

Geotechnical Assessment

Residential Subdivision

Whitwood Road, Ebbw Vale

Prepared for

Chum Street Land Evolution Pty Ltd

Project No. 022-135A

4 July 2025

Revision 3

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Important Information about your Geotechnical Report (2 pages)

ATTACHMENTS

Drawing No. 1 Rev B	Locality Plan and Test Locations
Appendix A	Bore and Test Pit Report Sheets with Explanatory Notes
Appendix B	Monitoring Results
Appendix C	Bespoke Engineering Mining Plans

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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 previous geotechnical investigation carried out at the site by Butler Partners and others, the site ground conditions at the locations tested 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

This report provides a summary of the geotechnical investigations and assessment carried out, as well as commentary on potential settlement reduction measures proposed during site bulk earthworks for the development.

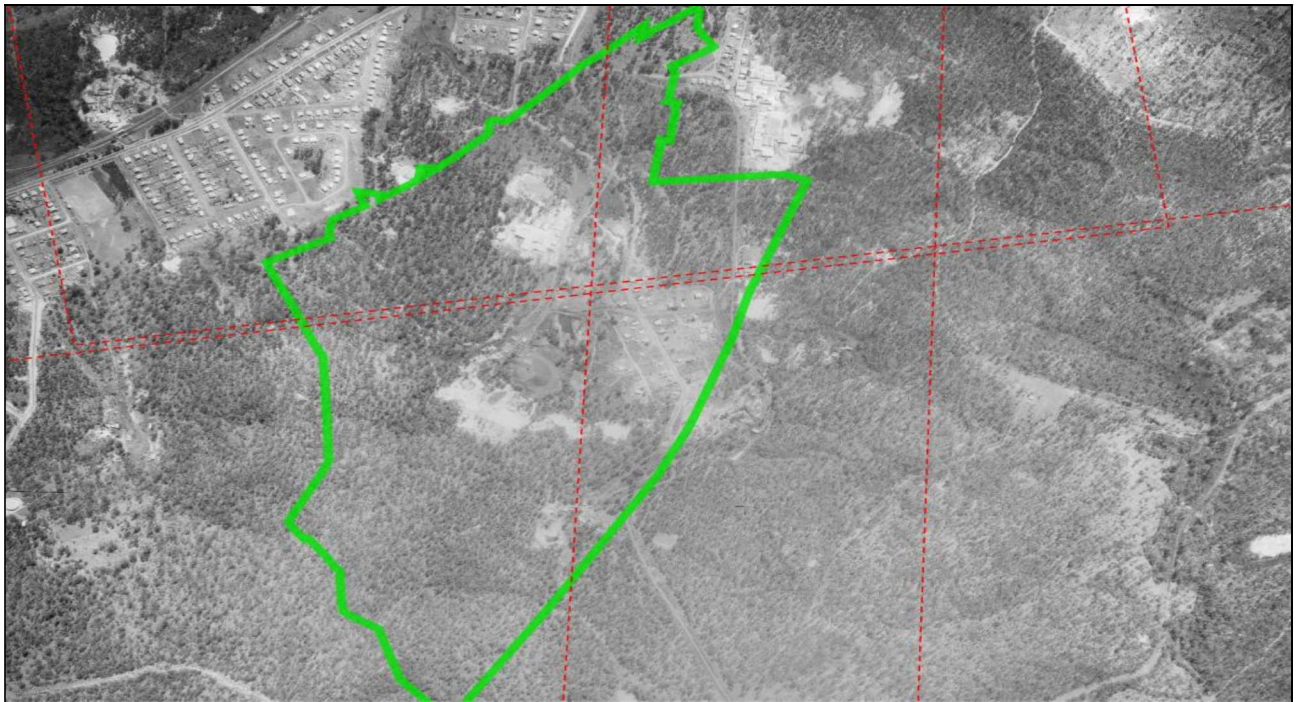
1.3 Commission

Butler Partners Pty Ltd (Butler Partners) was commissioned by Chum Street Land Evolution Pty Ltd (Chum Street Land Evolution) to prepare this geotechnical summary and assessment.

SECTION 2 - THE SITE

2.1 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 was generally undeveloped at the time (refer Photograph 1). In December 1972 (refer Photograph 2) large scale open cut excavations are evident, and the site appears to have been substantially backfilled by February 1986 (refer Photograph 3).



Photograph 1: Historical aerial photo from 9 September 1960



Photograph 2: Historical aerial photo from 1 December 1972



Photograph 3: Historical aerial photo from 21 February 1986

2.2 Background Documents

2.2.1 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 to Butler Partners for review.

2.2.1.1 December 2010 Moreton Geotechnical Services Report

Moreton Geotechnical Services Pty Ltd (Moreton Geotechnical Services) has previously carried out a geotechnical study which is summarised in the following report:

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.

2.2.1.2 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 are 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 STA Consulting Engineers 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.

2.2.1.3 Drawing Summary of Past Mining Activities

A review of past mining activities from available mine plans prepared by Bespoke Engineering Pty Ltd has been provided and copies of these drawings are included in Appendix C. In very broad summary, the drawings show

in plan and cross section, past mining activities as well as the open cut activities, presumably those evident in the aerial image presented in Photograph 2 from 1972.

2.2.1.4 Historic Mining Project

A report covering historic mining at the site has been prepared by Taylor Mining Services Pty Ltd (TMS) and the results are summarised in the following report.

Historic Mining Report
Lot 201 on SP349441
21 & 21A Whitwood Road, Ebbw Vale
Dated: June 2025

The TMS report includes details of the historic mining and backfilling activities at the site. Plan 16 from the TMS report (reproduced below as Figure 2) shows a composite view of the remnant underground mine workings and Plan 18 (reproduced below as Figure 3) shows mine constraint zones proposed by TMS.

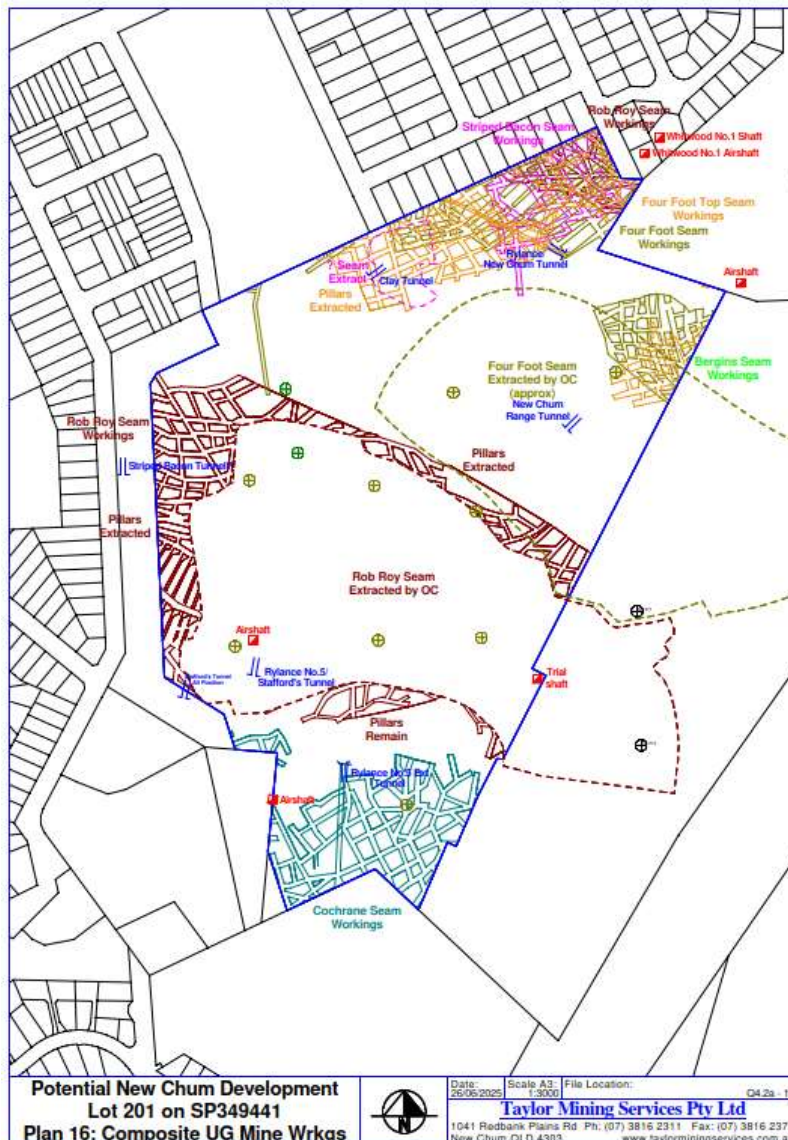


Figure 2: Excerpt from Plan 16 taken from Taylor Mining Services

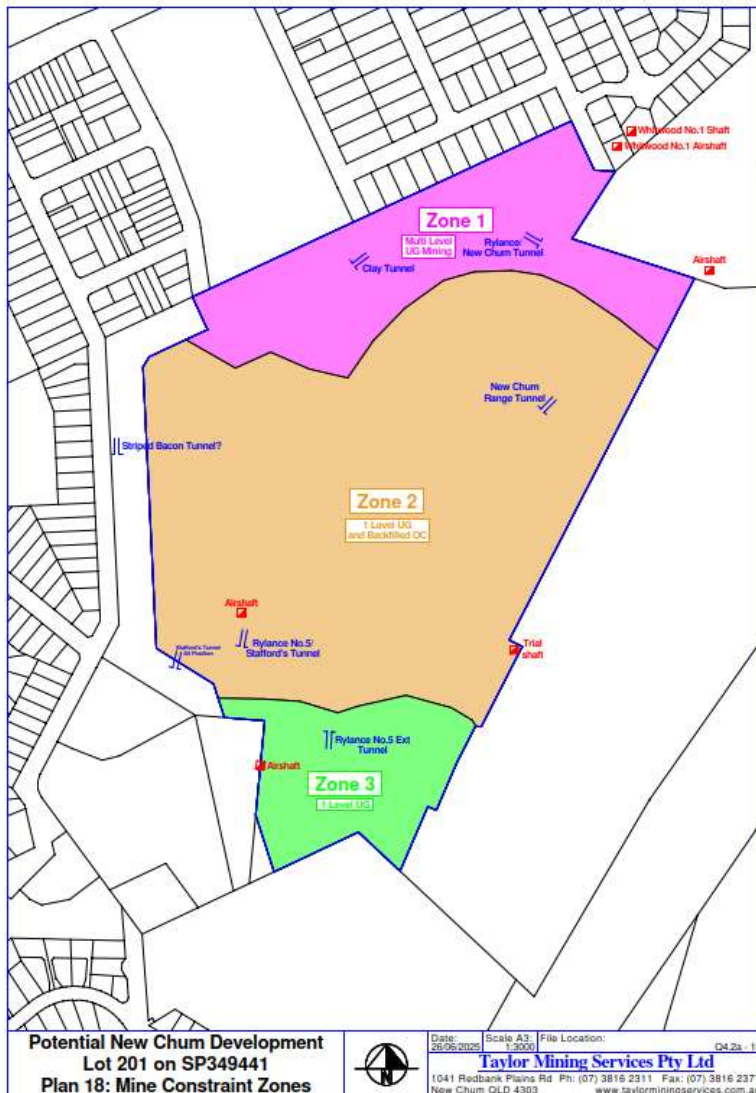


Figure 3: Excerpt from Plan 18 taken from the Taylor Mining Services report

The TMS report also includes reference to a 1978 report prepared by Coffey Partners Pty Ltd (Coffey) that notes that backfilling along the western wall was completed and the Coffey report includes the results of some limited testing that was carried out. The results indicated dry density ratios of the fill that varied between 82% and 101% modified (AASHTO). The Coffey report also notes that,

"It is understood that the company will continue the backfilling operations under the required degree of control, covering material selection and compaction technique."

The TMS report also notes that a number of tunnels, air shafts and a trial shaft noted on the plans were removed as part of the open cut activities.

2.3 Previous Geotechnical Investigation by Butler Partners

Geotechnical investigation has previously been carried out at the site by Butler Partners and the results of the investigation are summarised in the following report.

*Geotechnical Investigation
Residential Development
Whitwood Road, Ebbw Vale
Project No.: 022-135A*

Dated: 15 November 2022

The results of the previous Butler Partners geotechnical investigation are summarised in the following sections.

2.4 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).

2.5 Site Description

At the time of Butler Partners geotechnical investigation (November 2022), the site was undeveloped and was generally moderately vegetated with medium to tall trees and shrubs. 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 4 and Photograph 5.



Photograph 4: A general view of the site looking north-east from Test Pit 41



Photograph 5: A general view of the site looking west towards Test Pit 50

Since Butler Partners geotechnical investigation in November 2022, bulk earthworks drawings were prepared for the site by Bespoke Engineering Solutions Pty Ltd and subsequent bulk earthworks operations have been carried out at the site. An aerial view of the site showing the extents of the site clearing and cut and fill earthworks is given in Photograph 6.



Photograph 6: Aerial view of the site looking (Nearmap – December 2024)

2.6 Earthworks Supervision

It is understood that full-time, Level 1 geotechnical supervision and testing (in accordance with Australian Standard AS3798 *Guidelines on earthworks for commercial and residential developments*) has been carried out at the site by Protest CMT Pty Ltd (Protest) and the results are included in the following report.

Level 1 Earthworks Report

Residential Subdivision Development, Ebbw Vale

Dated: 25 October 2024

Reference: PTP/12910-0001-Rev0

It is also understood that general supervision of works, and assessment of depths of removal and replacement was carried out by Bespoke Engineering Solutions Pty Ltd.

SECTION 3 - FIELDWORK

3.1 Excavation, Drilling, and Sampling Methods

The Butler Partners 2022 geotechnical 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, as well as the drilling and sampling of nine 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 handheld '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

For a description of the stratigraphy encountered in the test pits and bores, the Test Pit and Bore Report sheets included in Butler Partners 2022 geotechnical investigation for the site should be consulted. Bore and Test Pit Report sheets are also included in Appendix A.

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 and 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 included in Butler Partners 2022 geotechnical investigation for the site.

SECTION 5 - POTENTIAL UNDERMINING EFFECTS

5.1 **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. The empirical methods presented by Holla (1987) are applicable to workings that are deeper than 60m below ground surface level. 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.

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 is 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 4 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.

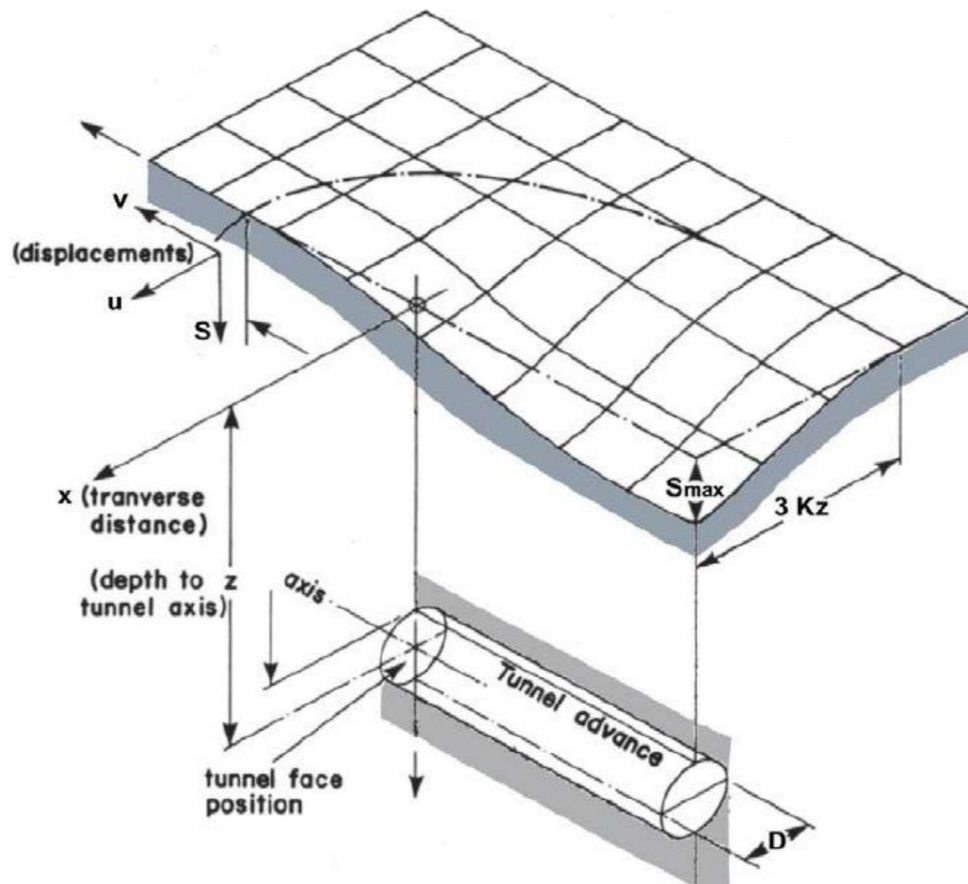


Figure 4: Settlement trough above a tunnel (Attewell et al, 1986)

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 5.

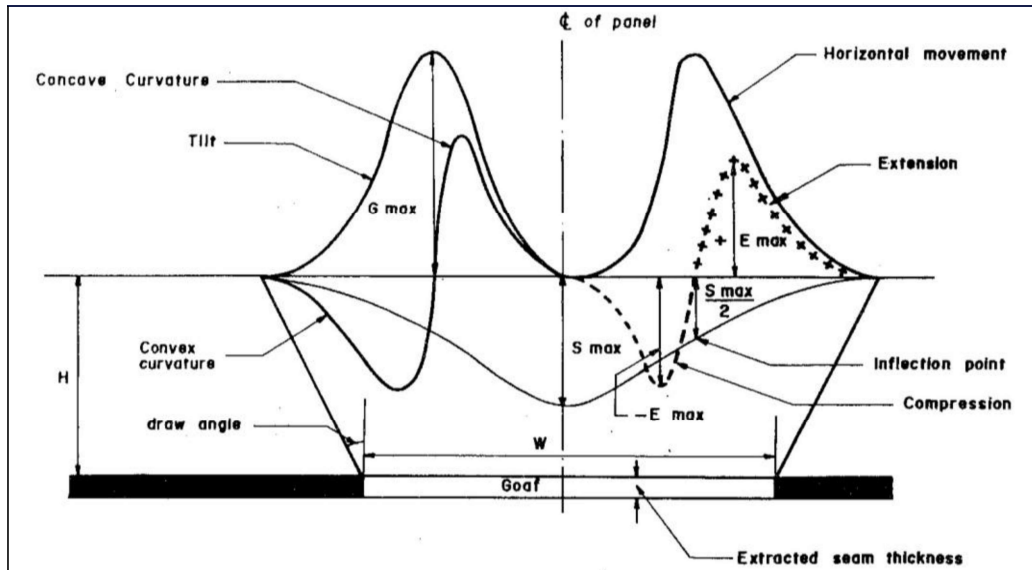


Figure 5: Relationship between different subsidence parameters (Waddington 2009)

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.

5.2 Reported Mining Activity

Based on the Moreton Geotechnical Services report, five areas of mining subsidence have been identified and are summarised in Table 1 and the interpreted locations of these areas are indicated in Figure 6.

Table 1: Underground Mine Workings Areas

Area (see Figure 4)	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

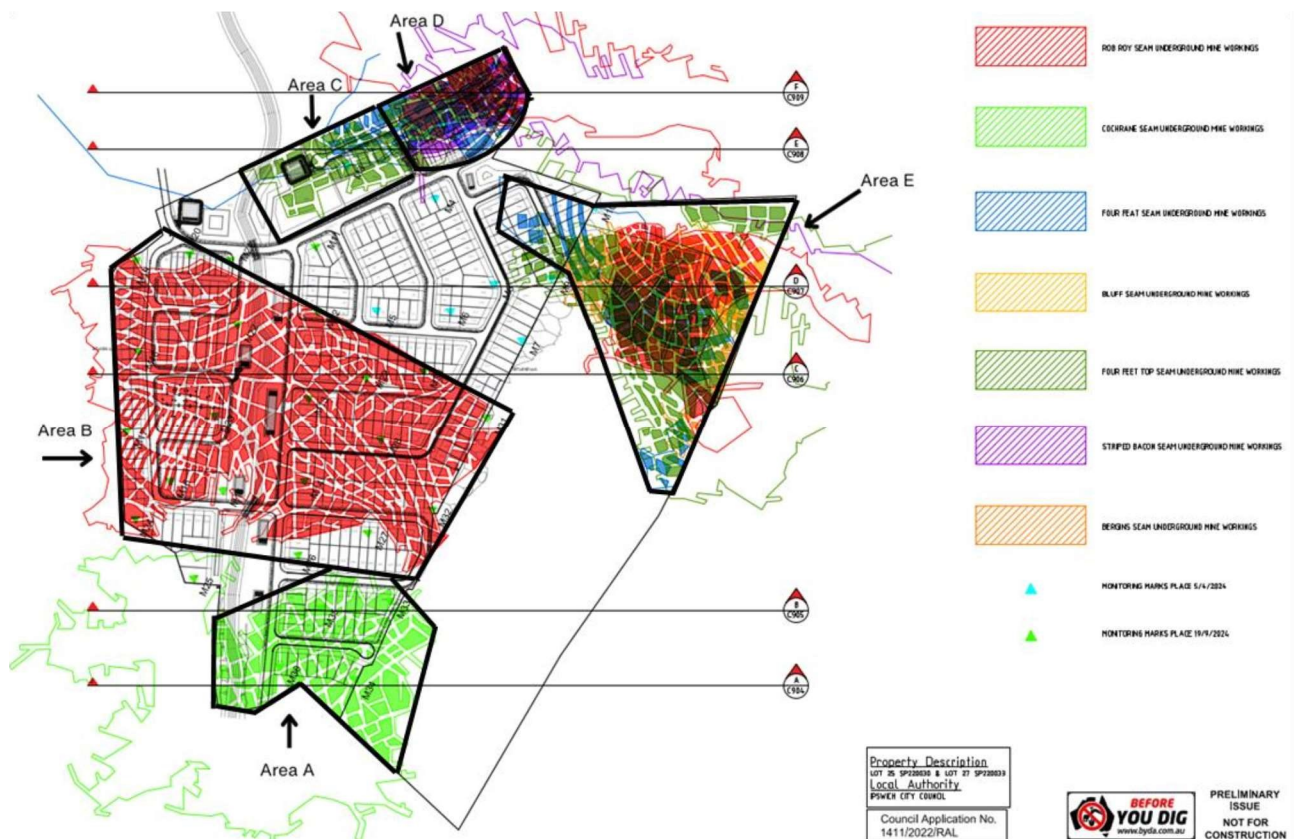


Figure 6: Underground mine workings areas from Bespoke Engineering drawings

It should be recognised that the methodology adopted has some limitations. Firstly, full details of the mining carried out are not available, presumably because the works were carried out between the 1870's and the 1960's and, 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.

5.2.1 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 2. An idealised surface subsidence profile plotted with horizontal displacements and strains is shown in Figure 7.

Table 2: 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

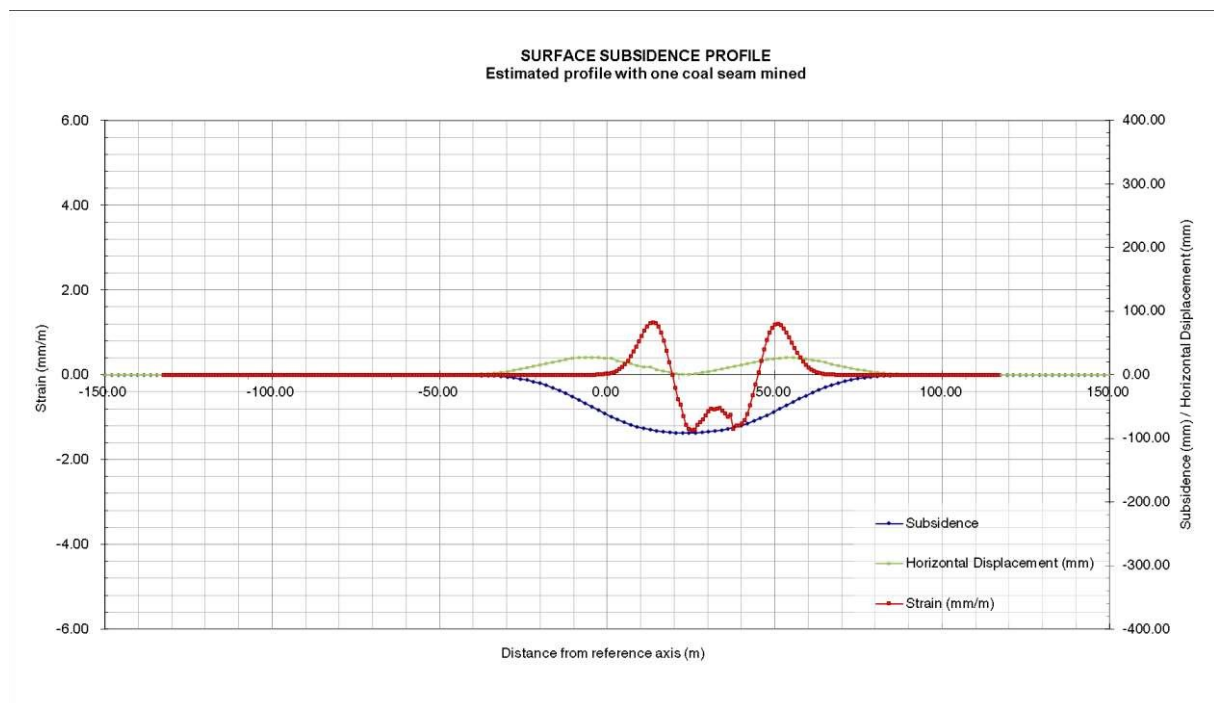


Figure 7: Subsidence profile for continued collapse of a single level of workings with 20m cover

5.2.2 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 3. An idealised surface subsidence profile plotted with horizontal displacements and strains is shown in Figure 8.

Table 3: 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

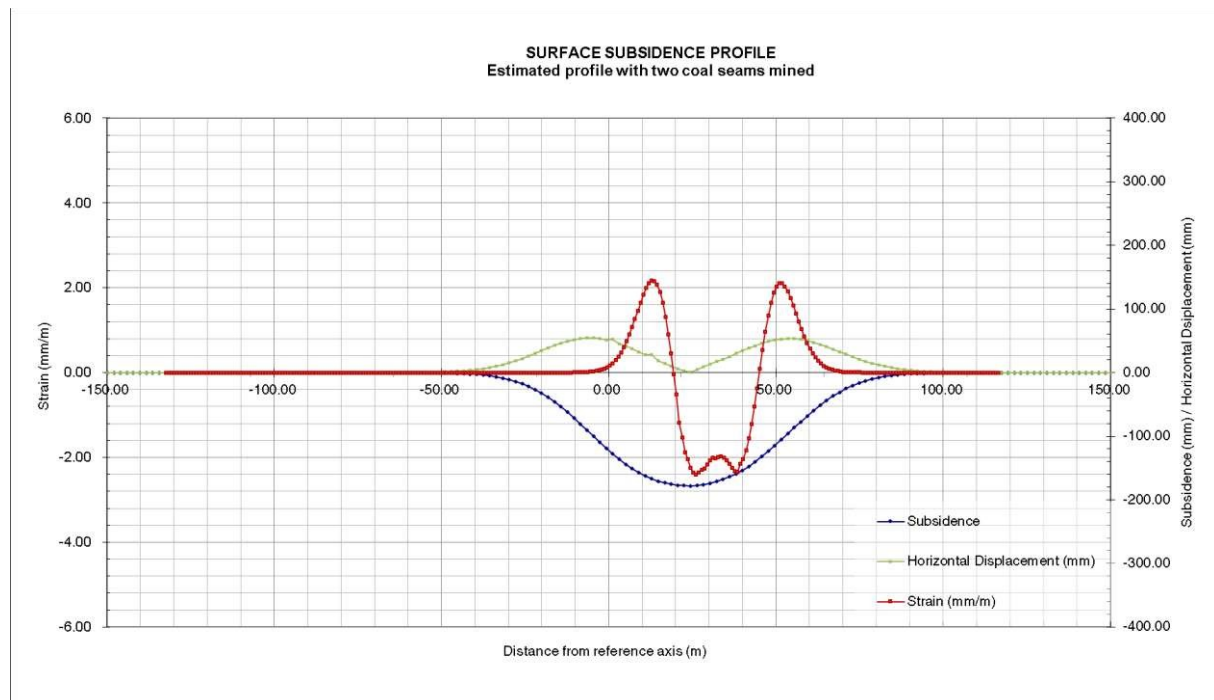


Figure 8: Subsidence profile for continued collapse of two levels of workings with 20m cover

5.2.3 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 4 and assume that the workings have undergone initial collapse. An idealised surface subsidence profile plotted with horizontal displacements and strains is shown in Figure 9.

Table 4: 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

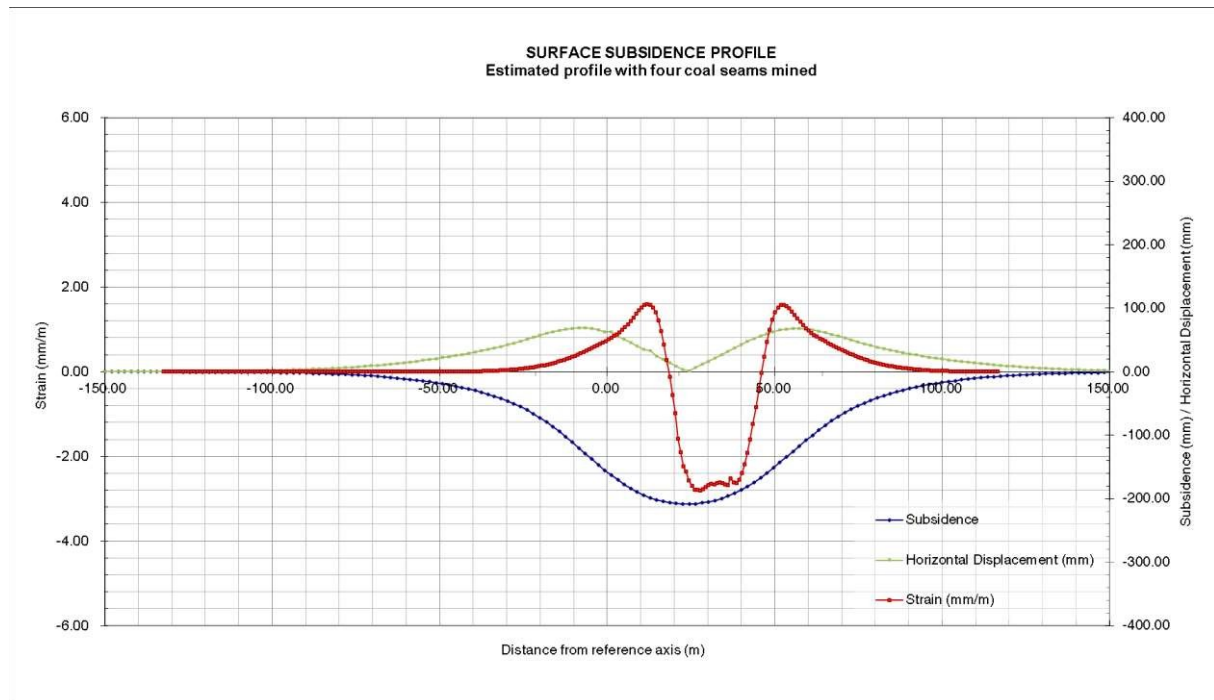


Figure 9: Subsidence profile for continued collapse of four levels of workings with 20m cover

5.3 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.

5.3.1 **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 5 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 5: Damage Categories based on Extent of Damage (Waddington 2009)

Damage Category	External Cracking	Internal Cracking	Loss of Bearing	Extent of Damage	Types of Repairs Likely to be Required
NO DAMAGE	None	None	None	No visible damage.	No repairs required.
0 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 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 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. External cracks will be required raking out & sealing. Small sections of cracked brickwork may require replacement. Roof gutters & wet area floor levels might need adjustment.
3 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 rellevelling.
4 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/lintels 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 rellevelling due to tilt or curvature. Cost of repairs is less than cost of rebuilding.
5 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 & rellevelling 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.

5.3.2 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.

5.3.3 Potential Damage Due to Horizontal Ground Strain

The National Coal Board of the United Kingdom has published a method (reproduced in Figure 10) 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 10 are those described in Table 5.

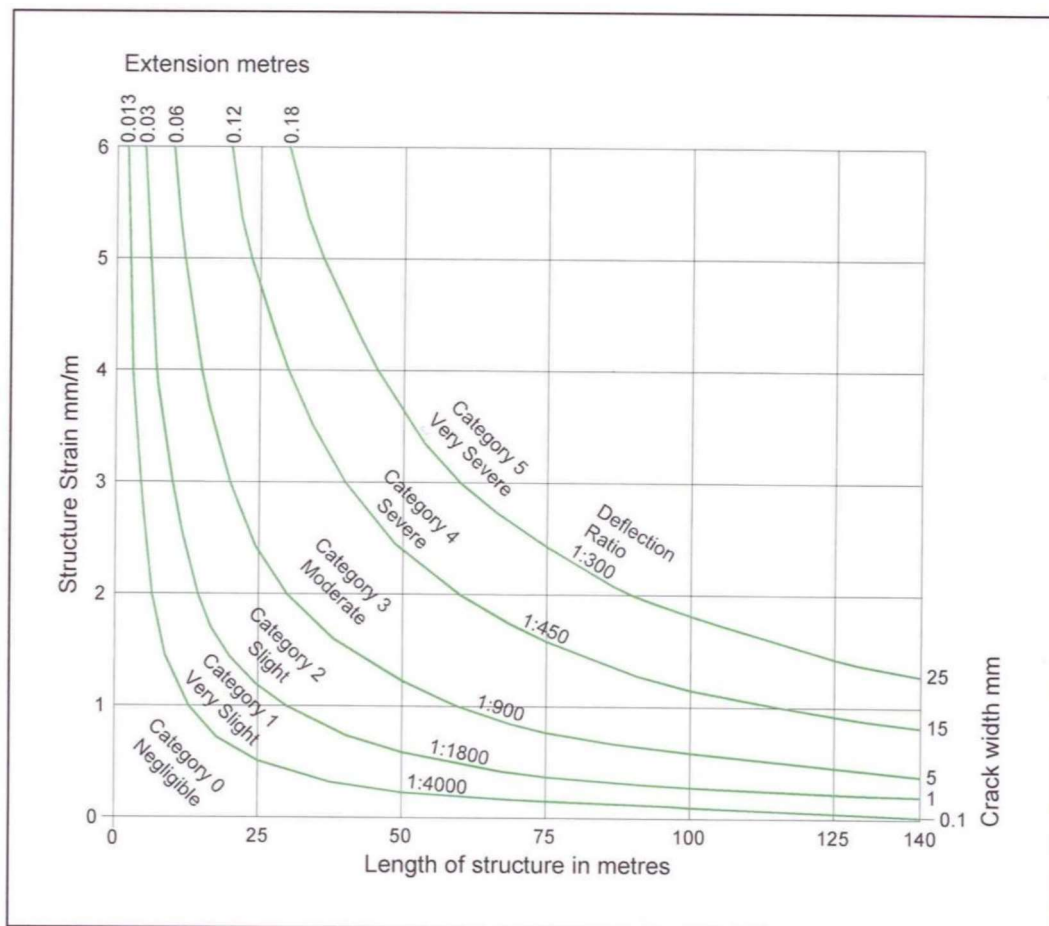


Figure 10: Damage classification based on horizontal ground strain and building length for two storey brick structures

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.

5.3.4 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 that needs to be considered in structural design. As a guide to the performance of structures 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 11 could be adopted.

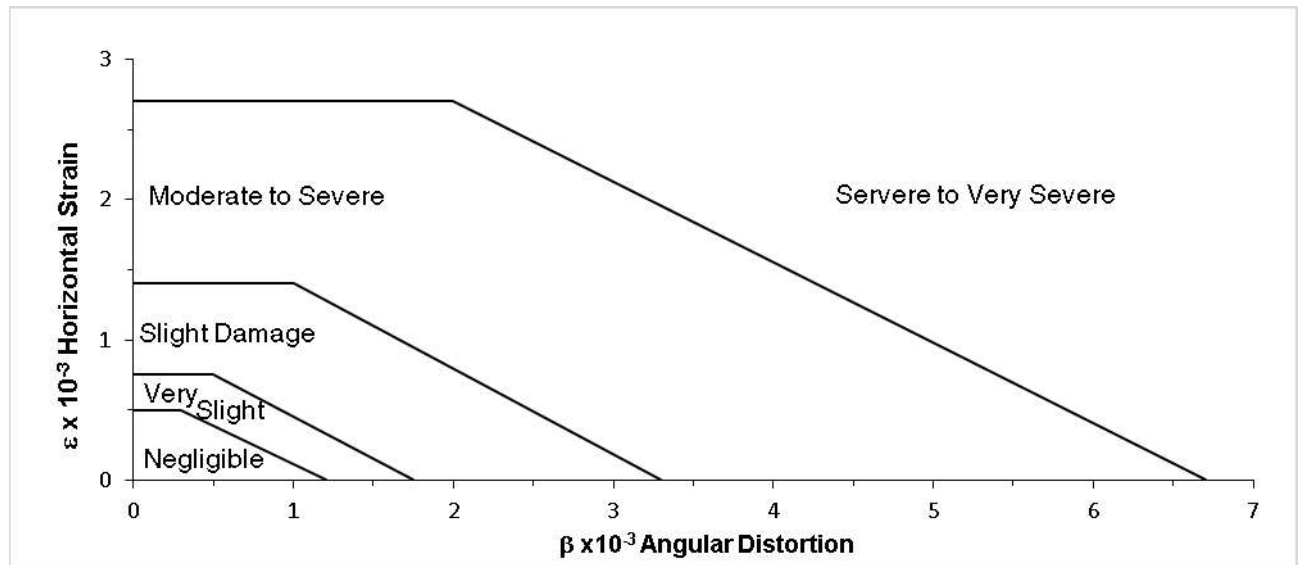


Figure 11: Damage Criteria for Masonry Bearing Wall Structures

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 6 for various types of structure constructed on a conventional on ground slab and subject to a range of deflection ratio limits.

Table 6: 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

5.4 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. It is understood that during site earthworks, where significant excavation, fill placement and subgrade treatment were undertaken, the site has been inspected by Bespoke Engineering and Protest and no evidence of tunnel entries and/or shafts were observed.

SECTION 6 - GEOTECHNICAL DESIGN DISCUSSION

6.1 Ground Model

The results of Butler Partners 2022 geotechnical investigation indicated 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, the reduction of the potential for, and the magnitude of, future settlements occurring at the site will need to consider especially (but not exclusively) the following:

- condition of the existing fill, where present;
- previous mine workings; and
- proposed earthworks levels and methodologies.

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

6.2 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). There is some very limited data included in the TMS report from a 1978 Coffey Partners report suggesting some compaction was undertaken. The results of insitu testing (SPTs) at regular depth intervals within the deep fill indicate that the fill is variable but generally appears to be reasonably well compacted. If, however, 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 fully control settlement risk from the presence of undetected voids, potential loose zones or the inclusion of deleterious materials, 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. However, where some risk of future adverse settlements can be accepted, settlement risk can be reduced by a combination of earthworks methodology and the adoption of a monitoring period prior to construction for confirmation of settlement performance.

6.3 Earthworks Drawings and Methodology

It is understood that earthworks at the site have been carried out in accordance with Bespoke Engineering Solutions Pty Ltd Drawings B774-C000 to C108, C200 to C207, C209 to C247, C700 to C701.

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 without undertaking settlement monitoring.

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 effectively subjected 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 and without settlement mitigation measures, estimates are provided in Table 7.

Table 7: 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

The earthworks methodology that has been adopted for the development bulk earthworks at the site was based on a settlement risk reduction methodology in the deep fill areas in lieu of full removal and replacement of all uncontrolled fill. In order to assess the likelihood of future settlement occurring at the site, both from settlement within the existing uncontrolled fill that was not removed and replaced and from underlying underground mining activities, a settlement monitoring program was adopted following completion of the bulk earthworks.

In general, the bulk earthworks operations comprised:

Cut Areas – In these areas, the removal of existing 'load' from the site means that future development at the site would impose a lower stress on the underlying strata than what it has already been subject to and, as a result, the magnitude of future settlement at the site is likely to be reduced. Where, following excavation to bulk earthworks level, existing uncontrolled fill was encountered, a zone of further excavation and replacement was proposed to create a controlled fill 'bridging zone' directly under the finished earthworks surface.

Fill Areas – Where additional fill placement is proposed, or in areas where there is less than 4m depth of excavation proposed, the upper 4m depth of existing fill below finished surface level was proposed to be removed, the exposed subgrade heavily compacted, proof rolled and tested then the fill (and any new fill) would be placed and compacted under Level 1 geotechnical supervision to a specification appropriate for residential construction over.

Where the design excavation depth is 4m or more, it was proposed that the site would be cut to design level then a further 2m depth of excavation undertaken, the exposed subgrade heavily proof rolled, compacted and tested, then the 2m depth of excavated fill material would be replaced and compacted under Level 1 geotechnical supervision to a specification appropriate for residential construction over.

The adoption of the above earthworks sequence would be expected to substantially reduce the likelihood of adverse settlements occurring, including large differential settlements that could occur over relatively short distances.

Where additional fill is to be placed at the site, the monitoring of settlement following the placement of the additional load over the pre-existing ground surface, would be assessed to provide an indication of the likelihood and magnitude of future settlements.

6.4 Settlement Monitoring Post Earthworks

In order to confirm reduced settlement occurrence following site earthworks it will be necessary to carry out settlement monitoring of sufficient duration to establish a pattern of sufficiently low movement to allow residential construction to proceed with a low risk of damage exceeding structural limits.

Monitoring of ground surface levels would need to be carried out over a sufficient period and through significant wet weather events in the areas of 'deep' fill to establish a suitably low level of future movement potential.

Where settlement monitoring confirms suitably low settlement following remedial works, future construction of appropriately design slab on ground construction would be possible.

6.5 Settlement Monitoring Post Earthworks

In order to confirm reduced settlement occurrence following site earthworks, consulting surveyors Bennett and Bennett Pty Ltd (Bennett & Bennett) and Gold Coast Surveys Pty Ltd (GCS) have carried out settlement monitoring at the locations indicted in Figure 12.



Figure 12: Monitoring point locations

The settlement monitoring results provided by Bennett & Bennett and GCS have been provided in two groups.

- Blue group (see Figure 10) comprising monitoring point M1 to M10 which have been monitored from 22 May 2024 to 22 January 2025; and,
- Green group (see Figure 10) comprising monitoring points M11 to M36 which have been monitored from 25 September 2024 to 25 May 2025

The results of the total amount of vertical movement recorded at each monitoring location, together with the intended bulk earthworks level changes (provided by Bespoke Engineering Solutions) are summarised in Table 8.

Table 8: Total measured settlements over the monitoring period

Monitoring Point	Predevelopment Ground Surface Level (mAHD)	Design Surface Level (mAHD)	Cut Depth (m)	Fill Depth (m)	Measured Vertical Movement * (mm)
M1	52.736	52.859	0.123		8
M2	54.240	52.990		1.250	-3
M3	50.083	53.088	3.005		-5
M4	57.823	54.589		3.234	-3
M5	71.985	62.706		9.279	-9
M6	71.613	73.276	1.663		-13
M7	71.765	77.883	6.118		-19
M8	64.779	69.275	4.496		-14
M9	62.253	68.446	6.193		-13
M10	60.102	60.721	0.619		-7
M11	56.634	52.546		4.088	-3
M12	57.489	55.326		2.163	-5
M13	58.231	57.534		0.697	-8
M14	57.253	59.442	2.189		-9
M15	58.356	60.786	2.430		-17
M16	67.676	66.954		0.722	-12
M17	71.948	69.600		2.348	-8
M18	67.673	63.326		4.347	-7
M19	55.414	53.508		1.906	7
M20	48.988	50.606	1.618		-2
M21	49.148	50.615	1.467		-4
M22	47.935	53.119	5.184		-63
M23	56.481	60.235	3.754		-19
M24	67.582	69.104	1.522		-16
M25	60.898	62.658	1.760		-8
M26	57.596	61.214	3.618		-11
M27	66.127	71.946	5.819		-25
M28	78.181	69.915		8.266	-7
M29	71.076	64.669		6.407	-7
M30	76.348	73.917		2.431	-11
M31	87.435	85.157		2.278	-15
M32	83.116	82.630		0.486	-17
M33	76.094	75.633		0.461	-48
M34	62.661	72.598	9.937		-10
M35	61.686	66.194	4.508		-10
M36	63.281	62.397		0.884	-13

*Positive values are upwards, negative values are downwards

For each of the groups of settlement monitoring points, a plot of vertical deflection against time is given in Figure 13 and Figure 14.

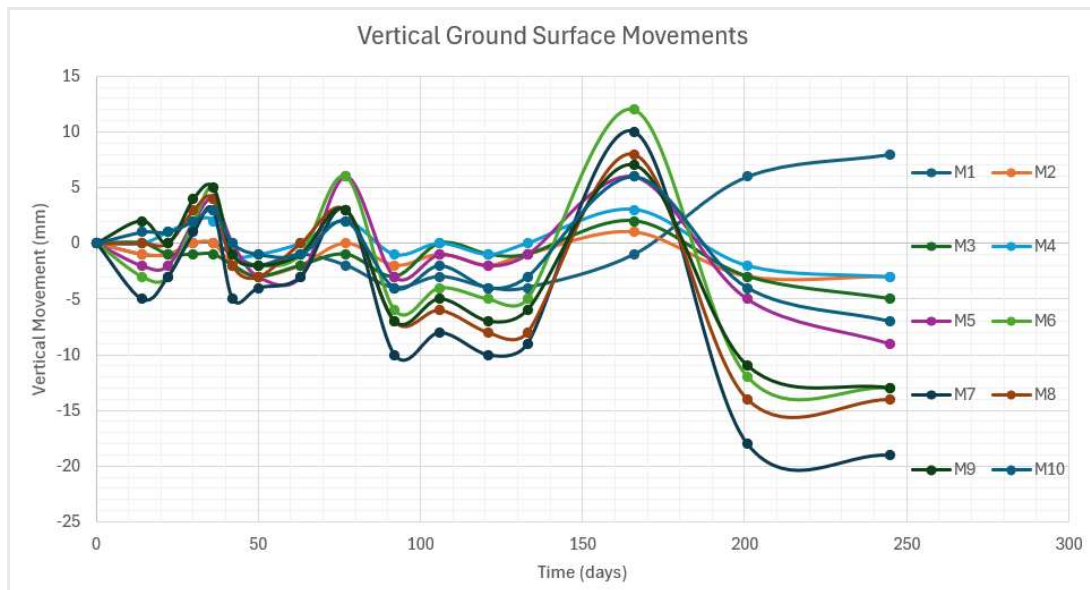


Figure 13: Blue Monitoring Points M1 to M10 – vertical movements over the monitoring period

Settlement results for monitoring points M1 to M10 appear to indicate that the vertical movements that have occurred at the monitoring locations, whether they are in areas of cut or areas of fill, are indicating areas of upwards and downwards movement with oscillations in both directions evident at the majority of the locations. These results appear to be indicating that ground surface movements at the monitoring locations are being governed by reactive soil movements. That is they are swelling and moving upwards when wet and shrinking and moving downwards when dry.

The upwards movement that was recorded for several of the monitoring points on 4 November 2024 (day 166) seems to be against trend for several of the monitoring points. It therefore seems reasonable to conclude that the vertical ground surface movements are a results of reactive ground surface movements and that there has not been underlying significant settlements occurring over the monitoring period.

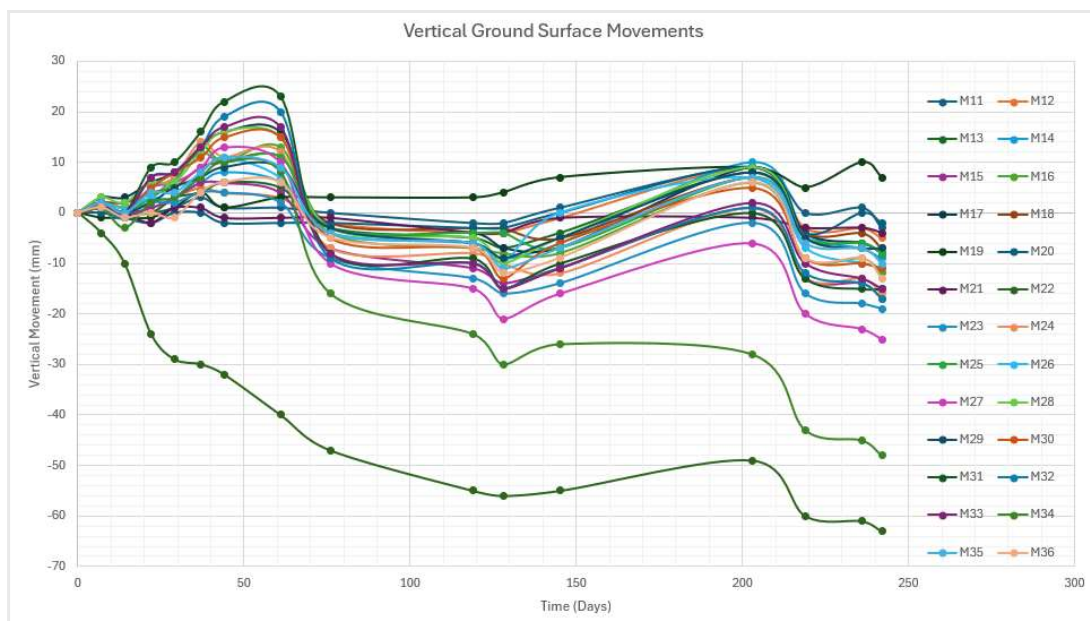


Figure 14: Monitoring Points 11 to 36 – vertical movements over the monitoring period

There appears to be a reversal in the data on two occasions with upwards movement being recorded. For example, at day 203 most locations recorded a reading of at least 5mm to 8mm against the gradual settlement trend measured in the prior three measurements. These readings are potentially due to reactive soil behaviour, as Ebbw Vale was subject to approximately 343mm of rain in the period immediately before day 203 (i.e. throughout March 2025). The ground has returned to a trend of gradual settlement between the measurements taken on day 219 and day 242 of monitoring.

Also, for the monitoring points M11 to M36 there appeared to be groups of monitoring points that appear to be showing some different behaviours. Figure 15 shows a group of monitoring points that appear to show reactive soil behaviour with little indication of significant settlement magnitude.

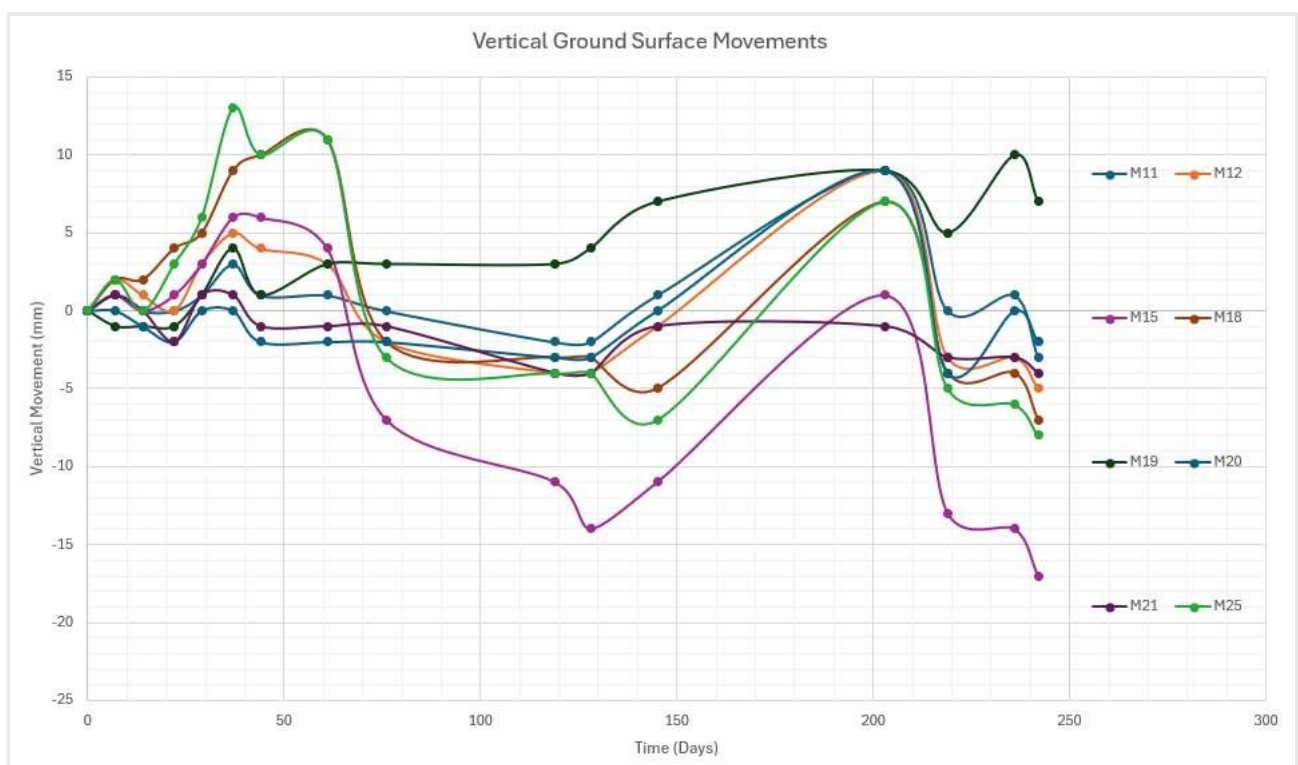


Figure 15: Monitoring Points 11 to 36 – possibly reactive soil dominated vertical movements

Figure 16 shows a group of monitoring points that have all trended downwards more consistently. Of the settlement monitoring points shown in Figure 16, monitoring points M22, M23, M27 and M33 appear to be indicating an ongoing downwards trend that is most prominent in monitoring points M22 (total downwards movement of 63mm) and M33 (total downwards movement of 48mm) with M22 showing a uniformly downwards movement trend. The other monitoring points in the group are all indicating change in vertical movement since 10 December 2024 of less than 25mm.

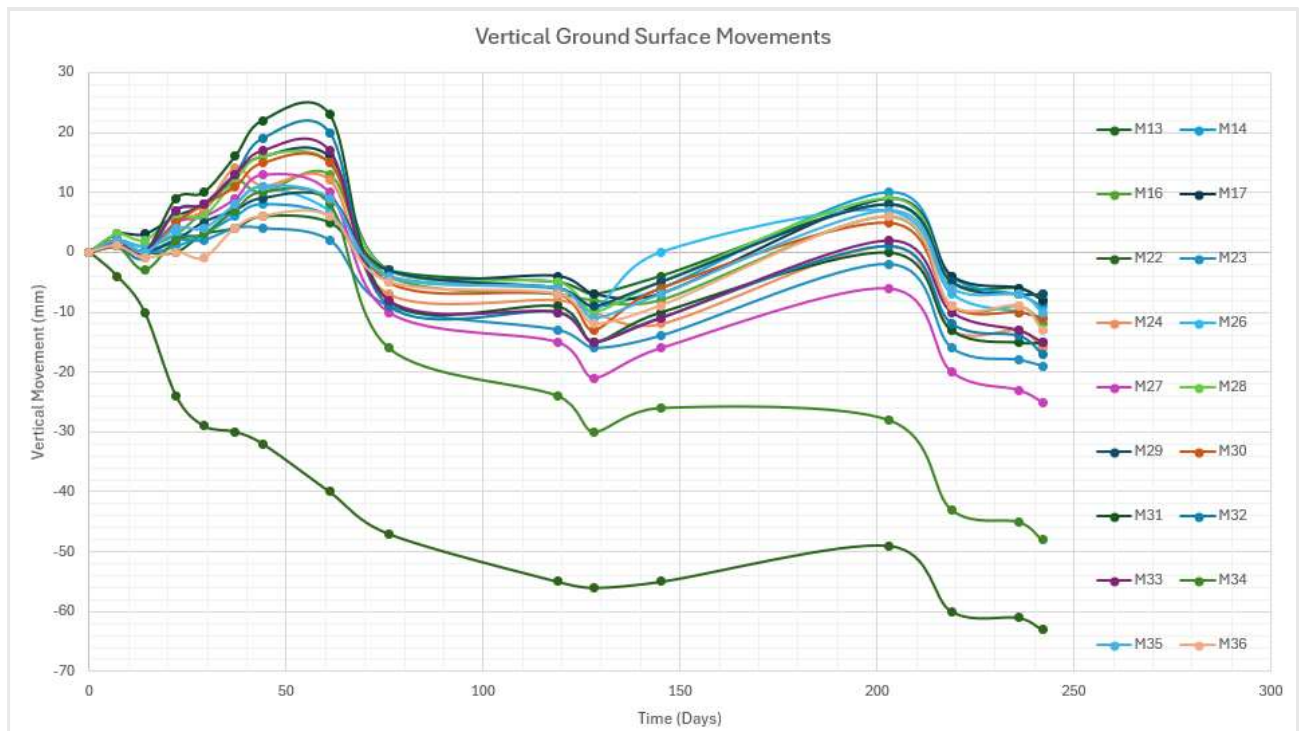


Figure 16: Monitoring Points 13 to 36 – monitoring points possibly showing settlement

6.6 Monitoring Summary

A significant number of the monitoring points are indicating ground surface movements that appear to be reflective of reactive ground surface movements without significant settlement although further monitoring is required for confirmation.

There are, however, some monitoring points that are indicating that settlement is occurring in areas of the site, most notably at monitoring point M22 where 63mm of settlement has occurred in an area where approximately 5m of new controlled fill has been placed over an area of deep, pre-existing uncontrolled fill. Based on the data available, it is estimated that the approximate order of magnitude of future settlement that could occur at this location over a 50 year design life could be 100mm to 200mm. A broadly similar order of magnitude of future site settlement is considered possible at monitoring point M33 where 48mm of downwards movement has occurred under approximately 10m depth of new controlled fill. Figure 17 shows an estimate of the possible distribution of future settlement at the site based on the monitoring results only.

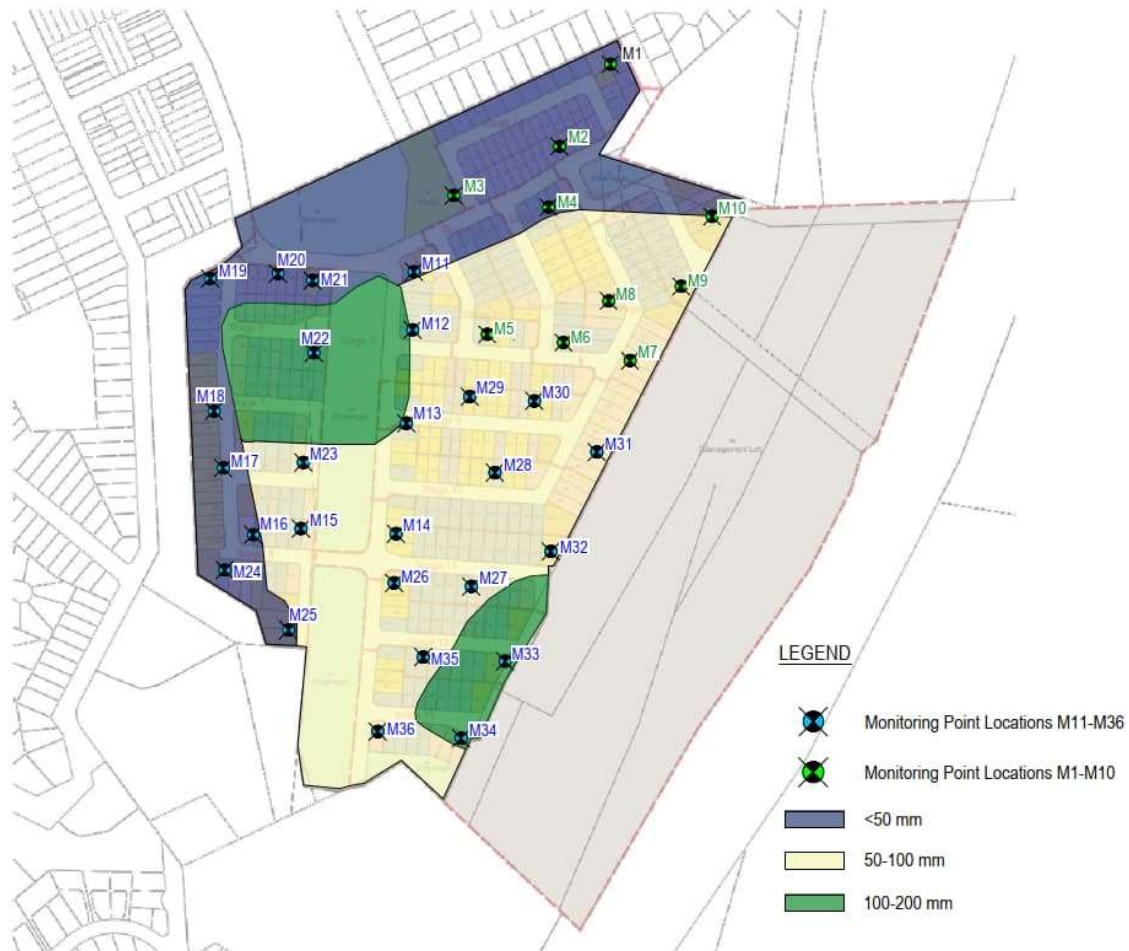


Figure 17: Estimated future settlement zones

Based on the results available, settlements recorded over the monitoring period generally appear consistent with:

- there being limited or no currently active mining subsidence, which is generally consistent with expectations for the age of the workings;
- there being limited ongoing settlements of the remnant uncontrolled fill at several of the monitoring point locations; and
- where settlements are occurring they are at the lower end of the range predicted.

For the range of settlements recorded at the monitoring point locations, it is considered that future construction of appropriately designed slab on ground construction (which must consider the range of ground movements discussed herein) would be suitable.

BUTLER PARTNERS PTY LTD


MIKE NEIGHBOUR
Principal
RPEQ 5385

Reviewed by:
RICARDO ZANNIN-PESCE
Associate

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.



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Butler Partners
geotechnical • geo-environmental • groundwater



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LEGEND

- Site Boundary
- TP1
- Test Pit
- Bore

Residential Subdivision Development

Whitwood Road, Ebbw Vale

Locality Plan and Test Locations

CLIENT: Chum Street Land Evolution Pty Ltd

SCALE AT A3:

0 50 100 150 200m

1:5000

DATE: JULY 2022

DRAWN: LA

APPROVED:

PROJECT No: 022-135A

DRAWING No: 1 REV: B



Site

UBD Reference: Map 214 Grid R11 (ACS v8) mls

APPENDIX A

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	SILTY CLAY (CH) - 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
	SANDY CLAY (CL) - 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	CLAYEY SILT (ML) - stiff, dark brown, with fine to medium grained sand	61.3			0.0	pp=170
	SILTY CLAY (CH) - stiff, red-brown, with fine to coarse grained sand	61.0		D	0.3	pp=160
	SILTY CLAY (CL) - 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	
	MUDSTONE (DW) - medium strength, brown with orange mottling, fine grained			D	1.6	
	SILTY CLAY (CI) - 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	FILL - red-brown and grey mottled, gravelly silty clay, fine to coarse sub-angular to angular gravel, with fine to coarse grained sand	69.5				
	GRAVELLY SILTY CLAY (CL) - hard, red-brown and pale grey mottled, fine to medium angular gravel, trace of fine to coarse grained sand	69.0		D	0.5 0.6 0.7	pp>600
1						
		68.0			1.6	pp>600
2						
		67.0		D	2.7 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	MUDSTONE (DW) - very low to low strength, grey and brown mottled, fine grained	75.8				
				D	0.4	
		75.0			0.8	
1						
		74.0				
2						
				D	2.6	
		73.0			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	SANDY CLAY (CI) - very stiff, red-brown and pale grey mottling, fine to coarse grained sand	63.5				
		63.0		D	0.5	pp=300
					0.7	
	- hard				0.8	pp>600
1						
	GRAVELLY CLAY (CI) - hard, red-brown with pale grey mottling, fine to medium angular gravel, with fine to coarse grained sand	62.0				
2						
		61.0		D	2.2	
					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	FILL - red-brown, silty clay, with fine to coarse grained sand, trace of fine to medium sub-angular to angular gravel - brown, silty sand, fine to coarse grained sand, with fine to medium sub-rounded to angular gravel - red-brown, with clay - brown, gravelly silty sand, fine to coarse grained sand, fine to coarse sub-angular to angular gravel	62.5				
1		62.0				
2	- trace of cobbles	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: 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	FILL - dark grey, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, trace of cobbles	56.8				
1	SILTY CLAY (CL) - very stiff, orange-brown and grey mottled, trace of fine to medium grained sand	56.0		U/D	1.2	pp=450
	MUDSTONE (DW) - 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	FILL - 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	MUDSTONE (DW) - very low to low strength, grey and brown mottled, fine grained	69.8				
				D	0.2	
					0.5	
		69.0				
1	MUDSTONE (XW) - very low to low strength, grey and brown mottled, fine grained					
		68.0				
2						
				D	2.4	
					2.5	
		67.0				
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: 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	SANDSTONE (SW) - medium to high strength, grey and orange mottled, coarse grained	0.0				
				D	0.5 0.6	
1	- red-orange	-1.0				
				D	1.7 1.9	
2		-2.0				
	End of Test Pit at 2.4 m (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	FILL - 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					
4		77.0				

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: 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	FILL - grey-brown, gravelly clayey sand, fine to coarse grained sand, fine to coarse angular gravel, trace of cobbles	72.8				
1	SILTY CLAY (CI) - very stiff, brown, trace of fine to coarse grained sand	72.0		U	0.9 1.0	pp=370
	- hard				1.3	pp>600
2	MUDSTONE (DW) - very low to low strength, grey and brown mottled, fine grained	71.0		D	1.8 2.0	
	SANDSTONE (SW) - medium to high strength, red-orange and grey mottled, fine to coarse grained			D	2.4 2.6	
3		70.0				
	End of Test Pit at 3.2 m					
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	MUDSTONE (DW) - very low to low strength, grey and brown mottled, fine grained	64.8				
1		64.0				
				D	1.3 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	SILTY CLAY (CI) - very stiff, brown and grey mottled, with fine to coarse grained sand	62.8				pp=500
				D	0.2	
					0.4	
		62.0		D	0.8	
1	MUDSTONE (XW) - very low to low strength, grey and brown mottled, fine grained				1.0	
		61.0				
		60.0				
2						
3	End of Test Pit at 3 m					
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	FILL - 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	FILL - 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 (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	FILL - 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	SILTY CLAY (CH) - firm, red and grey mottled, trace of fine to coarse grained sand			D	2.9 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	FILL - 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	SANDSTONE (DW) - medium to high strength, red and grey mottled, coarse grained	81.0			3.0	
	End of Test Pit at 3.3 m	80.0		D	3.3	
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: 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	FILL - 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	FILL - red-brown and orange mottled, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand	83.0				
1		82.0		B	1.2 1.4	pp>600
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	FILL - 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	FILL - 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	FILL - 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	FILL - 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 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	FILL - red-brown and pale grey mottled, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand	62.3				
		62.0				
	- pale brown, sandy gravel, fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand					
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	pp=270
	- dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand				2.3	
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	FILL - 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				
3	- dark grey	71.0				
	End of Test Pit at 3 m			D	2.8 3.0	pp>600
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	FILL - 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					
2		75.0				
				D	2.4	pp=250
	- red-brown and grey mottled				2.6	
3	End of Test Pit at 3 m	74.0				
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	FILL - 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	FILL - 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				
	SILTY CLAY (CI) - very stiff, pale grey and orange mottled, trace of fine to medium grained sand				0.8	pp=310
1					1.1	
		91.0		D	1.3	
	MUDSTONE (DW) - very low to low strength, pale grey with red-orange mottling, fine to medium grained				1.7	
2				D	1.9	
		90.0				
	SANDSTONE (DW) - 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	FILL - 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	FILL - orange and grey mottled, sandy clayey gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand - dark grey, with cobbles	66.0				
1		65.0				
	- brown			D	1.7	
2		64.0			1.9	
	- dark grey					
3		63.0				
	End of Test Pit at 3.1 m					
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: 482803

Coordinates: N: 6946151

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Ground Surface Level: RL73.8m*

D	Disturbed Sample	B	Bulk Sample	V	Vane Shear Strength (Uncorrected) kPa
U	Undisturbed Tube (50mm diameter)	pp	Pocket Penetrometer Test (kPa)	Is(50)	Point Load Test Result (MPa)

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	FILL - 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	FILL - 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	63.0			2.0	
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: 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	FILL - brown, silty sand, fine to coarse grained sand, with fine to coarse sub-rounded to sub-angular gravel - 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 - 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	FILL - 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		64.0				
	- with cobbles					
2		63.0				
	- brown					
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	FILL - 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 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	FILL - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles, with boulders	58.8				
1	SILTY CLAY (CI) - 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						
	SILTY CLAY (CH) - very stiff, grey and orange mottled, with fine to coarse grained sand, trace of fine sub-angular to angular gravel			D	2.4	
		56.0			2.6	
3					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	FILL - 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				
	SILTY CLAY (CH) - 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
					1.5	
2		57.0		B	2.5	
	SANDY CLAY (CL) - hard, pale grey and orange mottled, fine to coarse grained sand, with fine to coarse sub-rounded to sub-angular gravel				2.7	
3	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	FILL - 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	SILTY CLAY (CH) - stiff, grey and red mottled, trace of fine to medium grained sand	56.0		D	2.1 2.2 2.4	pp=200
3	End of Test Pit at 3 m	55.0			2.9	pp=210
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: 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	FILL - brown, silty clay, trace of fine to coarse grained sand	53.5				
	SILTY CLAY (CI) - firm, grey-brown, trace of fine to coarse grained sand				0.4	pp=140
		53.0				
					0.9	pp=200
1	- stiff					
	SILTY CLAY (CH) - 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						
	SILTY SAND (SM) - dense to very dense, pale grey, fine to coarse grained sand, trace of fine sub-rounded gravel			D	2.2	
					2.4	
		51.0				
	MUDSTONE (XW) - 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	FILL - brown, silty clay, with fine to coarse grained sand, trace of fine to medium sub-rounded to sub-angular gravel	53.0				
	SILTY CLAY (CI) - hard, pale grey with orange mottling, with fine to coarse grained sand				0.6	pp>600
1		52.0		D	0.9	pp>600
	SILTSTONE (DW) - very low to low strength, pale grey, fine grained				1.0	
				D	1.4	
					1.6	
2	SANDSTONE (XW) - low to medium strength, red-brown, coarse grained	51.0				
	SANDSTONE (DW) - 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	FILL - brown, silty clay, with fine to coarse grained sand, trace of fine to coarse sub-rounded to sub-angular gravel	54.3				
		54.0				
	SILTY CLAY (CI) - 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				
	SILTY CLAY (CH) - 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	FILL - 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	SANDSTONE (DW) - medium to high strength, pale grey, coarse grained	50.0		D	1.0 1.2	
2		49.0		D	2.1 2.3	
	End of Test Pit at 2.3 m (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	FILL - brown, silty clay, with fine to coarse grained sand, trace of fine to coarse sub-rounded to sub-angular gravel	53.5				
	SILTY CLAY (CI) - 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				2.0	pp=450
	SILTY CLAY (CH) - very stiff, grey with orange mottling, trace of fine to coarse grained sand, trace of fine sub-rounded gravel	51.0		D	2.8	pp=400
3	End of Test Pit at 3 m				3.0	
		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: 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	FILL - red and brown, silty clay, with fine to coarse grained sand, trace of fine to medium sub-rounded gravel	53.3				
	SILTY CLAY (CI) - stiff, grey-brown, trace of fine to medium grained sand	53.0				
				D	0.5 0.6	pp=150
1	SILTY CLAY (CH) - very stiff, grey and red mottled, trace of fine to medium grained sand	52.0		U	1.2 1.4	pp=400
	- hard, pale grey with red mottling, with fine to coarse grained sand				1.8 1.9	pp>600
2				D	2.1	
	SANDSTONE (XW) - very low to low strength, orange-brown, coarse grained	51.0				
3	SANDSTONE (DW) - low to medium strength, grey, coarse grained			D	2.9 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	FILL - 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					2.4	
				B		
		45.0			2.7	
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	FILL - brown, silty sand, fine to coarse grained sand, with fine to coarse sub-rounded gravel	52.5				
	SILTY CLAY (CI) - 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
	SANDY SILTY GRAVEL (GM) - 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	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	FILL - pale grey and orange mottled, sandy clay, fine to coarse grained sand, with fine to coarse sub-rounded gravel - 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 - with boulders	48.0		D	1.2 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 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	FILL - brown, silty sand, fine to coarse grained sand, with fine to medium sub-rounded to sub-angular gravel - 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	FILL - 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	FILL - 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	FILL - 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 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 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	FILL - 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 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	FILL - dark grey, sandy gravel, fine to coarse sub-angular to angular gravel, fine to coarse grained sand, with cobbles	52.5				
1		52.0				
2	- with boulders	51.0				
	End of Test Pit at 2.5 m (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	FILL - 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				
				D	1.7	
2					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	FILL - 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					
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: 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	FILL - 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				
	End of Test Pit at 3 m					
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: 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	FILL - 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 (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	FILL - pale grey, silty sandy gravel, fine to coarse sub-rounded to angular gravel, fine to coarse grained sand, with clay, with cobbles	62.3		D	0.1	
		62.0			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	FILL - 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	FILL - 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 N=9
				S	0.95 1.0	2,2,4 N=6
2		61.0			1.45	
3	SILTY CLAY (CI) - very stiff, pale grey and orange-brown mottled, with fine to coarse grained sand	60.0		S	2.5	6,10,15 N=25
					2.95	
4	- hard	59.0				
				S	4.0	15,18,20 N=38
5		58.0			4.45	
6	End of Bore at 5.95 m	57.0		S	5.5	12,19,20 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	FILL - dark brown, clayey sandy gravel, fine to medium grained sand, fine to coarse gravel	57.4				
0.5				S	0.5	2,7,6 N=13
0.95					0.95	
1.0				S	1.0	4,8,6 N=14
1.45		56.0			1.45	
2.5		55.0		S	2.5	4,3,3 N=6
2.95					2.95	
4.0		54.0		S	4.0	2,4,3 N=5
4.45		53.0			4.45	
5.5		52.0		S	5.5	4,3,3 N=39
5.95					5.95	
7.0		51.0		S	7.0	2,1,6 N=7
7.45		50.0			7.45	
8.5	SILTY CLAY (CI) - hard, dark brown	49.0		S	8.5	15,22,21 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	SILTY CLAY (CI) - hard, dark brown	47.0		S	10.0	13,27,29 N=56
					10.45	
12	MUDSTONE (XW) - 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	FILL - 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 0.95 1.0	6,5,3 N=8 4,3,3 N=6
2	- brown, gravelly sand, fine to coarse grained sand, fine to coarse sub-angular gravel	72.0			1.45	
3		71.0		S	2.5 2.95	2,2,2 N=4
4	- dark brown, sandy clayey gravel, fine to coarse sub-angular gravel, fine to coarse grained sand	70.0				
5		69.0		S	4.0 4.45	5,17,13 N=30
6		68.0		S	5.5 5.95	3,4,3 N=7
7		67.0		S	7.0 7.45	9,9,4 N=13
8	SANDSTONE (HW) - low to medium strength, brown and grey	66.0				
9		65.0		S	8.5 8.53	30/30mm
10	- very low strength	64.0				

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 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	SANDSTONE (HW) - very low strength, brown and grey	63.0		S	10.0 10.08	30/80mm
12	SILTSTONE (HW) - low to medium strength, brown and grey	62.0		S	11.5 11.59	30/90mm
13	SANDSTONE (HW) - low strength, brown	61.0		S	13.0 13.06	30/60mm
14	SILTSTONE (HW) - extremely low strength, dark grey, with thin coal seams	60.0		S	14.5 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	FILL - dark brown-grey, clayey sandy gravel, fine to coarse gravel, fine to coarse grained sand	50.8				
1		50.0		S	0.5 0.95 1.0	4,3,10 N=13
2		49.0		S	1.45	9,6,4 N=10
3		48.0		S	2.5 2.95	2,1,1 N=2
4		47.0		S	4.0 4.45	11,4,2 N=6
5	- dark grey, clayey gravel, fine to coarse sub-angular gravel	46.0				
6		45.0		S	5.5 5.95	2,2,2 N=4
7		44.0		S	7.0 7.45	3,3,2 N=5
8		43.0				
9		42.0		S	8.5 8.95	2,3,3 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	FILL - dark grey, clayey gravel, fine to coarse sub-angular gravel	40.0		S	10.0 10.45	3,3,2 N=5
12		39.0		S	11.5 11.95	3,7,6 N=13
13		38.0		S	13.0 13.45	4,6,7 N=13
14	- dark grey, clayey sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand	37.0		S	14.5 14.95	4,4,5 N=9
15		36.0		S	16.0 16.45	5,5,6 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 17.95	11,13,15 N=28
17	- grey, clayey gravel, fine to coarse sub-angular gravel, fine to coarse grained sand	34.0		S		
18		33.0				
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	FILL - dark grey, gravel, fine to medium angular gravel, with fine to coarse grained sand, with clay	30.0		S	20.5	7,7,8 N=15
					20.95	
22		29.0				12,13,20 N=15
23		28.0				
24		27.0		S	23.5	
					23.95	
25		26.0				6,12,15 N=27
26		25.0				
27		24.0		S	26.5	
					26.95	
28		23.0				30/40mm
29		22.0				
	COAL (SW) - low strength, black, fine grained					
30		21.0		S	29.5 29.54	

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	SILTSTONE (DW) - medium strength, pale grey, fine grained	20.0		S	31.0 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	FILL - pale red-grey, silty clay, with fine to coarse grained sand	66.3				
1				S	0.5	6,6,7 N=13
					0.95	
	- dark grey	65.0		S	1.0	4,15,14 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			2.5	4,8,7 N=15
3				S	2.95	
		63.0				
4	- dark grey, silty clay	62.0		S	4.0	8,14,12 N=26
					4.45	
5	- dark grey, gravelly clay, fine to coarse sub-angular gravel, with fine to coarse grained sand	61.0			5.5	3,3,3 N=6
6				S	5.95	
		60.0				
7	- dark grey, silty clay, with fine to coarse grained sand	59.0		S	7.0	3,4,5 N=9
					7.45	
8	- dark grey with red mottle, silty clay, with fine to coarse grained sand	58.0			8.5	7,9,13 N=22
9				S	8.95	
		57.0				
10						

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	FILL - dark grey with red mottle, silty clay, with fine to coarse grained sand (possibly natural)	56.0		S	10.0	6,9,11 N=20
					10.45	
11	SILTSTONE (XW) - extremely low strength, pale grey	55.0			11.5	13,28,30/90mm
12	SILTSTONE (HW) - low strength, pale grey	54.0		S	11.89	
	- extremely low strength, grey					
13		53.0		S	13.0	30/120mm
					13.12	
14		52.0		S	14.5	30/80mm HB
15	SANDSTONE (HW) - very low strength, pale grey				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	FILL - dark grey, clayey gravel, fine to coarse sub-angular gravel	54.4				
1				S	0.5	4,8,11 N=19
					0.95	
				S	1.0	4,13,9 N=22
2		53.0			1.45	
	- orange and brown, sandy clay, fine to coarse grained sand, with fine to coarse sub-angular gravel					
3		52.0		S	2.5	2,3,1 N=4
					2.95	
4		51.0				
				S	4.0	2,3,3 N=6
5		50.0			4.45	
	- dark brown					
6		49.0		S	5.5	3,3,6 N=9
					5.95	
7		48.0				
				S	7.0	3,6,5 N=11
8		47.0			7.45	
	- dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand					
9		46.0		S	8.5	26,12,14 N=26
					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	FILL - dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand	44.0		S	10.0	3,10,9 N=19
					10.45	
12		43.0		S	11.5	2,4,5 N=9
					11.95	
13		42.0				
		41.0		S	13.0	3,8,8 N=16
					13.45	
14		40.0		S	14.5	3,2,6 N=8
					14.95	
15	- dark grey, clayey gravel, fine to coarse sub-angular gravel	39.0				
16		38.0		S	16.0	4,4,5 N=9
					16.45	
17	- brown, silty clay, with fine to medium grained sand	37.0		S	17.5	3,7,7 N=14
					17.95	
18		36.0				
	- brown, clayey gravel, fine to coarse sub-angular gravel	35.0		S	19.0	3,4,5 N=9
					19.45	
19						
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	SILTSTONE (XW) - extremely low strength, dark grey	34.0		S	20.5 20.95	10,23,25 N=48
22	SILTSTONE (HW) - very low strength, dark grey	33.0		S	22.0 22.25	5,30/100mm
23	- low strength, pale grey	31.0		S	23.5 23.55	30/50mm
24	- very low strength	30.0		S	25.0 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	FILL - pale grey, clayey sand, fine to coarse grained sand	66.3				
0.5				S	0.5	3,5,4 N=9
1.0				S	0.95 1.0	
1.45	- with brown mottling	65.0		S	1.45	3,3,4 N=7
2.5		64.0		S	2.5	2,3,3 N=6
2.95		63.0			2.95	
4.0		62.0		S	4.0	4,5,6 N=11
4.45					4.45	
5.5	- with fine angular gravel	61.0		S	5.5	5,8,7 N=15
5.95		60.0			5.95	
7.0	- brown	59.0		S	7.0	5,7,12 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 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	FILL - brown, sandy gravelly clay/sandy clayey gravel, fine to medium gravel, fine to coarse grained sand	56.0		S	10.0	3,3,3 N=6
					10.45	
12		55.0		S	11.5	4,5,8 N=13
					11.95	
13		54.0				
	- dark brown	53.0		S	13.0	5,10,10 N=20
					13.45	
14		52.0				
15				S	14.5	10,9,8 N=17
					14.95	
	- interbedded layers of coal	51.0				
16		50.0		S	16.0	8,23,22 N=45
					16.45	
17		49.0				
18				S	17.5	3,7,14 N=21
					17.94	
19		48.0				
		47.0		S	19.0	5,9,6 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	SILTSTONE (XW) - extremely low to very low strength, pale grey, fine grained	46.0		S	20.5 10.58	30/80mm
22	- extremely low strength	44.0		S	22.0 22.09	30/90mm
23	- medium strength	43.0		S	23.5 23.9	30/20mm
24	End of Bore at 23.52 m	42.0				
25		41.0				
26		40.0				
27		39.0				
28		38.0				
29		37.0				
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: 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	FILL - 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 0.95 1.0 1.45	3,9,9 N=18 7,6,10 N=16
2		78.0				
3		77.0		S	2.5 2.95	3,4,2 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 4.45	2,3,3 N=6
5		75.0				
6		74.0		S	5.5 5.95	4,4,4 N=8
7	- brown mottled grey, sandy clay, fine to coarse grained sand	73.0		S	7.0 7.45	3,4,4 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 8.95	17,23,12 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	FILL - dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand	69.0		S	10.0 10.45	7,9,9 N=18
12	- brown and dark grey, sandy clay, fine to coarse grained sand	68.0		S	11.5 11.95	5,6,5 N=11
13		67.0		S	13.0 13.45	6,8,6 N=14
14		66.0		S	14.5 14.95	2,4,18 N=22
16	- dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand	64.0		S	16.0 16.45	14,6,14 N=20
18		62.0		S	17.5 17.94	7,24,30/140mm HB
19	- with coal	61.0		S	19.0 19.45	13,22,14 N=36
20		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	FILL - dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand, with coal	59.0		S	20.5 20.95	5,10,16 N=26
22		58.0				
23	SILTSTONE (HW) - extremely low strength, dark grey	57.0		S	22.0 22.44	9,12,30/140mm HB
24	COAL (DW) - very low strength, black	56.0		S	23.5 23.9	8,6,30/100mm HB
25	SILTSTONE (HW) - very low strength, pale grey	55.0				
25	SANDSTONE (HW) - medium strength, pale grey	55.0		(S)	25.0 25.03 25.6	30/30mm HB 30/30mm HB
25		54.0		S	25.63	
26	End of Bore at 25.63 m	54.0				
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	FILL - 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 0.95 1.0 1.45	1,6,10 N=16 4,8,8 N=16
2	- dark brown					
3	- brown-grey, silty clay, with fine to coarse sub-angular gravel	72.0		S	2.5 2.95	5,5,4 N=9
4	- pale grey-brown	71.0				
5	- red-brown					
6	- pale grey-orange-brown mottled	70.0		S	4.0 4.45	7,14,19 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		68.0		S	5.5 5.95	6,6,12 N=18
9	- pale grey, sandy clay, fine to coarse grained sand	67.0		S	7.0 7.4	4,14,30/100mm
10	- with coal lenses					
	- pale grey-orange-brown, silty clay, with fine to coarse grained sand, with fine to coarse sub-angular gravel	66.0		S	8.5 8.7 8.95	7,12,11 N=23
	- dark grey, silty sandy gravel, fine to coarse sub-angular gravel, fine to coarse grained sand	65.0		S		

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	FILL - 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 N=18
					10.45	
12		62.0		S	11.5	5,4,6 N=10
					11.95	
13		61.0		S	13.0	5,8,11 N=19
14		60.0			13.45	
15		59.0		S	14.5	3,30/140mm
					14.79	
16		58.0		S	16.0	8,11,11 N=22
17		57.0			16.45	
18		56.0		S	17.5	5,7,7 N=14
					17.95	
19		55.0		S	19.0	8,10,11 N=21
20					19.45	

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

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

Groundwater: No free groundwater encountered during auger drilling

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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	FILL - grey-orange-brown, silty clay, with fine to coarse sub-angular gravel			S	20.5 20.95	4,6,7 N=13
	- with coal	53.0				
22		52.0		S	22.0 22.45	6,9,9 N=18
23	- dark grey, clayey gravel, fine to coarse sub-angular gravel, with silt	51.0		S	23.5 23.95	8,9,8 N=17
24		50.0				
25		49.0		S	25.0 25.45	10,24,29 N=53
26		48.0				
27		47.0		S	26.5 26.95	2,8,7 N=15
28		46.0				
29		45.0		S	29.5 29.95	8,20,19 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	FILL - 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)

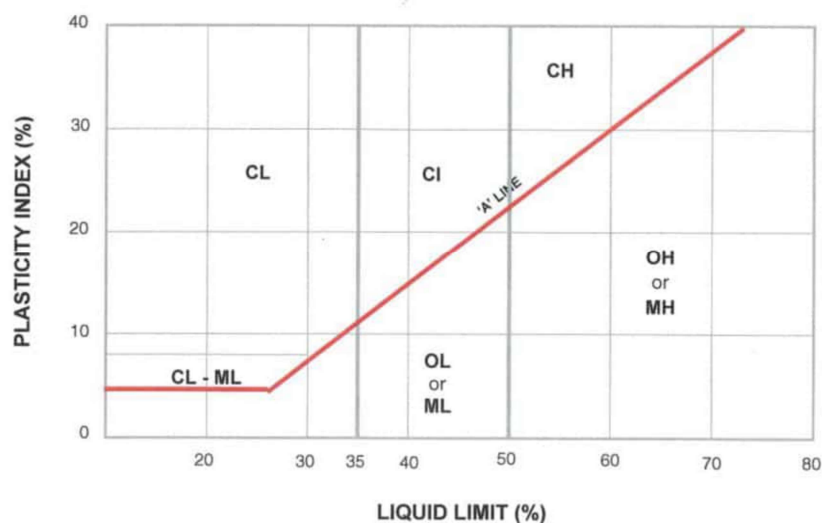
- strength/density, colour, structure/grain size, secondary and minor components, additional observations

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 (more than half of material is larger than 0.075mm)	BOULDERS	>200mm		
	COBBLES	63 – 200mm		
	GRAVELS (more than half of coarse fraction is larger than 2.36mm)	Coarse: 20 – 63mm Medium: 6 – 20mm 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 (more than half of coarse fraction is smaller than 2.36mm)	Coarse: 0.6 – 2.36mm Medium: 0.2 – 0.6mm 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 (more than half of material is smaller than 0.075mm)	SILTS & CLAYS (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 (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 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:

1. 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.
2. The field guide visual assessment for rock strength may be used for preliminary assessment or when point load testing is not available.
3. 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

MONITORING RESULTS



GOLD COAST SURVEYS
CONSTRUCTION & ENGINEERING SURVEYORS
BURLING HEADS, QLD, 4220
E: info@gcsurveys.com.au
P: 07 5599 9999
W: www.gcsurveys.com.au

- Notes:
1. Vertical Datum is Australian Height Datum (AHD) vide PM 30610
 2. Vertical settlement is calculated from the baseline observations to current observations and is shown in millimetres (mm).
 3. Survey Measurements have an accuracy of ± 3 mm

Date	Time (days)	Site Condition	M11 (Stage 5)		M12 (Stage 5)		M13 (Stage 10)		M14 (Stage 11)		M15 (Stage 8)		M16 (Stage 8)		M17 (Stage 7)		M18 (Stage 7)		M19 (Stage 6)		M20 (Stage 6)		M21 (Stage 6)		M22 (Stage 6)		M23 (Stage 7)	
			RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change
25/09/2024	0	dry ground	52.439	BL	55.152	BL	57.289	BL	59.350	BL	60.566	BL	66.771	BL	69.384	BL	63.141	BL	53.313	BL	50.506	BL	50.286	BL	52.950	BL	59.101	BL
2/10/2024	7	mid & wet in	52.440	1	55.154	2	57.290	1	59.352	2	60.567	2	66.773	2	69.387	3	63.143	2	53.312	-1	50.506	0	50.287	1	52.946	-4	59.102	1
9/10/2024	14	ry wet & mud	52.439	0	55.153	1	57.289	0	59.350	0	60.566	0	66.772	1	69.387	3	63.143	3	53.312	-1	50.505	-1	50.286	0	52.940	-10	59.101	0
17/10/2024	22	& wet in low	52.439	0	55.152	0	57.289	0	59.351	1	60.567	1	66.774	3	69.390	6	63.145	4	53.312	-2	50.504	-2	50.284	-2	52.926	-24	59.103	2
24/10/2024	29	ground & wet	52.440	1	55.155	3	57.292	3	59.353	3	60.569	3	66.778	7	69.392	8	63.146	5	53.314	1	50.506	0	50.287	1	52.921	-29	59.103	2
1/11/2024	37	uddy in low	52.442	3	55.157	4	57.293	4	59.356	6	60.572	6	66.783	12	69.397	13	63.150	9	53.317	4	50.506	0	50.287	1	52.920	-30	59.105	4
8/11/2024	44	very hot & dr	52.440	1	55.156	4	57.295	6	59.358	8	60.572	6	66.781	10	69.400	16	63.151	10	53.314	1	50.504	-2	50.285	-1	52.918	-32	59.105	4
25/11/2024	61	Dry top, wet	52.440	1	55.155	3	57.294	5	59.356	6	60.570	4	66.784	13	69.400	16	63.152	11	53.316	3	50.504	-2	50.285	-1	52.910	-40	59.103	2
10/12/2024	76	uddy in low	52.439	0	55.150	-2	57.286	-3	59.346	-4	60.559	-7	66.767	-4	69.381	-3	63.139	-2	53.316	3	50.504	-2	50.285	-1	52.903	-47	59.092	-9
22/01/2025	119	ddy in low al	52.437	-2	55.148	-4	57.284	-5	59.344	-6	60.555	-11	66.764	-7	69.380	-4	63.138	-3	53.316	3	50.503	-3	50.282	-4	52.895	-55	59.088	-13
31/01/2025	128	Dry top, wet	52.437	-2	55.148	-4	57.282	-7	59.341	-9	60.552	-14	66.763	-8	69.377	-7	63.138	-3	53.317	4	50.503	-3	50.282	-4	52.894	-56	59.085	-16
17/02/2025	145	Hot & dry	52.440	1	55.151	-1	57.285	-4	59.344	-6	60.555	-11	66.763	-8	69.377	-7	63.136	-5	53.320	7	50.506	0	50.285	-1	52.895	-55	59.087	-14
16/04/2025	203	Hot & Dry	52.448	9	55.161	9	57.297	8	59.360	10	60.567	1	66.777	6	69.393	9	63.148	7	53.322	9	50.515	9	50.285	-1	52.901	-49	59.099	-2
2/05/2025	219	Warm & Dry	52.439	0	55.149	-3	57.284	-5	59.346	-4	60.553	-9	66.762	-9	69.380	-4	63.137	-4	53.318	5	50.502	-4	50.283	-3	52.890	-60	59.085	-16
19/05/2025	236	Warm & Dry	52.440	1	55.149	-3	57.283	-6	59.343	-7	60.552	-14	66.762	-9	69.378	-6	63.137	-4	53.323	10	50.506	0	50.283	-3	52.889	-61	59.083	-18
25/05/2025	242	Warm & Dry	52.436	-3	55.147	-5	57.281	-8	59.341	-9	60.549	-17	66.759	-12	69.376	-8	63.134	-7	53.320	7	50.504	-2	50.282	-4	52.887	-63	59.082	-19

Job Number
250066 - Ebbw Vale

Notes: 1. Vertical Datum is Australian Height Datum (AHD) vide PM 30610

2. Vertical settlement is calculated from the baseline observations to current observations and is shown in millimetres (mm).

3. Survey Measurements have an accuracy of +/- 3mm



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M: 0401 560 842
W: www.geopconsurveys.com

Date	Time (days)	Site Condition	M24 (Stage 8)		M25 (Stage 8)		M26 (Stage 12)		M27 (Stage 11)		M28 (Stage 10)		M29 (Stage 9)		M30 (Stage 9)		M31 (Stage 9)		M32 (Stage 11)		M33 (Stage 12)		M34 (Stage 13)		M35 (Stage 12)		M36 (Stage 13)	
			RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change	RL	Vertical change
25/09/2024	0	Very dry ground & hot	68.882	BL	62.512	BL	62.369	BL	71.820	BL	69.590	BL	62.805	BL	71.785	BL	85.100	BL	82.470	BL	77.103	BL	72.436	BL	66.045	BL	62.310	BL
2/10/2024	7	Overcast, humid & wet in lower area	68.884	2	62.514	2	62.371	2	71.822	2	69.593	3	62.806	1	71.786	1	85.102	2	82.471	1	77.105	2	72.437	1	66.047	2	62.311	1
9/10/2024	14	Very wet & muddy	68.882	0	62.512	0	62.370	1	71.820	0	69.592	2	62.805	0	71.785	0	85.100	0	82.468	-1	77.103	0	72.433	-3	66.045	0	62.309	-1
17/10/2024	22	Humid & wet in lower areas	68.887	5	62.515	3	62.372	3	71.825	5	69.596	6	62.807	5	71.790	5	85.109	9	82.477	7	77.110	7	72.438	2	66.049	4	62.310	0
24/10/2024	29	Dry ground & very hot	68.889	7	62.518	6	62.372	3	71.826	6	69.596	6	62.810	6	71.793	8	85.110	10	82.478	8	77.111	8	72.439	3	66.049	4	62.309	-1
1/11/2024	37	Hot & muddy in lower areas	68.896	14	62.525	13	62.377	8	71.829	9	69.602	12	62.812	7	71.796	11	85.116	16	82.483	13	77.116	13	72.443	7	66.053	8	62.314	4
8/11/2024	44	Very hot & dry	68.893	11	62.522	10	62.380	11	71.833	13	69.606	16	62.814	9	71.800	15	85.122	22	82.489	19	77.120	17	72.446	10	66.056	11	62.316	6
25/11/2024	61	Hot, Dry top, wet low	68.894	12	62.523	11	62.376	7	71.830	10	69.605	15	62.814	9	71.800	15	85.123	23	82.490	20	77.120	17	72.444	8	66.054	9	62.316	6
10/12/2024	76	Hot & muddy in lower areas	68.875	-7	62.509	-3	62.365	-4	71.810	-10	69.587	-3	62.802	-3	71.780	-5	85.092	-8	82.461	-9	77.095	-8	72.420	-16	66.041	-4	62.305	-5
22/01/2025	119	Very hot, muddy in low areas & breeze	68.874	-8	62.508	-4	62.363	-6	71.805	-15	69.585	-5	62.799	-7	71.778	-7	85.091	-9	82.460	-10	77.093	-10	72.412	-24	66.039	-6	62.303	-7
31/01/2025	128	Hot, Dry top, wet low	68.872	-10	62.508	-4	62.359	-10	71.799	-21	69.580	-10	62.796	-9	71.772	-13	85.085	-15	82.455	-15	77.088	-15	72.406	-30	66.034	-11	62.298	-12
17/02/2025	145	Hot & dry	68.870	-12	62.505	-7	#VALUE!	#VALUE!	71.804	-16	69.585	-5	62.800	-6	71.779	-6	85.090	-10	82.459	-11	77.092	-11	72.410	-26	66.038	-7	62.301	-9
16/04/2025	203	Hot & Dry	68.883	1	62.519	7	62.376	7	71.814	-6	69.599	9	62.813	8	71.790	5	#VALUE!	#VALUE!	82.471	1	77.105	2	72.408	-28	66.052	7	62.316	6
2/05/2025	219	Warm & Dry	68.869	-13	62.507	-5	62.362	-7	71.800	-20	69.585	-5	62.800	-5	71.776	-9	85.087	-13	82.458	-12	77.093	-10	72.393	-43	66.039	-6	62.301	-9
19/05/2025	236	Warm & Dry	68.869	-13	62.506	-6	62.359	-10	71.797	-23	69.583	-7	62.798	-7	71.775	-10	85.085	-15	82.456	-14	77.090	-13	72.391	-45	66.038	-7	62.301	-9
25/05/2025	242	Warm & Dry	68.866	-16	62.504	-8	62.358	-11	71.795	-25	69.583	-7	62.798	-7	71.774	-11	85.085	-15	82.453	-17	77.088	-15	72.388	-48	66.035	-10	62.297	-13

221298 - Ebbw Vale

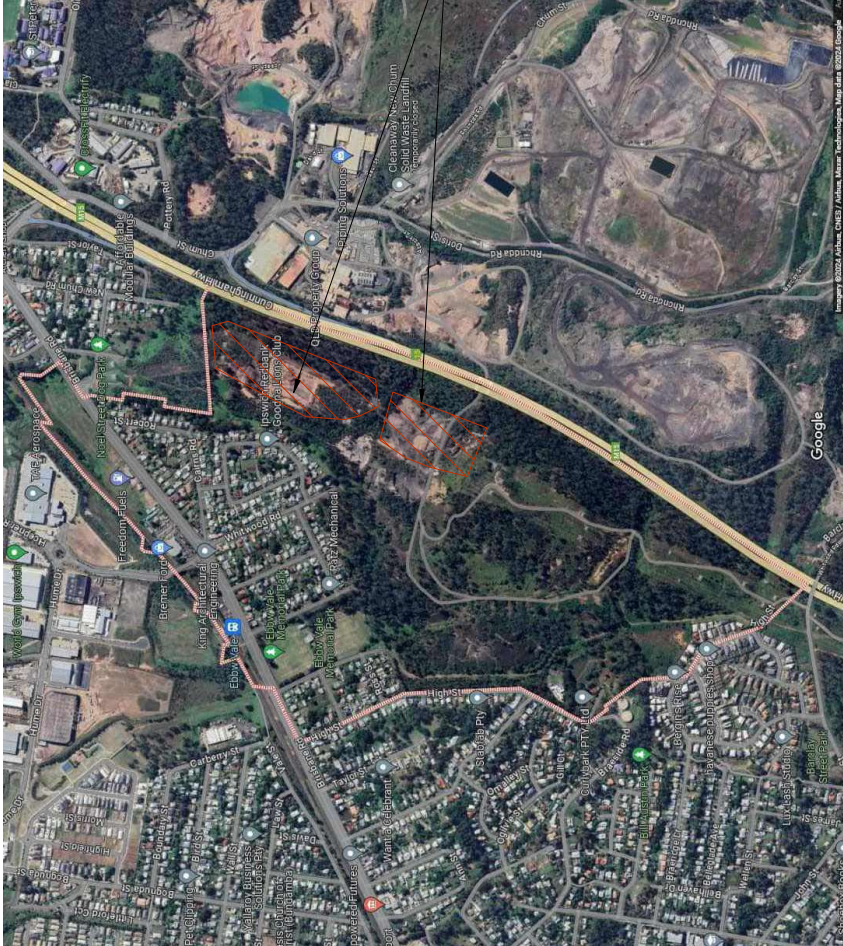
- Notes: 1. Vertical Datum is Australian Height Datum (AHD) vide PM 30604
2. Vertical settlement is calculated from the baseline observations to current observations and is shown in millimetres (mm).
3. Survey Measurements have an accuracy of +/- 2mm

Date	Time (days)	Site Condition	M1 (Stage 14)		M2 (Stage 14)		M3 (Stage 14)		M4 (Stage 15)		M5 (Stage 4)		M6 (Stage 3)		M7 (Stage 2)		M8 (Stage 2)		M9 (Stage 1)		M10 (Stage 1)	
			Z (RL raw)	Vert Settlement	Z (RL raw)	Vert Settlement	Z (RL raw)	Vert Settlement	Z (RL raw)	Vert Settlement	Z (RL raw)	Vert Settlement	Z (RL raw)	Vert Settlement	Z (RL raw)	Vert Settlement	Z (RL raw)	Vert Settlement	Z (RL raw)	Vert Settlement	Z (RL raw)	Vert Settlement
22/05/24	0		52.810	BL	52.990	BL	53.041	BL	54.583	BL	62.583	BL	73.882	BL	78.881	BL	71.482	BL	68.342	BL	60.673	BL
5/06/24	14	Dry and Sunny	52.809	-1	52.988	-1	53.041	0	54.583	0	62.581	-2	73.889	-3	78.876	-5	71.482	0	68.344	2	60.674	1
13/06/24	22	Ground very dry, Sunny clear skies	52.809	-1	52.989	-1	53.040	-1	54.584	1	62.582	-2	73.890	-3	78.877	-3	71.481	0	68.342	0	60.674	1
21/06/24	30	Dry and sunny	52.810	0	52.990	0	53.040	-1	54.584	2	62.586	2	73.895	2	78.882	1	71.484	3	68.346	4	60.675	2
27/06/24	36	Ground very dry, Sunny clear skies	52.810	0	52.990	0	53.040	-1	54.584	2	62.587	4	73.897	5	78.884	3	71.486	4	68.347	5	60.677	3
3/07/24	42	Very muddy in lower areas. Light rain at times.	52.809	-1	52.988	-2	53.039	-2	54.582	-1	62.583	0	73.891	-1	78.876	-5	71.480	-2	68.341	-1	60.673	0
11/07/24	50	Dry and Sunny	52.808	-2	52.987	-3	53.039	-3	54.583	-1	62.581	-3	73.890	-2	78.876	-4	71.479	-3	68.340	-2	60.672	-1
24/07/24	63	Very dry ground and Sunny	52.809	-1	52.988	-2	53.039	-2	54.583	0	62.581	-3	73.891	-1	78.877	-3	71.479	-3	68.341	-1	60.673	-1
7/08/24	77	Dry and Sunny	52.809	-2	52.990	0	53.040	-1	54.584	2	62.589	6	73.898	6	78.884	3	71.484	3	68.345	3	60.676	2
22/08/24	92	Very muddy in lower areas. Humid and Sunny	52.807	-4	52.988	-2	53.039	-3	54.582	-1	62.581	-3	73.886	-6	78.870	-10	71.475	-7	68.335	-7	60.670	-4
5/09/24	106	Ground very dry. Overcast and Humid	52.807	-3	52.989	-1	53.041	0	54.583	0	62.582	-1	73.889	-4	78.872	-8	71.476	-6	68.337	-5	60.671	-2
20/09/24	121	Very dry ground and Sunny	52.806	-4	52.988	-2	53.040	-1	54.582	-1	62.581	-2	73.887	-5	78.871	-10	71.474	-8	68.336	-7	60.670	-4
2/10/24	133	Muddy in lower area, overcast and humid	52.806	-4	52.989	-1	53.041	-1	54.583	0	62.582	-1	73.888	-5	78.871	-9	71.474	-8	68.336	-6	60.670	-3
4/11/24	166	Very hot & very dry ground	52.809	-1	52.991	1	53.043	2	54.586	3	62.589	6	73.904	12	78.890	10	71.490	8	FALSE	7	60.679	6
9/12/24	201	Muddy in lower area, overcast and humid	52.816	6	52.987	-3	53.038	-3	54.581	-2	62.578	-5	73.880	-12	78.862	-18	71.468	-14	68.331	-11	60.669	-4
22/01/25	245	Very hot, muddy in low areas & breezy	52.818	8	52.987	-3	53.036	-5	54.580	-3	62.574	-9	73.879	-13	78.861	-19	71.468	-14	68.329	-13	60.666	-7

APPENDIX C

BESPOKE ENGINEERING MINING PLANS

BALANCE AREA REMEDIATION WORK - FOR PROPOSED EBBWALE RESIDENTIAL SUBDIVISION AT EBBWVALE, EBBWVALE, QLD, 4304



SHEET LIST TABLE	
SHEET NO.	SHEET TITLE
C000	COVER SHEET
C100	PROPOSED CUT AND FILL PLAN
C201	BULK EARTHWORK LAYOUT
C202-C205	EARTHWORK CROSS SECTIONS
C301-C302	EROSION AND SEDIMENT CONTROL PLAN & DETAILS

Property Description
LOT 27 SP220033,
LOT 25 SP220030
Local Authority
IPSWICH CITY COUNCIL

**PRELIMINARY
ISSUE
NOT FOR
CONSTRUCTION**



LOCALITY PLAN
REFERENCE: GOOGLE
NOT TO SCALE

JOB		CLIENT		JOB No.	
TITLE		QUEENSLAND PROPERTY GROUP		Drawn: IA	
PROPOSED RESIDENTIAL SUBDIVISION		EBBWVALE RESIDENTIAL - BALANCE REMEDIATION		Date	
COVER SHEET		DESIGNED: IA		2024-05-29	
		Checked: AA		Drawing No.	
				C000	
				Revision	
				A	



SITE-1
TOTAL CUT:- -1428.949
TOTAL FILL:- 11625.549
TOTAL BALANCE:- 9796.600

Note: Volumes are bulk volumes only. No allowance for clearing and grubbing. Volumes are a guide only.

SITE-2
TOTAL CUT:- -6539.707
TOTAL FILL:- 114537.128
TOTAL BALANCE:- 107997.422

LEGEND:

PROPOSED RETAINING WALL

PROPOSED CUT

PROPOSED FILL

DESIGN CONTOURS

EARTHWORKS NOTES

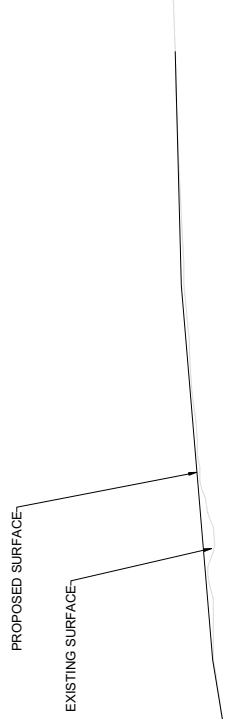
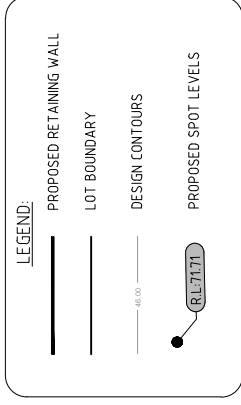
1. THE STANDARD FOR THE PROVISION OF EARTHWORKS ARE TO BE IN ACCORDANCE WITH AUSTRALIAN STANDARD AS 3798 "GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS". MODIFIED TO SUIT ALL LOCAL CONDITIONS, PRACTICES AND LOCAL AUTHORITY STANDARDS AS REQUIRED AND AS APPROVED IN WRITING BY THE SUPERINTENDENT.
2. SUPERVISION, INSPECTION AND TESTING IS TO BE CARRIED OUT IN ACCORDANCE WITH SECTION 8 AND APPENDIX B OF AS 3798. FOR ALL STRUCTURAL FILL THE SCOPE OF SERVICES TO BE PROVIDED BY THE GEOTECHNICAL TESTING AUTHORITY IS TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE SUPERINTENDENT. SUPERVISION IS NOT PERMITTED FOR STRUCTURAL FILL, BUT IS ACCEPTABLE FOR NONSTRUCTURAL FILL. REQUIREMENT 5, LEVEL 3 CLEARED VEGETATION SHALL BE MULCH AND DISPOSED OF OFFSITE. BURNING OFF IS NOT CONSIDERED AN ACCEPTABLE MEANS OF DISPOSAL AND WILL NOT BE APPROVED.
3. EARTHWORKS LEVELS SHOWN ON DRAWINGS ARE TO FINISHED SURFACE LEVEL AND ARE TO INCLUDE TOPSOIL WHERE PRIOR TO WORKS. THE CONTRACTOR IS TO CHECK AND CONFIRM ANY STRUCTURES OR FENCING ENCRoACHING THE WORKS AREA AND NOTIFY THE SUPERINTENDENT.
4. ALL SPOT HEIGHTS ARE GENERALLY FOR THE CORNER OF A LOT OR TOP/BOTTOM OF A BATTER, AND ARE FOR ASSISTANCE ONLY. IF A DISCREPANCY OCCURS BETWEEN CONTOURS AND SPOT HEIGHTS, CONTACT SUPERINTENDENT FOR DIRECTION.
5. THE ROAD PAVEMENT DEPTH ALLOWED IN EARTHWORKS CALCULATIONS ARE BASED ON THE MINIMUM PAVEMENT THICKNESS FOR STRATA IS TO BE TREATED IN ACCORDANCE WITH THE SPECIFICATION PRIOR TO PLACING ANY FILL.
6. THE ROAD PAVEMENT DEPTHS ALLOWED IN EARTHWORKS CALCULATIONS ARE BASED ON THE MINIMUM PAVEMENT THICKNESS FOR STRATA IS TO BE TREATED IN ACCORDANCE WITH THE SPECIFICATION PRIOR TO PLACING ANY FILL.
7. THE ROAD PAVEMENT DEPTHS ALLOWED IN EARTHWORKS CALCULATIONS ARE BASED ON THE MINIMUM PAVEMENT THICKNESS FOR STRATA IS TO BE TREATED IN ACCORDANCE WITH THE SPECIFICATION PRIOR TO PLACING ANY FILL.
8. TOPSOIL AND SUBSOIL SHOULD BE STOCKPILED SEPARATELY.
9. THE ROAD PAVEMENT DEPTHS ALLOWED IN EARTHWORKS CALCULATIONS ARE BASED ON THE MINIMUM PAVEMENT THICKNESS FOR STRATA IS TO BE TREATED IN ACCORDANCE WITH THE SPECIFICATION PRIOR TO PLACING ANY FILL.
10. ALL FOOTPATHS, BATTERS, ALLOTMENT FILL AREAS AND DISTURBED AREAS SHALL BE TOPSOILED FROM ONSITE STOCKPILES. THE TOPSOIL SHALL BE SCREENED PRIOR TO PLACING.
11. THE LOCATION OF RETAINING WALLS RELATIVE TO PROPERTY BOUNDARIES SHOULD BE AS SHOWN ON THE RETAINING WALL SUPERINTENDING ENGINEER PRIOR TO WORKS.
12. AT COMPLETION OF RETAINING WALL CONSTRUCTION, THE CONTRACTOR SHALL INSTALL SAFETY FENCING ON TOP OF ANY WALLS THAT ARE GREATER THAN 1.0m HIGH.
13. ALL ON-SITE VEHICLES AND MACHINERY TO REMAIN A MINIMUM DISTANCE FROM RETAINING WALL EQUIVALENT TO THE HEIGHT OF THE WALL. IF THERE ARE ANY OTHER WALLS WITHIN INFLUENCE OF THIS WALL, THE ENGINEERS IS TO BE CONTACTED FOR RE-DESIGN.
15. EXTENT OF RETAINING WALL MAY BE DETERMINED ON SITE IN CONSULTATION WITH THE ENGINEER.

PROJECT FILL
SITE -2



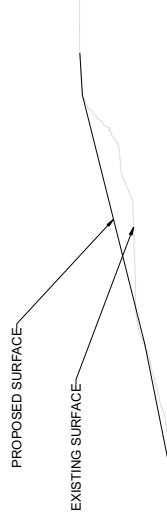
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CONSTRUCTION

REVIEWS		DATE		BY	
A	CONSTRUCTION ISSUE	29.08.24	IA	AA	CHK
R.F.E.O.		DRIS AHMAD		RPEC 09127	
BESPOKE ENGINEERING SOLUTIONS		CIVIL STRUCTURAL HYDRAULIC PROJECT MANAGEMENT		Head Office: Phone: (07) 3801 4449 - (07) 38020000	
Address: Unit 1 / 3974 Pacific Highway, Loganholme QLD 4129		W: www.bespokeeng.com.au		E: admin@bespokeeng.com.au	
SCALE		NORTH		CLIENT	
1:1000 - A1		1:2000 - A3		QUEENSLAND PROPERTY GROUP	
JOB		DRAWN		IA	
PROPOSED RESIDENTIAL SUBDIVISION		DESIGNED		IA	
EBBWALE RESIDENTIAL - BALANCE REMEDIATION		CHECKED		AA	
TITLE		JOB NO.		B774	
PROPOSED CUT AND FILL PLAN		DATE		2024-05-29	
		DRAWING NO.		C100	
		REVISION		A	



DATUM = 16.000					
CONTROL LINE CHAINAGE		-0.003	38.520	38.521	40.179
		0.000	38.521	38.521	
CUT / FILL DEPTH					
EXISTING SURFACE LEVEL					
FINISHED SURFACE LEVEL					

A1 SCALE: H 1:500, V 1:500
SECTION B



DATUM = 21.400									
FINISHED SURFACE LEVEL	44.000								
	44.001								
EXISTING SURFACE LEVEL	44.000								
CUT / FILL DEPTH	0.001								
	0.000								
CONTROL LINE CHAINAGE	0.000								
	0.000								
	44.000								
	44.001								
	45.000								
	46.000								
	47.000								
	48.000								
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	71.000								
	72.000								
	73.000								
	74.000								
	75.000								

A1 SCALE: H 1:500, V 1:500
SECTION A

PRELIMINARY
ISSUE
NOT FOR
CONSTRUCTION



A		CONSTRUCTION ISSUE			R/P.E.Q.	 BESPOKE ENGINEERING SOLUTIONS CIVIL STRUCTURAL HYDRAULIC PROJECT MANAGEMENT Head Office Phone: (07) 3501 4446 (07) 36038900 Address Unit 1 350A Pacific Highway, Loganholme QLD 4129 W: www.bespokeengineering.com.au E: admin@bespokeeng.com.au	CUSTOMER INFORMATION CLIENT QLD PROPERTY GROUP JOB PROPOSED RESIDENTIAL SUBDIVISION EBBWALE RESIDENTIAL - BALANCE REMEDIATION TITLE EARTHWORK CROSS SECTIONS	DRAWING INFORMATION SHEET NO. 1 OF 1 SCALE 0 5 10 15 20 25m Scale 1:500 - A1 NORTH DATE 03.06.24 DESIGNED BY IA CHECKED BY AA REVISIONS DRAWN BY IA Job No. B774 Date 2024-06-03 Drawing No. C202 Revision A
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Property Description
LOT 25 SP220030 & LOT 27 SP220033
Local Authority
IPSWICH CITY COUNCIL

LEGEND:

- PROPOSED RETAINING WALL
- LOT BOUNDARY
- DESIGN CONTOURS
- PROPOSED SPOT LEVELS

EXISTING SURFACE

PROPOSED SURFACE

DATUM = 13.400

CONTROL LINE CHAINAGE	0	36.000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															</
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<u>Property Description</u>	<u>Local Authority</u>
LOT 25 SP220030 & LOT 27 SP220033	IPSWICH CITY COUNCIL

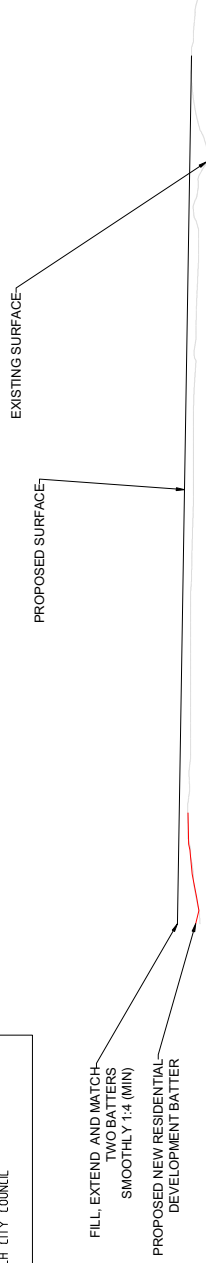
LEGEND:

PROPOSED RETAINING WALL

LOT BOUNDARY

DESIGN CONTOURS

PROPOSED SPOT LEVELS

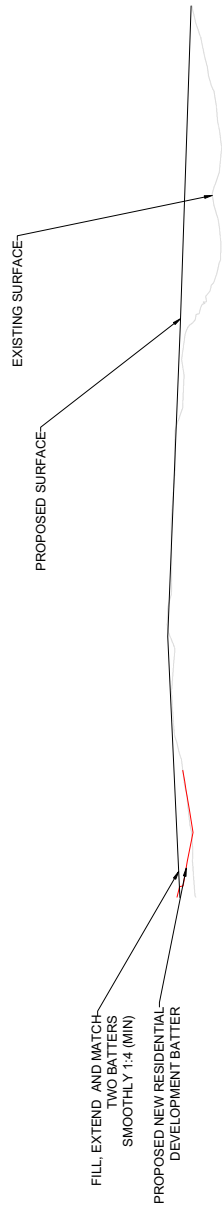


DATUM = 39.300					
CONTROL LINE CHAINAGE		0+001			
	CUT / FILL DEPTH				
		10	2.736	64.880	67.316
		20	1.595	65.660	67.155
		30	1.854	65.140	66.994
		40	1.833	65.000	66.833
		50	1.672	65.000	66.672
		60	1.511	65.000	66.511
		70	1.604	64.746	66.350
		80	1.689	64.500	66.189
		90	1.528	64.500	66.028
		100	1.520	64.347	65.867
		110	1.706	64.000	65.706
		120	1.821	63.724	65.545
		130	1.854	63.530	65.384
		140	1.741	63.482	65.223
		150	1.439	63.623	65.062
		160	-0.023	64.924	64.901
		172.391		64.837	63.613
FINISHED SURFACE LEVEL	EXISTING SURFACE LEVEL				

DATUM = 39.300

A1 SCALE: H 1:500, V 1:500

SECTION F

[illegible]

DATUM = 43.500

A1 SCALE: H 1:500. V 1:500.

SECTION E

PRELIMINARY
ISSUE

**NOT FOR
CONSTRUCTION**

[illegible]

<u>Property Description</u>	<u>Local Authority</u>
LOT 25 SP220030 & LOT 27 SP220033	IPSWICH CITY COUNCIL

FILL, EXTEND AND MATCH-
TWO BATTERS
SMOOTHLY 1:4 (MIN)

PROPOSED NEW RESIDENTIAL
DEVELOPMENT BATTER

PROPOSED SURFACE-

EXISTING SURFACE



LEGEND:

PROPOSED RETAINING WALL

LOT BOUNDARY

DESIGN CONTOURS

PROPOSED SPOT LEVELS

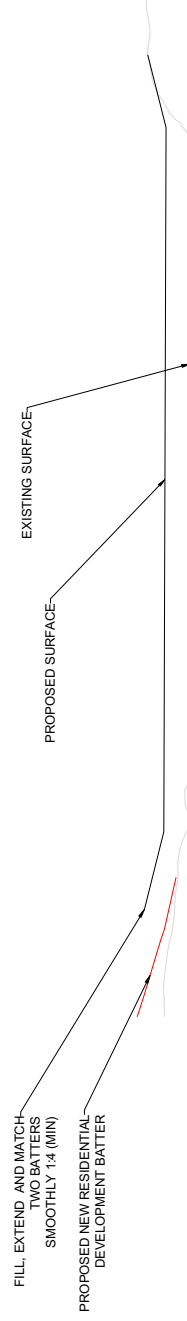


DATUM = 30.700

STATION	FINISHED SURFACE LEVEL		EXISTING SURFACE LEVEL		CUT / FILL DEPTH	CONTROL LINE CHAINAGE	
	CH	EL	CH	EL		CH	EL
20		56.481					
0			55.093	60.928	5.835		
10			54.478	58.425	3.947		
20			54.105	55.923	1.818		
30			53.807	54.031	0.224		
40			53.549	54.675	1.126		
50			53.384	55.320	1.936		
60			53.351	55.964	2.613		
70			53.891	56.609	2.718		
80			53.802	57.253	3.451		
90			54.143	57.898	3.755		
100			53.849	58.542	4.693		
110			55.934	59.187	3.253		
120			61.340	59.831	-1.509		
130			62.749	60.476	-2.273		
138.132	138.132	61.000			0.000		
140			61.347	61.464	0.117		
150			63.240	63.947	0.707		
157.869	157.869	65.523			0.254		

A1 SCALE: H 1:500. V 1:500.

SECTION H



DATUM = 32.400

CONTROL LINE CHAINAGE	-20	
	CUT / FILL DEPTH	EXISTING SURFACE LEVEL
0	5.662	64.119
10	3.948	61.617
14.824	4.268	60.460
20	3.947	60.447
30	4.921	60.421
40	5.130	60.395
50	5.330	60.370
60	5.344	60.344
70	5.102	60.318
80	4.793	60.293
90	4.673	60.267
100	4.644	60.241
110	4.540	60.216
120	4.496	60.190
130	5.080	60.164
140	5.139	60.139
146.45	3.236	60.122
150	1.181	59.828
160		61.009
160.38		63.500
170.38		63.752

A1 SCALE: H 1:500. V 1:500.

SECTION G



**PRELIMINARY
ISSUE
NOT FOR
CONSTRUCTION**

[illegible]

Property Description
lot 25 9p220030 & lot 27 9p220033
Local Authority
IPSWICH CITY COUNCIL



CONSTRUCTION ISSUE
REVISED

DATE
30/08/24

BY
AA

CHK
AA

APPROVED
IDRIS AHMAD
RPEQ 09127



BESPOKE ENGINEERING SOLUTIONS
CIVIL | STRUCTURAL | HYDRAULIC | PROJECT MANAGEMENT
Head Office: Phone: (07) 3801 4449 - (07) 38020000
Address: Unit 43 Baboon Rd, Shailer Park, Qld, 4128
W: www.bespokeeng.com.au | E: admin@bespokeeng.com.au

SCALE

N.T.S

NORTH



CLIENT

QUEENSLAND PROPERTY GROUP

JOB

PROPOSED RESIDENTIAL SUBDIVISION
EBBWALE RESIDENTIAL - BALANCE REMEDIATION

TITLE

EROSION AND SEDIMENT CONTROL PLAN & DETAIL

Drawn:

IA

Job No.

B774

Designed:

IA

Date

2024-05-30

Checked:

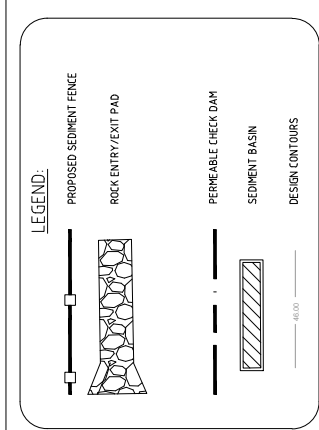
AA

Drawing No.

C301

Revision

A



SEDIMENT & EROSION CONTROL NOTES:

PRIOR TO THE COMMENCEMENT OF CONSTRUCTION

1. VOID STRIPPING & EXCAVATING UNTIL NECESSARY.
2. CONSTRUCTION OF AN ENTRY/EXIT POINT TO THE SITE SHOULD BE MANAGED SO THAT SEDIMENT IS NOT TRACKED OFF THE SITE.

BULK EARTHWORKS

3. TOPSOIL SHOULD BE STOCKPILED ON SITE FOR LATER USE.
4. WHERE PRACTICABLE MAINTAIN VEGETATION IN A HEALTHY STATE DURING THE CONSTRUCTION PROCESS.
5. WHEN UP-SLOPE WATER IS DIVERTED AROUND A WORK SITE IT IDEALLY SHOULD BE DISCHARGED AS SHEET FLOW THROUGH AN UNDISTURBED AREA.

CONSTRUCTION OPERATIONS

6. THE PLAN SUGGESTS MINIMUM SEDIMENT & EROSION PROTECTION. THE CONTRACTOR SHALL TAKE ANY OTHER MEASURES AS NECESSARY IN CONSULTATION WITH THE SUPERVISING ENGINEER.
7. ADHERE TO STOCKPILE INLET PROTECTION DIAGRAM ON IPWEA.D. STD. DWG. D-004.1.
8. PLACE 75mm THICK PLATE OVER MANHOLES UNTIL C/F RINGS & LID ARRIVE. THIS IS TO KEEP SEDIMENT OUT OF DRAINAGE SYSTEM.
9. SAND BAGS ARE TO BE PLACED AT 45° TO THE ROAD AS SPECIFIED:
 - (a) ROAD GRADE (0.5% TO 5%) - 75m MAX. CENTRES
 - (b) ROAD GRADE (5% TO 10%) - 5m MAX. CENTRES
 - (c) ROAD GRADE (10% TO 15%) - 5m MAX. CENTRES
 - (d) ROAD GRADE (15% TO 20%) - 5m MAX. CENTRES
10. ERODABLE MATERIAL MUST NOT BE PLACED WITHIN THE ROAD RESERVE (INCLUDING ACCIDENTAL SPILLAGE & TRACKING OF SUCH MATERIALS ONTO THE ROAD) THAT CANNOT BE PREVENTED THROUGH REASONABLE MEANS. MUST BE:
 - (a) REMOVED IMMEDIATELY IF RAINFALL IS IMMINENT OR OCCURRING.
 - (b) REMOVED PRIOR TO THE END OF THE DAY'S WORK IF RAINFALL IS NOT EXPECTED.
11. MATERIALS SHOULD BE SWEEPED FROM THE ROAD, NOT WASHED DOWN THE GUTTER.
12. ALL SOLID WASTE SHOULD BE STORED ON SITE IN SUCH A MANNER THAT IT IS PREVENTED FROM LEAVING THE SITE EITHER BY THE ACTION OF WIND OR WATER.
13. SMALLER MATERIALS, SUCH AS LITTER, SHOULD BE CONTAINED IN COVERED BINS.

SEDIMENT & EROSION CONTROL NOTES:

STOCKPILES

1. STOCKPILES ARE NOT TO BE STORED ON THE FOOTPATH OR THE ROAD RESERVE, UNLESS APPROVED BY COUNCIL.
2. WHERE NECESSARY STOCKPILE LOSSES CAN BE MINIMIZED WITH THE USE OF COVERS.
3. ALL STOCKPILES & BUILDING MATERIAL SHOULD BE LOCATED WITHIN THE SEDIMENT CONTROL ZONE.
4. TO MINIMIZE EROSION & THE LOSS OF SAND & SOIL, STOCKPILES SHOULD NOT BE LOCATED WITHIN AN OVERLAND FLOW PATH. IF IT IS IMPRACTICAL TO AVOID STOCKPILING, STOCKPILES SHOULD BE CONSTRUCTED UP-SLOPE OF THE STOCKPILE TO DIRECT FLOW IN A CONTROLLED MANNER AROUND THE STOCKPILE.

SEDIMENT BARRIERS

SEDIMENT FENCE

5. INSTALL SEDIMENT FENCE(S) ALONG THE LOW SIDE OF THE SITE & IDEALLY ALONG A LINE OF CONSTANT LAND LEVEL TO PREVENT THE CONCENTRATION OF STORMWATER RUNOFF. IN AREAS WHERE IT IS EITHER UNDESIRABLE OR IMPRACTICAL TO BURY THE LOWER EDGE OF THE SEDIMENT FENCE, THE LOWER 200mm (MIN) PORTION OF THE FABRIC SHOULD BE PLACED ON THE GROUND UP-SLOPE OF THE FENCE & BURIED UNDER A 100mm (MIN) LAYER OF AGGREGATE REFER IPWEA.D. STD. DWG. D-004.0.

FIELD INLET GULLIES

6. SEDIMENT CONTROLS FOR STORMWATER INLETS LOCATED WITHIN THE PROPERTY BOUNDARIES MAY CONSIST OF GEOTEXTILE FABRIC PLACED EITHER DIRECTLY OVER THE GRATED INLET OR AROUND THE INLET SUPPORT BY A TIMBER FRAME. FIELD INLET PROTECTION IS NECESSARY WHERE INLETS DRAIN AREAS OF BARE & UNPROTECTED SOIL DURING STORMS. PONDING SHOULD BE ALLOWED TO OCCUR AROUND THE STORMWATER INLET TO ASSIST IN THE SETTLING OUT OF SEDIMENTS. REFER IPWEA.D. D-004.1.

PAVED INLET GULLY

7. A ROADSIDE INLET BARRIER IS TO BE INSTALLED, SO THAT IT SHOULD NOT BE ALLOWED TO FULLY BLOCK THE INLET STRUCTURE, ON A HILLSLOPE, SEDIMENT BARRIERS MAY CONSIST OF A TEMPORARY DIRT CONSTRUCTED FROM SAND & GRAVEL BAGS AT LEAST 4 METRES UP-SLOPE FROM THE GULLY INLET.

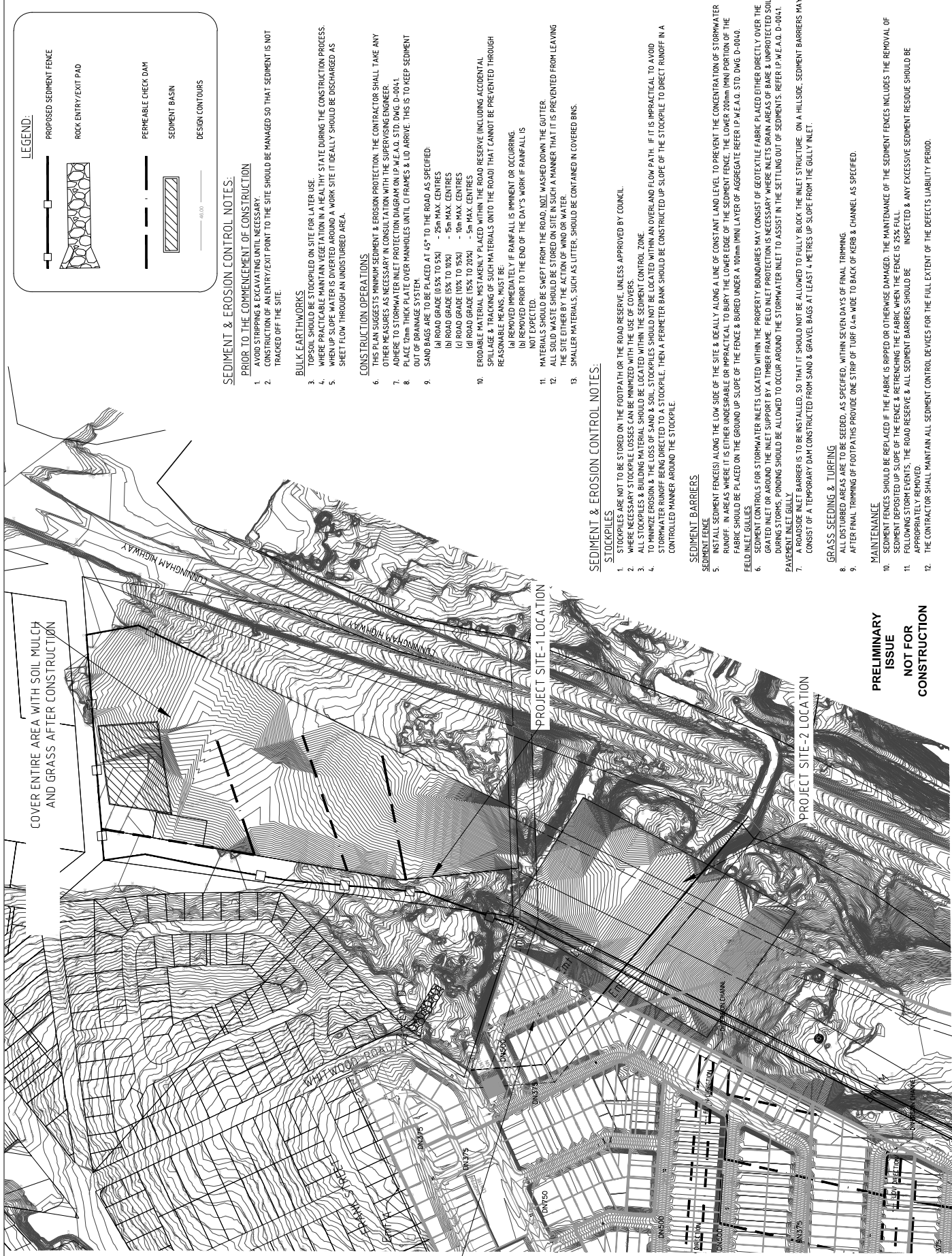
GRASS SEEDING & TURFING

8. ALL DISTURBED AREAS ARE TO BE SEED. AS SPECIFIED, WITHIN SEVEN DAYS OF FINAL TRIMMING.
9. AFTER FINAL TRIMMING OF FOOTPATHS PROVIDE ONE STRIP OF TURF 0.4m WIDE TO BACK OF KERB & CHANNEL AS SPECIFIED.

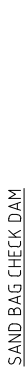
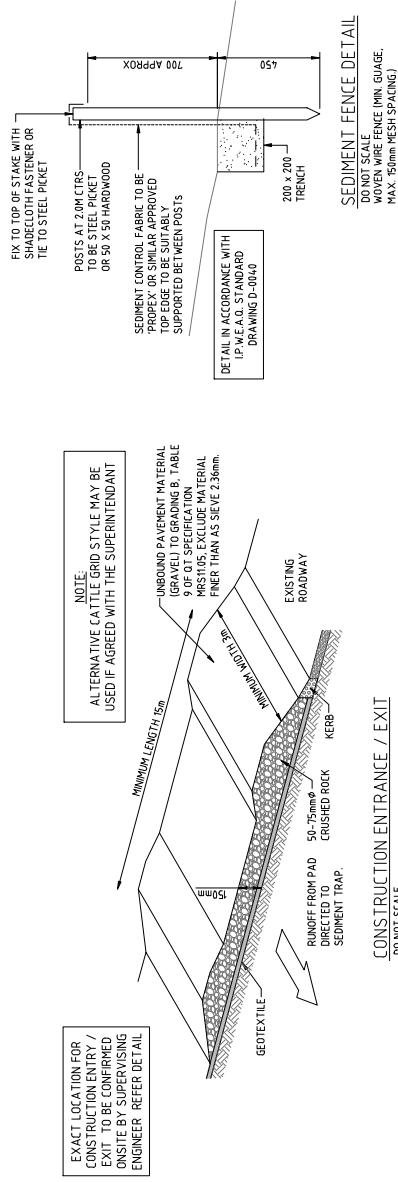
MAINTENANCE

10. SEDIMENT FENCES SHOULD BE REPLACED IF THE FABRIC IS RIPPED OR OTHERWISE DAMAGED. THE MAINTENANCE OF THE SEDIMENT FENCES INCLUDES THE REMOVAL OF SEDIMENT DEPOSITED UP-SLOPE OF THE FENCE & RETENCING WHEN THE FENCE IS 25% FULL.
11. FOLLOWING STORM EVENTS, THE ROAD RESERVE & ALL SEDIMENT BARRIERS SHOULD BE INSPECTED & ANY EXCESSIVE SEDIMENT RESIDUE SHOULD BE APPROPRIATELY REMOVED.
12. THE CONTRACTOR SHALL MAINTAIN ALL SEDIMENT CONTROL DEVICES FOR THE FULL EXTENT OF THE DEFECTS LIABILITY PERIOD.

PRELIMINARY
ISSUE
NOT FOR
CONSTRUCTION



PROPOSED NEW RESIDENTIAL
DEVELOPMENT



**PRELIMINARY
ISSUE
NOT FOR
CONSTRUCTION**

[illegible]