No. 5 Colliery plan of the Rob Roy Seam workings under the site also reveals the position of this fault under this site.

The New Chum Fault is another fault which extends through the site and which has influenced coal mining operations. This fault splits off from Gilliver's Fault in original Portion 257.

The Braeside Fault is a normal fault (see Plan 4A attached) that dips at 40 – 50 degrees to the north. Although this fault is not shown on Plan 3 attached it clearly shows up on the mine plan of the Rob Roy Seam workings and also separates the Rob Roy Seam workings from the adjoining Cochrane Seam workings.

Smaller east west faults are also known in the area.

The beds and coal seams under the site area dip at shallow angles (0- 5 degrees) to the north, south or south west, except adjacent to fault lines where the angles steepen up to 20 degrees to 30 degrees and steeper.

The Blackstone and Cooneana Stages (sandstone, shale, siltstone and coal) include the previously productive Bluff, Four Foot Top, main Four Foot, Bergin's, Striped Bacon and Rob Roy Seams as well as the oldest and only Cooneana Stage Seam, i.e. the Cochrane Seam. To the west of the site the coal seams were also known as the Bluff, Four Foot Top, main Four Foot, Bergin's (Braeside No. 1), Striped Bacon (Braeside No. 2), Rob Roy (Braeside

No. 3) and Lindsay's Hard Seam (Braeside No. 4). West of High Street, the seams were generally referred to as the Braeside Seams, whereas east of High Street (the site area) the seams were known as Seams No.s 1 to 5 (unrelated to the Braeside Seam numbers), the Top Coal, New Chum Seam, "Underbands" etc. The New Chum Seam was later correlated with the Four Foot Seam.

The Top Seam, Four Foot Seam and Bergin's Seam are separated by less than 6m in the central area of the Rylance No. 3 Colliery in the northern sector of the site. The Top Four Foot Seam however diverges from the Four Foot Seam to the north by up to 21m while the Bergin's also diverges from the Four Foot Seam to the south by up to 24m.

## 2.3 MINING

### 2.3.1 General

Underground mining took place under or in the area of the site between the 1870s and 1960s. Many mine plans of the various operations are held at the Mines Department, however plans for the earliest New Chum Colliery in particular appear to be incomplete. Understanding the various plans is further complicated by the different seam nomenclature used in the adjoining mine operations e.g. the No. 1 Seam (Braeside), No. 5 (Rylance) and "Underbands" (Rylance) describe the same Bergin's Seam.

Open cut mining took place from the 1960s when appropriate equipment became available. Open cut mining also took place on this site well into the 1970s. Good open cut mine plans are seldom available for the whole of the Ipswich region and this is also the case for this site. The most complete plan is that of the Rylance No. 5 Colliery which operated on the east side of High Street on this site. The completeness of this plan appears to be more to do with the failure and gradual movement of the western highway and High Street itself which required emergency backfilling to stabilise the road reserve and properties above. We have had to rely on other sources of information (1972 topography plan, 1974 aerial photograph) in establishing the extent of open cut mining to the east of the Rylance No. 5 Open Cut due to paucity of open cut mine plans for that area.

### 2.3.2 Underground Mining

Underground mining in the area of the site started with Mr Gulland's New Chum Colliery in the 1870s. Other early collieries in the area of the site included the Whitwood, Dinmore, Braeside and Day Dawn Collieries. The Rylance No. 3 Colliery and subsequent Rylance No. 5 Colliery, which covered

most of the site, incorporated parts of the original New Chum and Whitwood Collieries with the change in name to Rylance taking place in 1935.

Plan 4A attached shows the locations of tunnel entries and shafts prior to the occurrence of open cut mining. The locations of the main faults have also been shown on this plan for ease of reference. The locations of the tunnels and shafts have been taken from mine plans and geology maps. From the plan it can be seen that four tunnels and one shaft were known to have been located on the site with another three tunnels and two shafts located close to, but outside of, the site boundaries. The tunnel and quarry (clay pit) shown at the northern end of the site in the Tertiary geology has been referred to as the "Clay Tunnel" in this report due to the geological setting and as underground mining of high quality white clay was common practice in the area of the site in the 1890s. The New Chum, Rylance No. 3, Rylance No. 5 and Clay Tunnels are all indicated to have been removed during the later open cut operations.

Plan 4B shows the location of the bord and pillar Bluff Seam workings from the Rylance No. 3 Colliery before open cut mining. Denmead states that the seam is approximately 10m thick and that only a section in the upper part of the seam (which was excessively banded) was worked.

Plan 4C shows the location of the Four Foot Top Seam workings, by bord and pillar methods, from the New Chum Colliery. Denmead states that this seam lies approximately 5.0m above the main Four Foot Seam.

Plan 4D shows the location of the main Four Foot Seam workings, by bord and pillar methods, from the New Chum Colliery. Denmead states that this seam lies approximately 60m below the Bluff Seam, also that it had a worked thickness of approximately 1.4m.

Plan 4E shows the location of the Bergin's Seam workings, by bord and pillar methods, from the Rylance No. 3 Colliery. Denmead states that this seam lies 0.5m below the base of the main Four Foot Seam. The seam, which attains a total thickness of 4.6m, was apparently worked separately along the top or bottoms section in different areas (not both sections together) each to 2.1m high.

Plan 4F shows the location of the Striped Bacon Seam workings by bord and pillar methods, from the Rylance No. 3 Colliery. Denmead states that this seam lies approximately 20m below the Bergin's Seam and has a workable height of 1.8m. Interestingly Denmead also states that all the pillars were being extracted during his visit in 1946. Plan 4F attached only shows some pillar extraction.

Plan 4G attached shows the locations of the Rob Roy Seam workings in three areas, i.e. the localised bord and pillar Rylance No. 3 Colliery workings in the extreme north of the site, the localised possible New Chum Colliery workings in the north east part of the site and the Rylance No. 5 Colliery workings in the central to southern parts of the site. The Rylance No. 5 Colliery workings include the original Stafford Welsh bord and pillar workings as well as the subsequent Rylance No. 5 Colliery bord and pillar workings that were also subsequently pillar-extracted. Denmead states that this seam lies 20m below the Striped Bacon Seam. The seam has a maximum thickness of 2.2m. This seam was first worked by Welsh bord and pillar methods by Mr Stafford (see Rylance No. 5 (Stafford's) Tunnel on Plan 4A). These workings were also used to store munitions during WWII. After removal of the munitions the tunnel was reopened as the Rylance No. 5 Colliery. The original 1.2m high workings were increased to 1.5m high and also extended beyond the original workings.

Plan 4H attached shows the location of the bord and pillar workings on the Cochrane Seam from the Rylance No. 5 Extended Colliery.

### 2.3.3 Open Cut Mining

Plan 5 attached shows the locations of known past open cut mining activity as well as an area of probable open cut mining.

The Rylance No. 5 open cut is reasonably well documented for the reasons stated above. This operation extracted mainly the Rob Roy Seam up to the western boundary parallel to High Street. The open cut extracted most of the original Stafford and Rylance No. 5 underground workings prior to backfilling. A berm that was left in place parallel to High Street (now buried) has resulted in remnant Rob Roy Seam workings still existing there. Previous drilling and geophysical studies by our company in the backfill of this open cut (along the drainage line) revealed that the backfill thickness is generally in the order of 35 -40m thick there but is liable to increase to 60m in places.

The Rylance No. 5 open cut plan shows that a small lenticular shaped open cut also took place along the Four Foot Seam, i.e. along the crop of the seam from a New Chum Colliery tunnel between the New Chum and Gulliver's Fault shown on Plan 4A. No other open cut mining is shown on that plan (and no other plans could be obtained) however more open cut activity is liable to have taken place, as the separation between the Four Foot Top Seam, main Four Foot Seam, Berghin's Seam and Striped Bacon Seam thereabouts is only 33m, whereas it is an additional 22m (total 55m) to the Rob Roy Seam. Plan 5 as a result has incorporated the perimeter of open cut activity shown on the

1972 topography plan as this appears to be a realistic interpretation based on our discussion above. The void in any case is now backfilled and is located under the large spoil heap now located in that area.

The 1974 aerial photographs for the site revealed that a small open cut operation was taking place at the southern end of Jordan Street. This operation had a highwall consistent with a coal mining operation and not clay mining, even though the excavation removed the original "Clay Tunnel" and small quarry void. The void is now backfilled.

The Bluff Seam was open cut (Rylance No. 3 open cut) on the extreme north east corner of the site as shown on a mine plan. This operation also butted up against the new Whitwood No. 3 open cut. The void is now backfilled.

#### 2.3.4 Tailings

Mined coal was sent through a washing plant to improve the quality of the product. After extracting the saleable product from the washing process, the coarse reject (poor quality coal and carbonaceous shale) was dumped in mullock heaps whereas the fine grained slurry material (mainly sands and fine gravel size coal) was placed in tailings ponds.

Part of the Rylance No. 5 open cut void was used as a tailing pond for coal washing fines that originated in the Rylance coal washing plant on the east side of today's Cunningham Highway.

Plan 7 attached shows the location of a known tailings pond. Material in this facility has in recent years been re-excavated for use in the manufacture of pavers.

#### 2.3.5 Mining Leases

Plan 6 attached shows the locations of mining leases on or adjacent to the site.

The table below shows details of each of the mining leases.

| ML No. | Status                   | Granted Date | Expiry Date  | Ha    | Holder                                |
|--------|--------------------------|--------------|--------------|-------|---------------------------------------|
| 4553   | Granted                  | 1 Aug 1950   | 31 July 2013 | 33.63 | Claypave Pty Ltd                      |
| 4556   | Granted – Renewal Lodged | 4 Mar 1976   | 31 Mar 2007  | 33.75 | Transpacific Waste Management Pty Ltd |
| 4559   | Granted – Renewal Lodged | 05 Dec 1974  | 31 Dec 2005  | 64.58 | Claypave Pty Ltd                      |
| 4642   | Granted                  | 19 Oct 1978  | 31 Oct 2020  | 10.29 | M & J L Feeney Pty Ltd                |
| 4714   | Granted                  | 1 June 1989  | 30 June 2024 | 2.00  | Claypave Pty Ltd                      |
| 50077  | Granted                  | 10 Feb 1994  | 28 Feb 2019  | 2.02  | Claypave Pty Ltd                      |

#### 2.4 WATER

The south to north drainage line below High Street and the west to east drainage line beyond the southern ends of Jordan Street and Whitwood Road control the runoff on this site.

Underground mine voids are expected to be flooded except possibly near the remaining tunnel entries.

Previous drilling in the drainage line below High Street revealed that the standing water table is located at approximately 3.5m below ground level there, i.e. at the existing standing water level in the re-excavated old tailing pond area.

#### 2.5 SUBSIDENCE

Subsidence problems that have occurred in the general area in the past include sinkholes in the Grenadier Circle area and further west in Bundamba, constant resurfacing of the top end of High Street close to the western boundary of this site due to subsidence, an unusual depressional feature adjacent to Brisbane Road to the north, probable fault/mining-related movement of a railway embankment near Ebbw Vale station etc.

#### 2.6 HEATINGS

This phenomenon is usually the result of spontaneous combustion of coal, reject coal and carbonaceous shale. This can occur in situ in the mine

workings as a result of roof creep (particularly in the Aberdare Seam and less so in other seams) which, under appropriate conditions, generates the friction necessary to fire the coal. Alternatively, this can occur in coal or coalstone (usually substandard quality coal mixed with carbonaceous shale) stockpiles also due to the right incubation conditions prevailing for some time. Once ignited, then adequate underground airflow, wind or internal circulation in the case of stockpile material, is necessary to maintain the burning. Grass and bushfires are also known to have activated heatings and fires. Control of fires underground requires sealing off the area from air, whereas stockpile heatings are usually controlled by removal or covering with relatively impervious material such as clay. Heatings can be difficult to eliminate quickly and can flare up from time to time over periods of many years. The end result from the burnt out material is a white chalky-looking stone which is known locally as chitters and which has had many uses in the past.

It is not known whether heatings have occurred on this site in the past although Denmead states that the main Four Foot Seam workings were sealed off in the past due to underground fires. Heating are however not known to have occurred on this site in recent years.

## 2.7 CONTAMINATION

The Department of Environment and Heritage (forerunner to the EPA) and the Ipswich City Council had a 'probable' contamination listing on their registers for the site area in the 1980s. The listing was based on the reported dumping of unknown material or materials (expected to include CCA) down a shaft on the property.

An investigation of the reported event was carried out in 1998 for the owner of original Lot 7 RP807113 that fronted High Street. The aim of the investigation was to assess whether Lot 7 could be subdivided into three smaller lots. Lot 27 SP220033 (under investigation in this report) was one of the three lots; the other two lots now each contain a house and commercial building (former retail nursery and office for an air conditioning business) fronting High Street. The investigation revealed that material (of unknown type but again expected to include CCA) had been dumped on the site in the 1970s. The material was however found to have been poured down an 8 inch diameter borehole that had been drilled into the Rylance No. 5 Extended Tunnel entry (see location on Plan 4A attached) which is now located within Lot 25 SP22030.

It is understood that the contamination listing was removed from all of the area covered in the original Lot 7 (i.e. the subsequent three new lots) as a



result of the findings of the report, which essentially indicated that the material was now encapsulated in abandoned underground mine workings beyond the area under study at that time. The contamination listing may therefore still exist for Lot 25 SP22030 on this site where the Rylance No. 5 Extended tunnel entry still exists.

### **3.0 COMMENT**

In summary, this broadscale mining study has found that:

- the original topography has been impacted on by past open cut mining activities
- the Bundamba Anticline, and its associated New Chum, Gilliver's and Braeside Faults, has complicated the geology, mining and our assessment of past mining activities on this site
- extensive underground and open cut coal mining activities (as well as clay pit activities) have taken place on this site between the 1870s and 1970s
- our assessment has had to rely on available mine plans, of which the underground plans appear to be substantially complete, but the open cut plans away from the Rylance No. 5 open cut are incomplete
- the New Chum tunnel entry (north of New Chum Fault) and the Rylance Extended No. 5 tunnel entry appear to still exist on this site, whereas the other tunnels and shafts appear to have been removed during the open cut operations
- part of Lot 25 on the site may be on the EPA contamination register
- the site is covered by two current mining leases

Plan 7 has been constructed with a view to rationalising this complicated site into twelve simplified constraint areas. From the plan it can be seen that the best non-disturbed, non-mined land is localised to small areas at the northern and southern ends of the site. The non-mined land with surface disturbances (i.e. cut or filled land) essentially also adjoins the non-mined land. The backfilled open cut mining, over no underground mining, can also be seen to comprise the largest constraint area on this site. The remaining infill areas comprise varying degrees of complexity.

In conclusion, the work in this study has revealed that an extensive history of documented and undocumented mining activity over a period of approximately 100 years has impacted on this site which acts as an ongoing resource area for the production of pavers.

Potential development scenarios for the site will depend largely on Council's town planning regime as well as limitations placed by the Powerlink easement which takes up approximately 25% of the site area. The existing drainage lines could possibly take up another 15% of the surface area, whereas the large stockpile away from the power easement (if not flattened and/or capped with clay to guarantee the long term protection from fires or heatings) could account for another 10% of the site. In broad terms about 40% of the site area could be constrained by non-mining issues with most of the rest of the site constrained by past underground open cut issues.

In the event that a residential type application is sought, then the highest level of development that could be considered applicable to this site would comprise flexible small buildings in a demountable home park/caravan park type complex around parks, gardens or sports field complexes. In the event that an industrial type application is sought, then the highest level of development that could be considered applicable to this site would generally comprise small steel clad buildings e.g. muffler shop, mechanical repairs etc.

The value in this site, once the resource potential is exhausted or no longer required, is expected to be as one composite site rather than three separate parcels, although Lot 27 SP220033 may have value as a stand-alone site for a residential application as discussed above. In any case all development on this site, either in total or separate parcels, will need to be structured in such a way that the controlling company accepts full responsibility for all repairs and maintenance and all other costs and issues that may result from fill settlement or subsidence from underground mines.

Finally, more detailed studies will be required as concepts develop so that more specific comments can be provided e.g. on the permanent sealing of the two tunnel entries, the closer definition of constraint areas, the need or otherwise to clay cap the open cut stockpiles etc etc.

#### **4.0 LIMITATIONS**

This report, which may contain attachments in the form of plans, borehole record sheets, laboratory test results etc, must be read in its entirety.

The work in this report was produced for Claypave P/L and their Associates on the basis of information available at the time of writing. This report will not contain sufficient information for other parties and purposes.

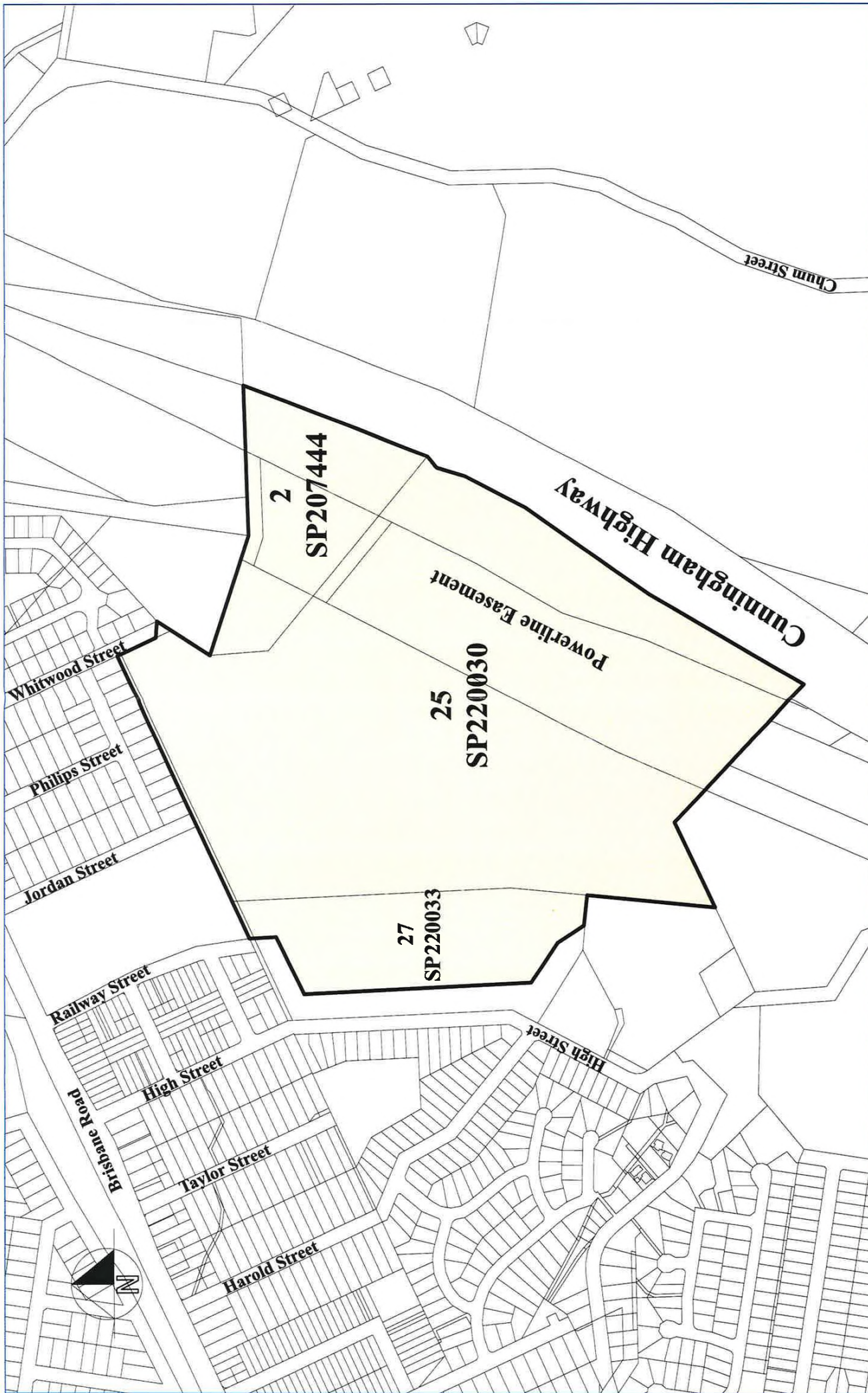
While care has been taken in producing this report, it needs to be said that there will always be some risk associated with building in these settings. This is more so on this site where extensive mining has taken place over at least a one hundred year period, where poor plans and undocumented mining could exist etc. Recommendations put forward in this report are aimed at minimising the risk.

This company accepts no responsibility for works which do not fully comply with the recommendations in this report.

**MORETON GEOTECHNICAL SERVICES PTY LTD**

A handwritten signature in blue ink, appearing to read 'K. B. Grubb', is written over a faint, circular blue stamp or watermark.

**K. B. GRUBB**  
**M.App.Sc., MIE Aust., CP Eng., RPEQ 2811**



|                                                                                                                                                                 |                                                                                                            |                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Moreton Geotechnical Services Pty Ltd</b></p> <p>PO Box 915 Ipswich QLD 4305<br/>         Tele/Fax: (07) 3294 6988<br/>         Email: mgs@gil.com.au</p> | <p><b>Broadscale Mining Study</b><br/> <b>Claypave Land - Ebbw Vale</b><br/> <b>Plan 1 - Site Plan</b></p> | <p>Date: December 2010<br/>         Scale: 1:5000<br/>         Sheet No: 1 of 1<br/>         Drawing No: 100098</p> <p><b>Taylor Mining Services Pty Ltd</b><br/>         Redbank Plains Road<br/>         Blackstone QLD 4305<br/>         Ph: (07) 3816 2311<br/>         Fax: (07) 3816 2377<br/>         www.tayorminingservices.com.au</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|





**Moreton Geotechnical Services Pty Ltd**

PO Box 915 Ipswich QLD 4305  
Tele/Fax: (07) 3294 6988  
Email: mgs@gil.com.au

**Ref: 2010/91**

ACN 055 833 120  
ABN 24 055 833 120

**Broadscale Mining Study**

**Claypave Land - Ebbw Vale**

**Plan 2 - April 2009 Aerial Photo**

Date: December 2010

Scale: 1:5000

Sheet No: 1 of 1

Drawing No: 100098

**Taylor Mining Services Pty Ltd**

Redbank Plains Road  
Blackstone QLD 4305

Ph: (07) 3816 2311

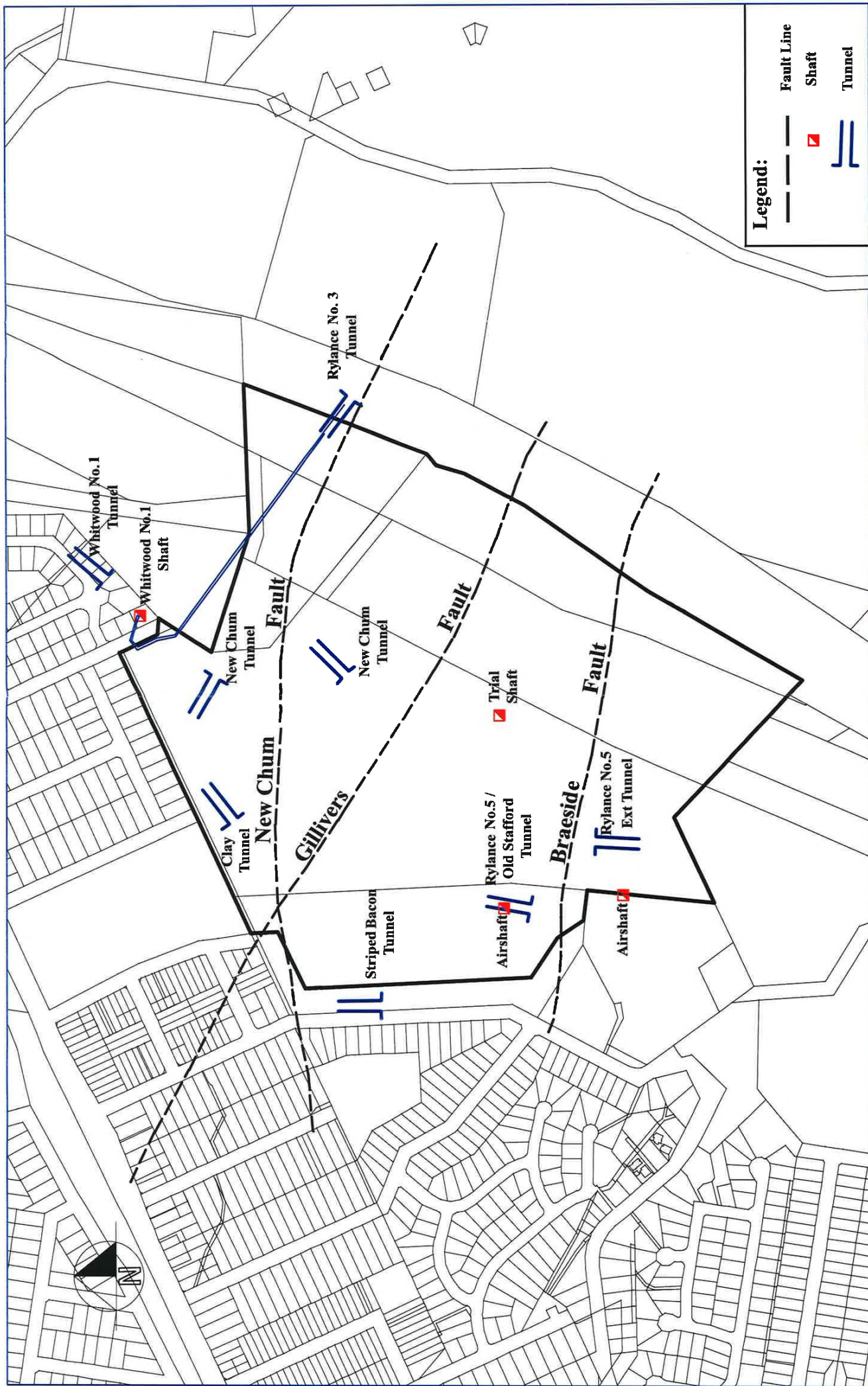
Fax: (07) 3816 2377

[www.taylorminingservices.com.au](http://www.taylorminingservices.com.au)









**Legend:**

- Fault Line
- Shaft
- == Tunnel

Date: December 2010  
 Scale: 1:5000  
 Sheet No: 1 of 1  
 Drawing No: 100098

**Taylor Mining Services Pty Ltd**  
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 Blackstone QLD 4305  
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 Fax (07) 3816 2377  
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**Broadscale Mining Study**  
**Claypave Land - Ebbw Vale**  
**Plan 4A- Mining Features Plan**

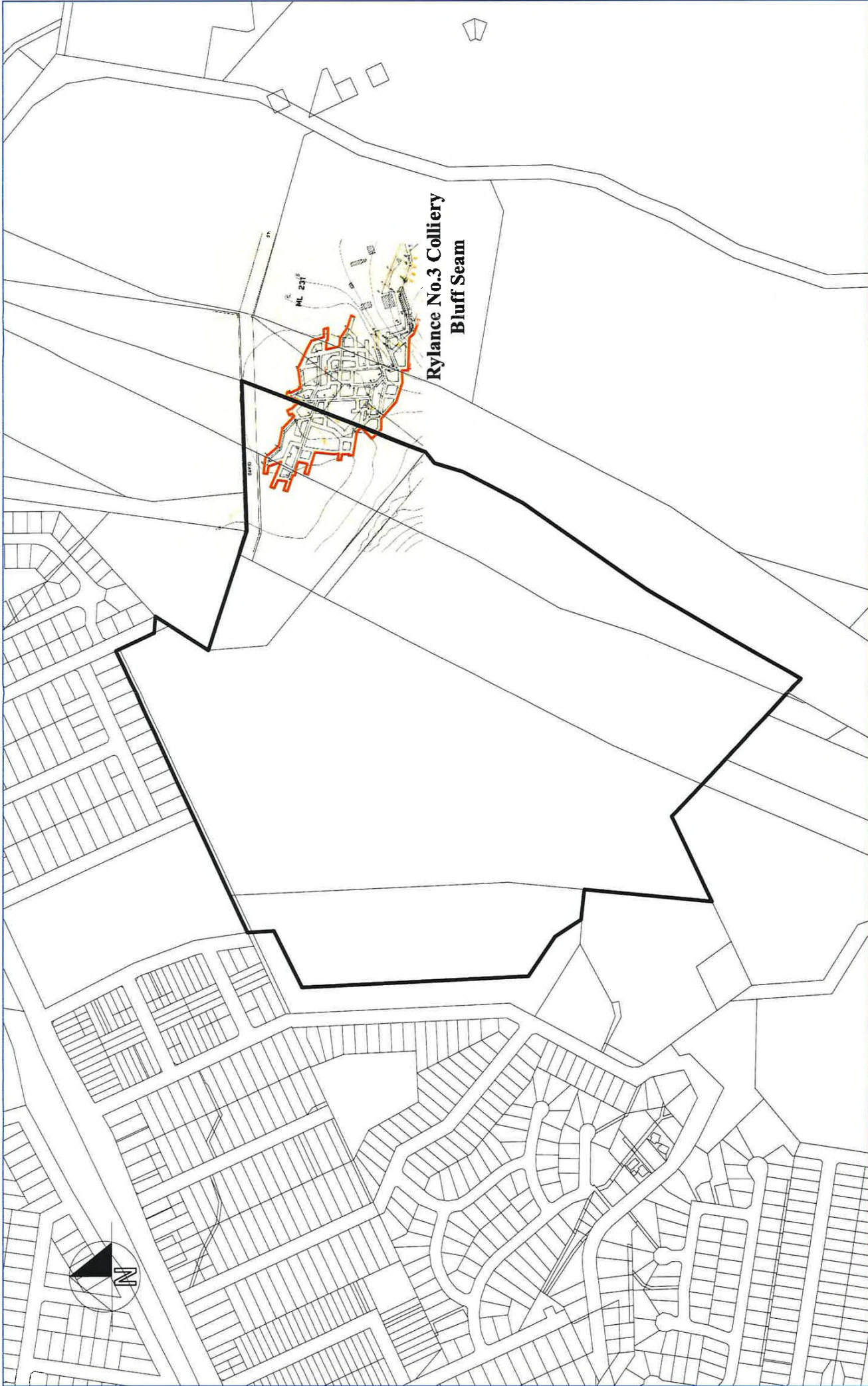
**Moreton Geotechnical Services Pty Ltd**

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 Tele/Fax: (07) 3294 6988  
 Email: mgs@gjl.com.au

**Ref: 2010/91**

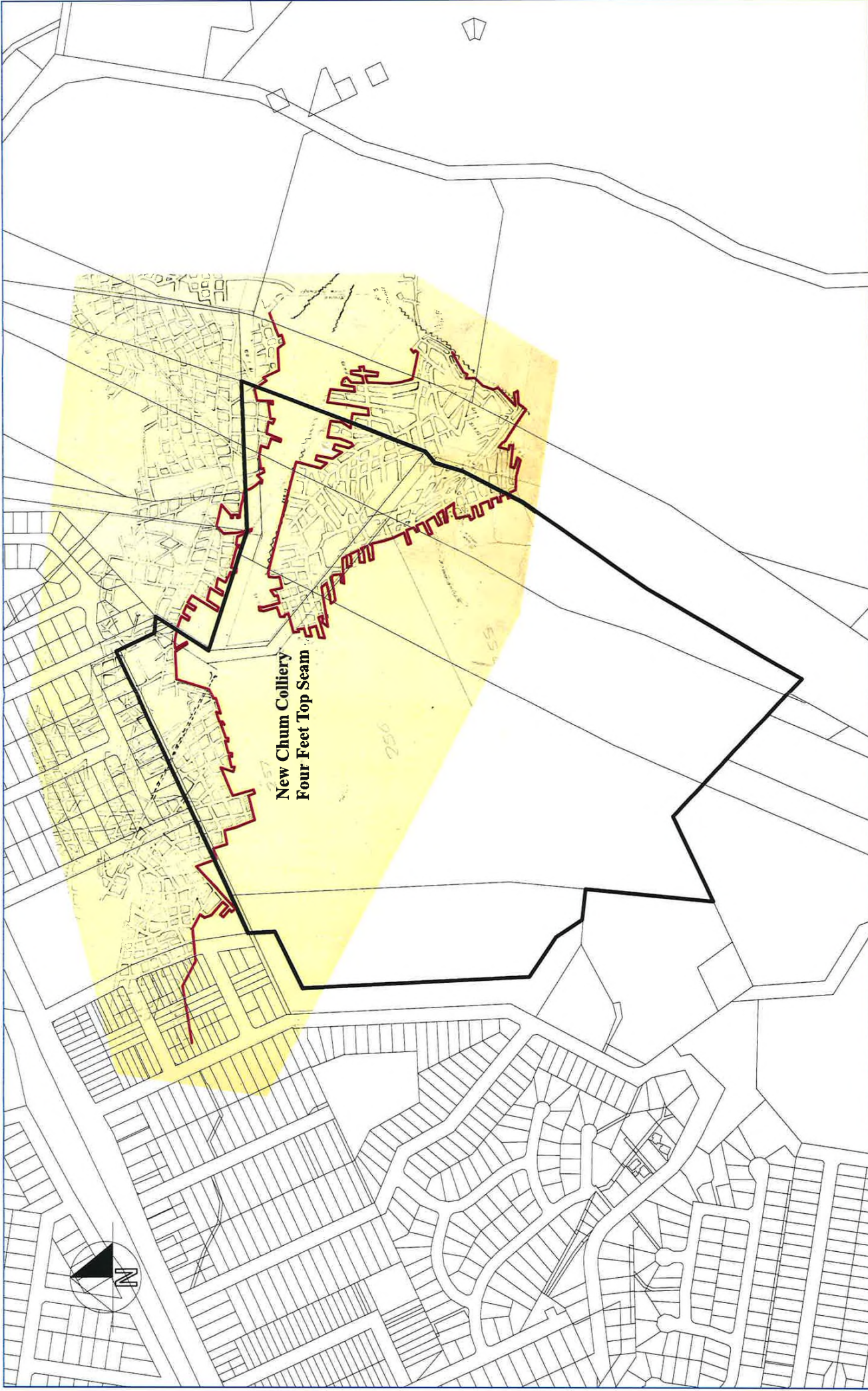
ACN 055 833 120  
 ABN 24 055 833 120





|                                                                                  |  |                                       |  |                                                       |  |                                                                          |                  |                    |
|----------------------------------------------------------------------------------|--|---------------------------------------|--|-------------------------------------------------------|--|--------------------------------------------------------------------------|------------------|--------------------|
| <b>Moreton Geotechnical Services Pty Ltd</b>                                     |  | <b>Broadscale Mining Study</b>        |  | Date: December 2010                                   |  | Scale: 1:5000                                                            | Sheet No: 1 of 1 | Drawing No: 100098 |
| PO Box 915 Ipswich QLD 4305<br>Tele/Fax: (07) 3294 6988<br>Email: mgs@gjl.com.au |  | <b>Claypave Land - Ebbw Vale</b>      |  | <b>Plan 4B - Bluff Seam Underground Mine Workings</b> |  | Redbank Plains Road<br>Blackstone QLD 4305                               |                  |                    |
| <b>Ref: 2010/91</b>                                                              |  | ACN 055 833 120<br>ABN 24 055 833 120 |  | <b>Taylor Mining Services Pty Ltd</b>                 |  | Ph: (07) 3816 2311 Fax: (07) 3816 2377<br>www.tayorminingservices.com.au |                  |                    |





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Tele/Fax: (07) 3294 6988  
Email: mgs@gil.com.au

**Ref: 2010/91**

ACN 055 833 120  
ABN 24 055 833 120

**Broadscale Mining Study**  
**Claypave Land - Ebbw Vale**  
**Plan 4C - Four Feet Top Seam Underground Mine Workings**

Date:  
December 2010

Scale:  
1:5000

Sheet No:  
1 of 1

Drawing No:  
100098

**Taylor Mining Services Pty Ltd**  
Redbank Plains Road  
Blackstone QLD 4305  
Ph: (07) 3816 2311  
Fax: (07) 3816 2377  
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|                                              |  |                                |  |                                                           |  |                                       |                  |                    |
|----------------------------------------------|--|--------------------------------|--|-----------------------------------------------------------|--|---------------------------------------|------------------|--------------------|
| <b>Moreton Geotechnical Services Pty Ltd</b> |  | <b>Broadscale Mining Study</b> |  | Date: December 2010                                       |  | Scale: 1:5000                         | Sheet No: 1 of 1 | Drawing No: 100098 |
| PO Box 915 Ipswich QLD 4305                  |  | <b>Ref: 2010/91</b>            |  | <b>Claypave Land - Ebbw Vale</b>                          |  | <b>Taylor Mining Services Pty Ltd</b> |                  |                    |
| Tele/Fax: (07) 3294 6968                     |  | ACN 055 833 120                |  | <b>Plan 4D - Four Feet Seam Underground Mine Workings</b> |  | Redbank Plains Road                   |                  |                    |
| Email: mgs@gjl.com.au                        |  | ABN 24 055 833 120             |  |                                                           |  | Blackstone QLD 4305                   |                  |                    |
|                                              |  |                                |  |                                                           |  | Ph: (07) 3816 2311                    |                  |                    |
|                                              |  |                                |  |                                                           |  | Fax: (07) 3816 2377                   |                  |                    |
|                                              |  |                                |  |                                                           |  | www.taylorminingservices.com.au       |                  |                    |





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 Email: mgs@gil.com.au

**Ref: 2010/91**

**Broadscale Mining Study**  
**Claypave Land - Ebbw Vale**  
**Plan 4E - Bergins Seam Underground Mine Workings**

Date: December 2010  
 Scale: 1:5000  
 Sheet No: 1 of 1  
 Drawing No: 100098

**Taylor Mining Services Pty Ltd**  
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 Blackstone QLD 4305  
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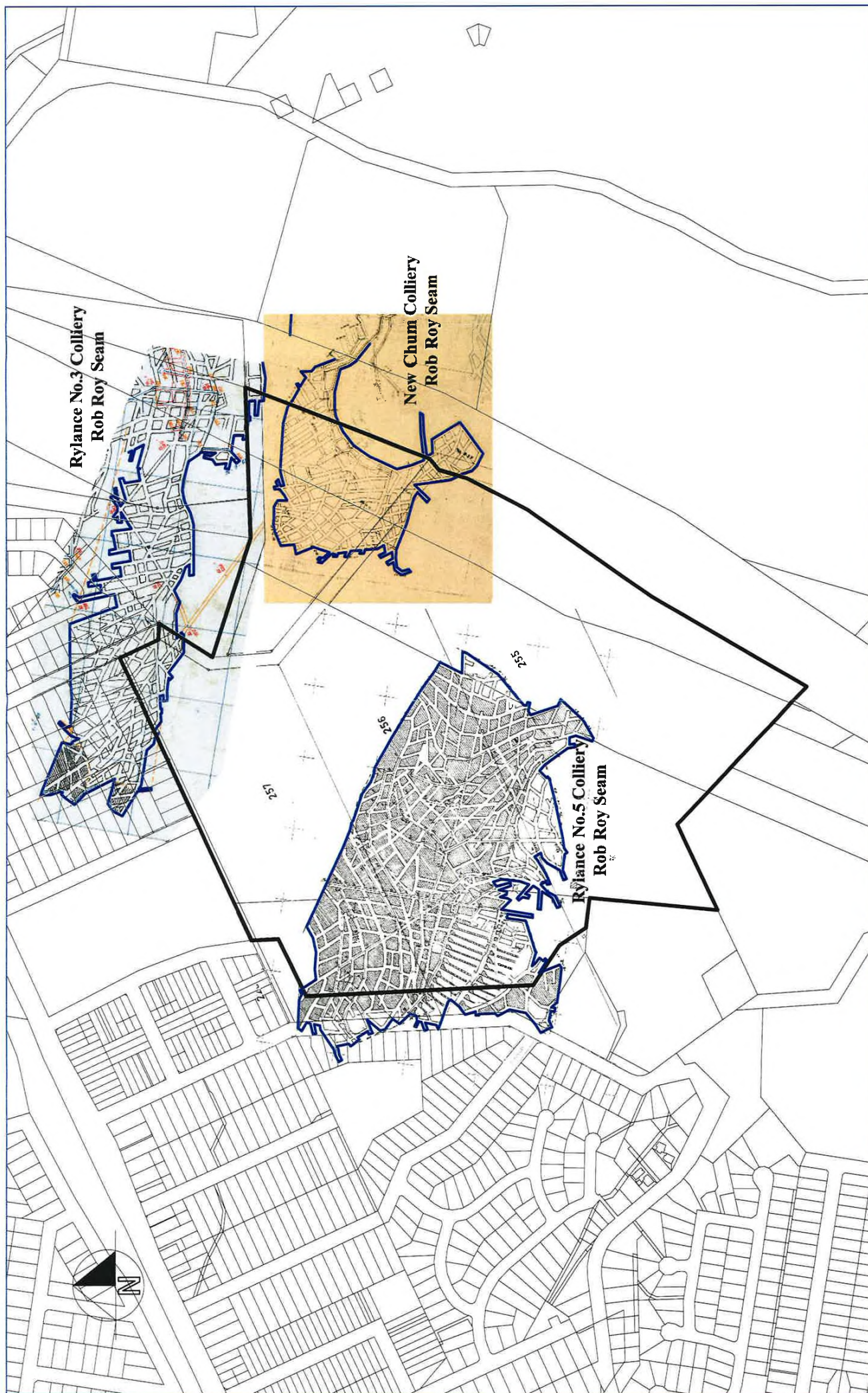
**Ref: 2010/91**

**Broadscale Mining Study**  
**Claypave Land - New Chum**  
**Plan 4F - Striped Bacon Seam Underground Mine Workings**

Date: December 2010  
 Scale: 1:5000  
 Sheet No: 1 of 1  
 Drawing No: 100098

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 ABN 24 055 833 120

**Broadscale Mining Study**

**Claypave Land - Ebbw Vale**

**Plan 4G - Rob Roy Seam Underground Mine Workings**

Date: December 2010

Scale: 1:5000

Sheet No: 1 of 1

Drawing No: 100098

**Taylor Mining Services Pty Ltd**

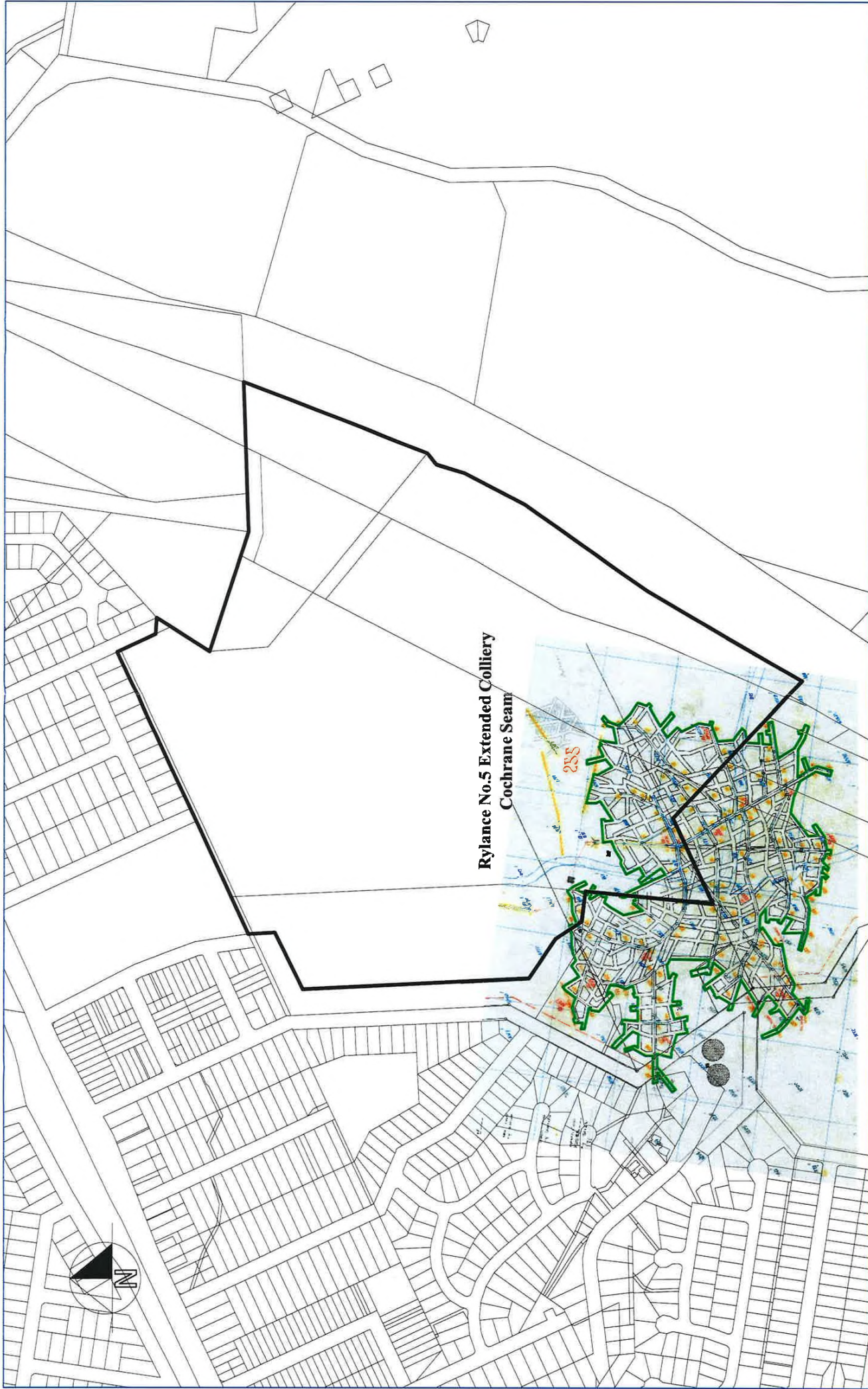
Redbank Plains Road  
 Blackstone QLD 4305

Ph: (07) 3816 2311

Fax: (07) 3816 2377

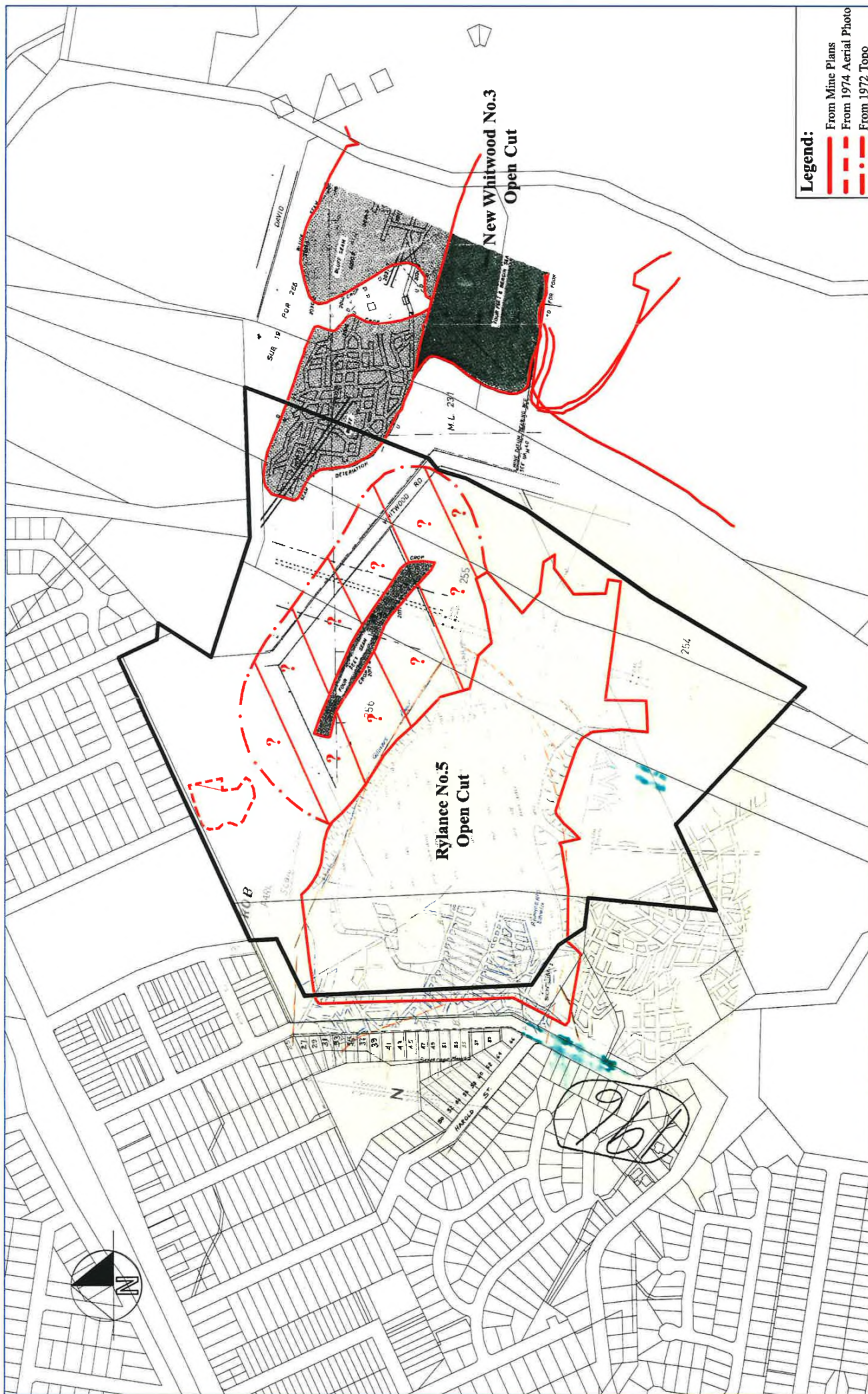
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|                                              |  |                                                          |  |  |  |                                                                                      |        |           |             |
|----------------------------------------------|--|----------------------------------------------------------|--|--|--|--------------------------------------------------------------------------------------|--------|-----------|-------------|
| <b>Moreton Geotechnical Services Pty Ltd</b> |  | <b>Broadscale Mining Study</b>                           |  |  |  | Date:                                                                                | Scale: | Sheet No: | Drawing No: |
| PO Box 915 Ipswich QLD 4305                  |  | <b>Ref: 2010/91</b>                                      |  |  |  | December 2010                                                                        | 1:5000 | 1 of 1    | 100098      |
| Tele/Fax: (07) 3294 6988                     |  | ACN 055 833 120                                          |  |  |  |                                                                                      |        |           |             |
| Email: mgs@gil.com.au                        |  | ABN 24 055 833 120                                       |  |  |  |                                                                                      |        |           |             |
|                                              |  | <b>Claypave Land - New Chum</b>                          |  |  |  |                                                                                      |        |           |             |
|                                              |  | <b>Plan 4H - Cochrane Seam Underground Mine Workings</b> |  |  |  |                                                                                      |        |           |             |
|                                              |  | <b>Taylor Mining Services Pty Ltd</b>                    |  |  |  |                                                                                      |        |           |             |
|                                              |  | Redbank Plains Road                                      |  |  |  | Ph: (07) 3816 2311                                                                   |        |           |             |
|                                              |  | Blackstone QLD 4305                                      |  |  |  | Fax: (07) 3816 2377                                                                  |        |           |             |
|                                              |  |                                                          |  |  |  | <a href="http://www.taylorminingservices.com.au">www.taylorminingservices.com.au</a> |        |           |             |





**Legend:**  
 — From Mine Plans  
 - - - From 1974 Aerial Photo  
 — From 1972 Topo

Date: December 2010  
 Scale: 1:5000  
 Sheet No: 1 of 1  
 Drawing No: T00098

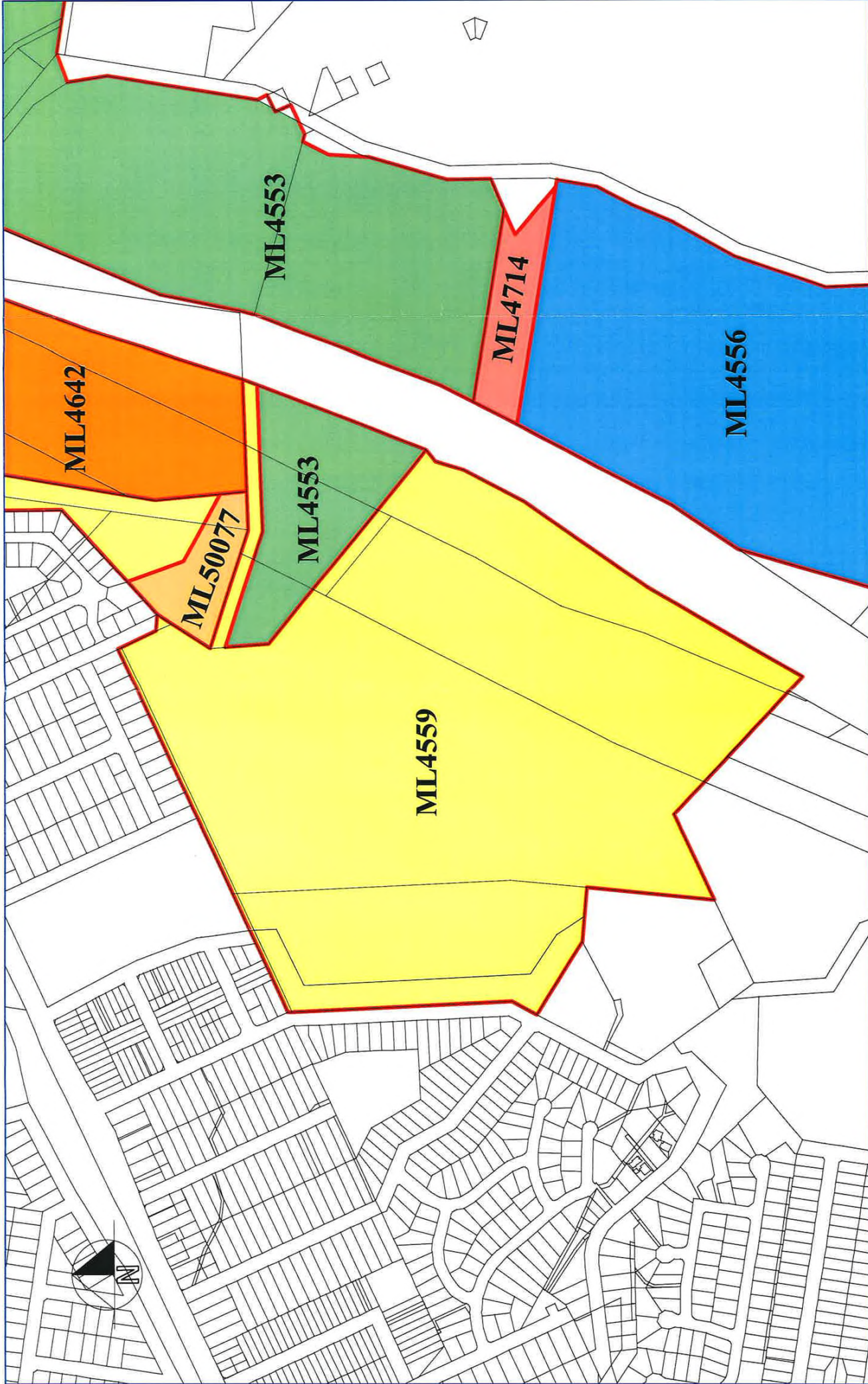
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 Blackstone QLD 4305  
 Ph: (07) 3816 2311 Fax: (07) 3816 2377  
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**Broadscale Mining Study**  
**Claypave Land - New Chum**  
**Plan 5 - Open Cut Mining Plan**

**Moreton Geotechnical Services Pty Ltd**  
 PO Box 915 Ipswich QLD 4305  
 Tele/Fax: (07) 3294 6988  
 Email: mgs@gjl.com.au

**Ref: 2010/91**  
 ACN 055 833 120  
 ABN 24 055 833 120





|                                                                                                                                                                                           |  |                                                                                                         |  |                     |               |                  |                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------|--|---------------------|---------------|------------------|--------------------|
| <b>Moreton Geotechnical Services Pty Ltd</b><br>PO Box 915 Ipswich QLD 4305    Ref: 2010/91<br>Tele/Fax: (07) 3294 6988    ACN 055 833 120<br>Email: mgs@gil.com.au    ABN 24 055 833 120 |  | <b>Broadscale Mining Study</b><br><b>Claypave Land - Ebbw Vale</b><br><b>Plan 6 - Mining Lease Plan</b> |  | Date: December 2010 | Scale: 1:5000 | Sheet No: 1 of 1 | Drawing No: 100098 |
| <b>Taylor Mining Services Pty Ltd</b><br>Redbank Plains Road    Ph: (07) 3816 2311    Fax: (07) 3816 2377<br>Blackstone QLD 4305    www.tayorminingservices.com.au                        |  |                                                                                                         |  |                     |               |                  |                    |





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 Tele/Fax: (07) 3294 6988  
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**Ref: 2010/91**

ACN 055 833 120  
 ABN 24 055 833 120

**Broadscale Mining Study**

**Claypave Land - Ebbw Vale**

**Plan 7 - Mining Constraints Plan**

Date: December 2010

Scale: 1:5000

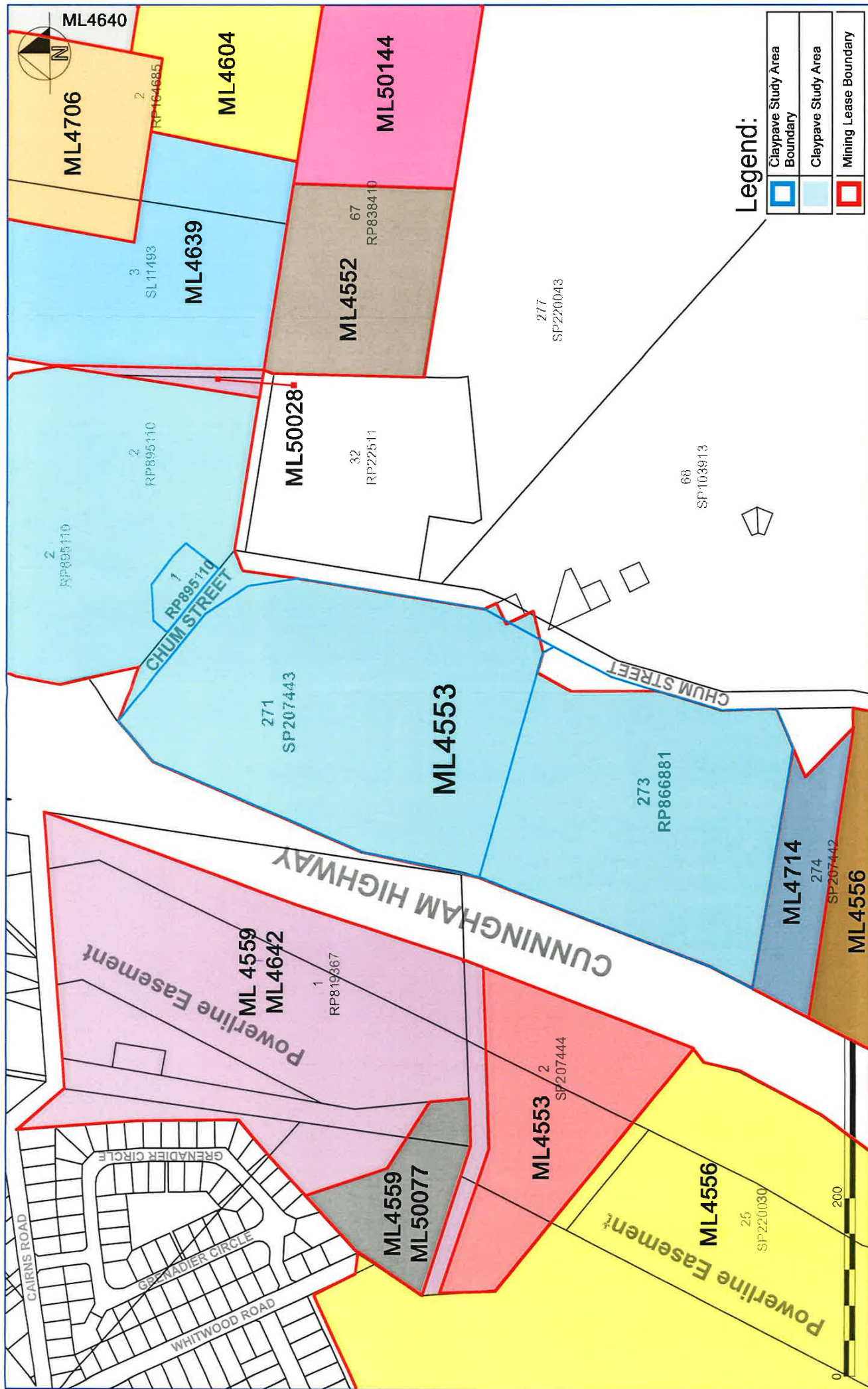
Sheet No: 1 of 1

Drawing No: 100098

**Taylor Mining Services Pty Ltd**

Redbank Plains Road  
 Blackstone QLD 4305  
 Ph: (07) 3816 2311 Fax: (07) 3816 2377  
[www.taylorminingservices.com.au](http://www.taylorminingservices.com.au)





# **Moreton Geotechnical Services Pty Ltd**

PO Box 915 Ipswich QLD 4305  
 Tele/Fax: (07) 3294 6988  
 Email: mgs@gil.com.au

Ref: 2013/12

ACN 055 833 120  
 ABN 24 055 833 120

## **Desktop Mining Study** **Claypave Pty. Ltd - Dinmore, Ipswich, Qld.** **Plan 7 - Mining Lease Plan**

Date: February, 2013  
 Sheet No: Thirteen (13 of 15)  
 Scale: 1:4000  
 Drawing No: 2013.02.6.7

### **Taylor Mining Services Pty Ltd**

Redbank Plains Road  
 Blackstone QLD 4305  
 Ph: (07) 3816 2311  
 Fax: (07) 3816 2377  
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# Legend:

|  |                              |
|--|------------------------------|
|  | Claypave Study Area Boundary |
|  | Claypave Study Area          |
|  | Mine Shaft                   |
|  | Mine Tunnel                  |

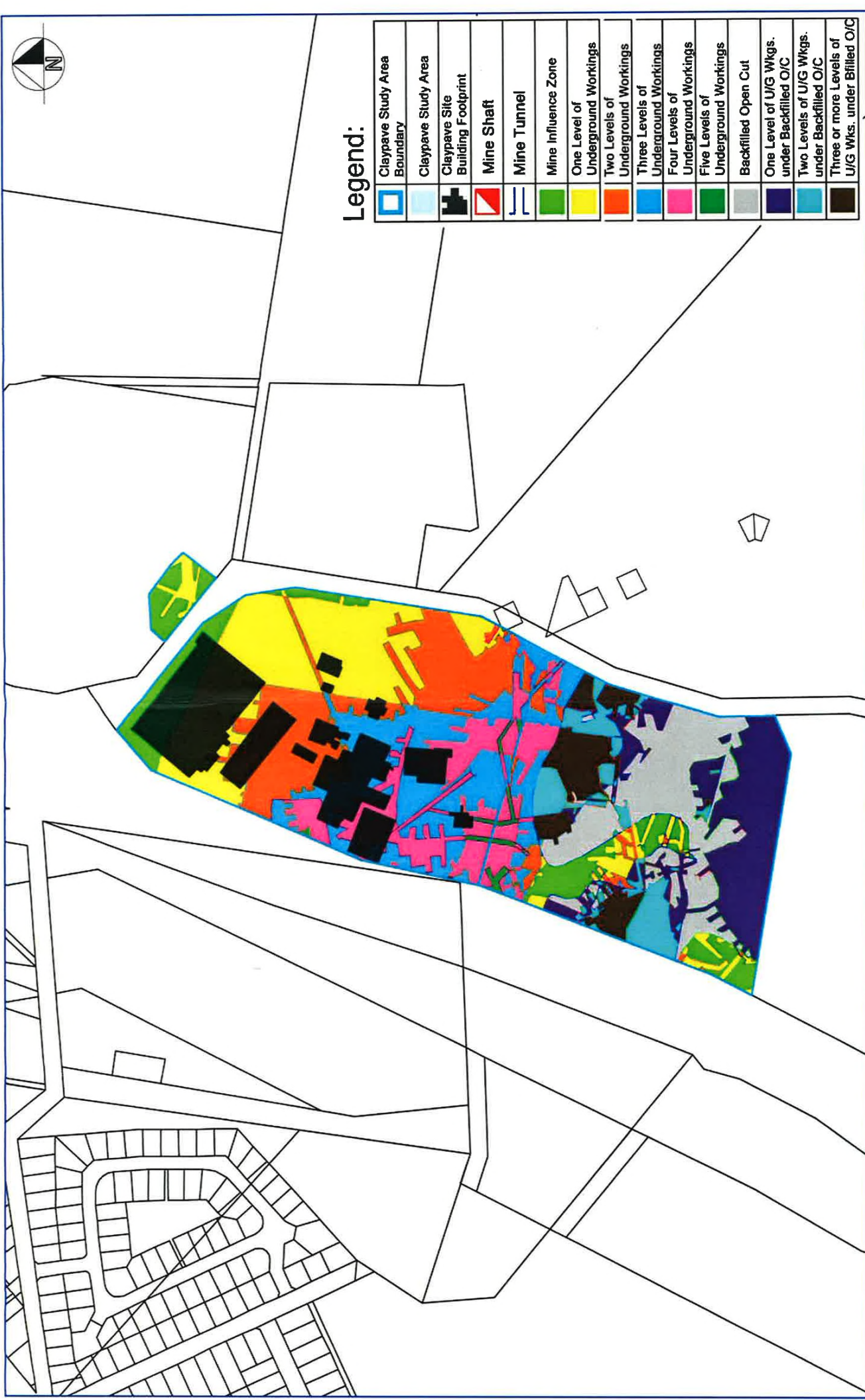
Date: February, 2013  
 Sheet No: Fourteen (14 of 15)  
 Scale: 1:4000  
 Drawing No: 2013.02.6\_8

**Desktop Mining Study**  
**Claypave Pty. Ltd - Dinmore, Ipswich, Qld.**  
**Plan 8 - Composite Plan**

**Moreton Geotechnical Services Pty Ltd**  
 PO Box 915 Ipswich QLD 4305  
 Tele/Fax: (07) 3294 6988  
 Email: mgs@gil.com.au  
 Ref: 2013/12  
 ACN 055 833 120  
 ABN 24 055 833 120

**Taylor Mining Services Pty Ltd**  
 Redbank Plains Road  
 Blackstone QLD 4305  
 Ph: (07) 3816 2311  
 Fax: (07) 3816 2377  
 www.taylorminingservices.com.au





**Legend:**

|  |                                                        |
|--|--------------------------------------------------------|
|  | Claypave Study Area Boundary                           |
|  | Claypave Study Area                                    |
|  | Claypave Site Building Footprint                       |
|  | Mine Shaft                                             |
|  | Mine Tunnel                                            |
|  | Mine Influence Zone                                    |
|  | One Level of Underground Workings                      |
|  | Two Levels of Underground Workings                     |
|  | Three Levels of Underground Workings                   |
|  | Four Levels of Underground Workings                    |
|  | Five Levels of Underground Workings                    |
|  | Backfilled Open Cut                                    |
|  | One Level of U/G Wkgs. under Backfilled O/C            |
|  | Two Levels of U/G Wkgs. under Backfilled O/C           |
|  | Three or more Levels of U/G Wkgs. under Backfilled O/C |

**Moreton Geotechnical Services Pty Ltd**

PO Box 915 Ipswich QLD 4305  
 Tele/Fax: (07) 3294 6988  
 Email: mgs@gil.com.au

Ref:2013/12

**Desktop Mining Study**  
**Claypave Pty. Ltd - Dinmore, Ipswich, Qld.**  
**Plan 9 - Constraints and Building Footprint Plan**

Date: February, 2013  
 Scale: 1:4000

Sheet No: Fifteen (15 of 15)  
 Drawing No: 2013.02.6.9

**Taylor Mining Services Pty Ltd**

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