



Douglas Partners

Geotechnics | Environment | Groundwater

Report on
Preliminary Geotechnical Investigation

Proposed Residential Subdivision
Goulburn Street, Marulan

Prepared for
Darraby Pty Ltd

Project 88505.06
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Integrated Practical Solutions





Douglas Partners

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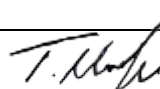

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

Signature	Date
Author 	5 July 2022
Reviewer 	5 July 2022



Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
Unit 2, 73 Sheppard Street
Hume ACT 2620
PO Box 1487
Fyshwick ACT 2609
Phone (02) 6260 2788

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Report on Preliminary Geotechnical Investigation

Proposed Residential Subdivision

Goulburn Street, Marulan

1. Introduction

This report presents the results of a preliminary geotechnical investigation undertaken for a proposed residential subdivision at Goulburn Street, Marulan. The investigation was commissioned by Mr David Matthews of Darraby Pty Ltd with purchase order 039 and was undertaken in accordance with Douglas Partners' proposal 88505.06.P.001.Rev0 dated 15 March 2022.

The aim of the investigation was to assess the subsurface soil and groundwater conditions along approximately 1.6 km of proposed roadways to assist in pavement thickness design and provide advice on possible site classifications for the proposed 124 lots.

The investigation included the excavation of test pits and laboratory testing of selected samples. The details of the field work and laboratory testing are presented in this report, together with comments and recommendations on site classification, site earthworks, excavation conditions, filling placement and pavement design considerations.

It is noted that the investigation was undertaken concurrently with a preliminary site investigation (PSI) for contamination which has been separately reported by Douglas Partners Pty Ltd.

This report must be read in conjunction with the notes "About this Report" which are included in Appendix A.

2. Proposed Development

It is understood that the site is approximately 14.6 ha, with internal roadways of roughly 1,400 m in length, an additional approximately 180 m long entry road and the creation of 124 lots proposed as part of the Stage 3 residential development. Although design details were not available at the time of reporting, it is expected that the road and lots will be constructed with the finish level at about existing grade.

3. +Site Description

The site is a roughly parallelogram shaped parcel of land, located to the west of Portland Street, opposite the western end of Goulburn Street. The maximum dimensions of the site are approximately 485 m east to west and approximately 430 m north to south. The site is located at an elevation of approximately 640 – 650 m Australian Height Datum (AHD). The topography of the region is characterised by

undulating rises and low lying hills with elevations between 600 m and 700 m AHD and slope gradients generally at <10%. The site slopes gently towards the north-west and south-east, divided by a low lying ridgeline which intersect the site.

The site comprises grass paddocks with a farm dam located close to the western boundary and a drainage channel is located just beyond the western boundary. Sporadic stands of trees are located across the site, but mainly centrally in the eastern half. The Main Southern Railway Line is present immediately to the north of the site. The railway line runs through a cutting along the western portion of the northern boundary and along a small embankment on the eastern portion of the northern boundary. Marulan Rural Fire Brigade station is located adjacent to the site boundary in the north-eastern corner of the site, at the intersection of Portland Street and the proposed access road to the subdivision.

The approximate site location and boundary is presented in Figure 1.



Figure 1: Approximate Site Location and Boundary

4. Regional Geology

Reference to Thomas O.D. et al indicates that the site is underlain by undifferentiated Quaternary age residual deposits. Beneath the residual deposits, Marulan Granite and Kerrawarra Dacite is indicated to be present. Marulan Granite, a member of the Athursleigh Suite, is described as Devonian age pinkish grey to green, medium-grained equigranular to strongly porphyritic hornblende-biotite granite, whilst the Kerrawarra Dacite, a member of the Bindook Group, is described as Devonian Age dark grey, crystal-rich dacitic lava, phenocrysts of plagioclase, pyroxene and trace quartz set in groundmass, minor auto-brecciated dacite, and discontinuous horizons of feldspathic siltstone and minor sandstone. The fieldwork confirmed the presence of granitic rock underlying the site.

5. Field Work

5.1 Field Work Methods

The field work comprised the excavation of 35 test pits (Pits 1 – 31 and 33 – 36). The pits were excavated to depths of 0.6 – 2.6 m using a Bobcat E50 mini-excavator fitted with a 300 mm wide bucket. The test pits were logged onsite by a geo-environmental scientist and incorporated the collection of disturbed and bulk samples to assist in strata identification and for laboratory testing. The approximate locations of the test pits are shown on Drawing 1, Appendix B.

Dynamic cone penetrometer tests (AS1289 6.3.2) were undertaken adjacent to the test pit locations to provide an assessment of the in-situ strength of site soils.

It must be noted that Pit 32 was not excavated due to a clerical in the planning stages of the investigation, and was not required as part of the field work.

The test pits were located on site using a handheld GPS unit which is accurate to approximately 3 – 5 m. The reduced levels were not recorded on the logs due to insufficient surface level data, whilst the coordinates provided on the logs for the test locations were interpreted from state survey mapping and must be considered approximate only and not relied on.

5.2 Field Work Results

The test pit logs for this assessment are included in Appendix C. The logs recorded the following general sub-surface profile:

The test pits encountered a relatively uniform subsurface profile of colluvial soils, then residual soils over weathered rock. The typical subsurface sequence can be summarised as follows:

- **TOPSOIL:** generally comprising silty sand or sandy silt with rootlets to a depth of 0.1 m below ground level (bgl) in most test pits except Pits 35 and 36;
- **TOPSOIL FILL:** generally comprising sandy gravel, encountered in Pits 35 and 36 to a depth of 0.1 m bgl;

- **FILL:** low plasticity, brown sandy clay with some fine to coarse grained sand, encountered only in Pit 36 to a depth of 0.4 m bgl;
- **SANDY CLAY/CLAYEY SAND:** generally fine to coarse grained, grey mottled orange clayey sand or low plasticity pale brown sandy clay encountered in all pits except Pits 35 and 36, to depths between 0.2 m and 0.5 m bgl;
- **SILTY CLAY:** medium and high plasticity, firm to very stiff silty clay, to depths of between 0.6 m and 2.0 m bgl. Pit 4 terminated in this strata at a depth of 0.6 m due to refusal, possibly on weathered rock;
- **GRANODIORITE:** very low to medium strength, highly to slightly weathered granodiorite from depths of between 0.6 – 2.0 m bgl to depths of between 0.7 – 2.6 m bgl in all pits except Pit 4.

No groundwater was encountered during the investigation however, wet conditions were encountered in the upper portions of most test pits. However, the test pits were backfilled immediately following excavation precluding longer term monitoring of groundwater levels. Groundwater conditions rarely remain constant and can change seasonally due to variations in rainfall, temperature and soil permeability. For these reasons, it is noted that the moisture condition of the site soils may vary considerably from the time of the investigation compared to at the time of construction.

6. Laboratory Testing

Samples collected from the test pits were tested in the laboratory for measurement of either field moisture content, compaction properties and California bearing ratio (CBR) or plasticity properties. The detailed laboratory test report sheets are given in Appendix D with the results summarised in Tables 1 and 2.

Table 1: Results of Laboratory Testing – Atterberg Limits

Pit	Depth (m)	Description	FMC (%)	LL (%)	PL (%)	PI (%)
3	0.5	Silty Clay	33.0	72	29	43
11	0.6	Silty Clay	21.4	67	29	38
15	0.9	Silty Clay	24.8	52	27	25
30	1.1	Silty Clay	15.3	44	22	22
31	0.6	Silty Clay	24.4	61	21	40
35	0.4	Clayey Sand	11.1	15	13	2

Notes to table

FMC - Field Moisture Content

LL - Liquid Limit

PL - Plastic Limit

PI - Plasticity Index

The Atterberg limits test results indicate that the clay soils tested were of low (Pit 35), medium (Pit 30) and high plasticity.

The CBR testing was carried out on samples compacted to about 100% standard maximum dry density at close to optimum moisture content. The samples were soaked for four days under surcharge loading of 4.5 kg.

Table 2: Results of Laboratory Testing – CBR and Standard Compaction

Pit	Depth (m)	Description	FMC (%)	OMC (%)	SMDD (t/m ³)	CBR (%)
6	0.4 – 0.6	Silty Clay	28.0	27.5	1.50	2.5
9	0.4 – 0.6	Silty Clay	30.0	25.5	1.50	3.0
13	0.4 – 0.6	Silty Clay	21.6	22.5	1.59	3.5
15	0.4 – 0.6	Silty Clay	29.3	27.0	1.54	3.0
17	0.4 – 0.6	Silty Clay	25.9	27.0	1.53	3.0
26	0.4 – 0.6	Silty Clay	22.1	20.0	1.64	3.5
33	0.4 – 0.5	Clayey Sand	23.9	22.5	1.61	3.5
36	0.4 – 0.6	Silty Clay	23.8	22.0	1.58	1.0

Notes to table

FMC - Field Moisture Content

OMC - Optimum Moisture Content (Standard)

SMDD - Maximum Dry Density (Standard)

CBR - California Bearing Ratio

The results indicate the samples tested were 4.5% wet to 1.1% dry of optimum moisture values.

7. Comments

7.1 Earthworks and Site Preparation

7.1.1 Stripping

Site preparation for the construction of pavements should include the removal of vegetation, uncontrolled filling, silty topsoils, moisture impacted soils and other deleterious materials from the proposed construction areas. Based on the results of the investigation, an average topsoil stripping depth of around 0.1 m is expected.

Low plasticity sandy soils were encountered underlying the topsoil to depths of 0.2 – 0.6 m over most of the site. These soils are sensitive to changes in moisture content, which is indicated by relatively weak in situ soil strengths as shown on the test pit logs (refer Appendix C), and can prove difficult to handle and compact and as such, allowance should be made for their removal, pending preceding weather conditions and inspection by a geotechnical engineer.

It is also noted that the test pits across the majority of the site encountered firm to stiff clays to depths of up to 1.2 m. This material would not have sufficient strength to support pavement construction and would either need to be fully removed to expose the underlying rock, or potentially removed to 0.5 – 1.0 m below subgrade level and bridged with a rock material and/or geofabric separating layer. The most appropriate treatment method would best be determined on site during earthworks by a geotechnical engineer.

It is further noted that the test pits around the existing dam (Pits 1, 2 and 17) encountered firm to stiff clays to depths of 0.9 – 1.2 m and as such, weak and wet soils must be expected at the dam base.

Following the completion of surface stripping works and approval by the engineer, the surface should be (where appropriate) tyned, moisture conditioned and compacted to at least 98% standard maximum dry density followed by a test roll in the presence of a geotechnical engineer.

It is noted that some mature trees are scattered across the site and as such some root affected soil will be encountered. The depth of root affected soils can only be determined on-site during site works however allowance should be made for at least 0.5 – 1.0 m but up to 1.5 m of additional stripping in the vicinity of trees.

7.1.2 Site Trafficability

Following periods of wet weather, the surface across the site is expected to be boggy and effectively un-trafficable to all but tracked construction vehicles. Some measures that can be undertaken to reduce the impact of wet weather on the earthworks construction could include:

- Retention of grass cover in areas not being worked on at the time;
- Provide cut surfaces with a slight but even cross-gradient to assist surface drainage;
- “Seal” exposed fill surfaces at the end of each work day by running over with a smooth-wheeled roller;
- Armour temporary access roads with rockfill and limit the area of the site subject to vehicle movements; and
- Formation of swale drains at upslope locations to redirect surface run-off to outside the works area.

7.1.3 Excavation Conditions

Filling, natural soils and bedrock up to very low to low strength should be readily removed using a conventional medium sized dozer or excavator fitted with a toothed bucket possibly with some light ripping in the weathered bedrock, and as such no difficulties are anticipated in these materials.

Where deeper excavations are required (for example for service trenches) and low, or higher, strength rock is expected to be encountered, large excavators fitted with toothed buckets and single tyne rippers would be required at slow production rates.

Whilst no groundwater was observed during the field, it is noted that the extent of groundwater inflow would be dependent on prior weather conditions.

7.1.4 Re-Use of Excavated Material

The topsoil and the underlying low plasticity clayey layer are not considered to be soil suitable for engineering applications. The low plasticity soil can be difficult to handle and compact, and is prone to loss of strength upon saturation. Blending of the non-organic low plasticity soils (in small amounts, say 15 – 20% by volume) with the site clayey soils and weathered rock may produce a suitable material suitable for inclusion in deeper embankment filling. Alternatively, the low plasticity soil could be placed in non-structural applications.

The natural soils underlying the topsoil and low plasticity upper soils generally comprise medium to high and high plasticity silty clay with varying amounts of sand and gravel. The high plasticity clayey soils can be susceptible to shrink/swell movements with a change in moisture conditions. It is considered the reuse of these soils for controlled fill applications should be used with caution. It is advised that if reuse is required and a Class M (moderately reactive) site classification is desired then it should be suitably mixed with a low plasticity granular material and validated by a geotechnical engineer. The ratio of high plasticity clay and low plasticity material is difficult to determine at this stage and should be assessed during construction in conjunction with additional laboratory testing, though it is likely the maximum percentage of allowable clay could yield uneconomical results.

Many of the site soils are wet of their optimum moisture content (OMC), which can make compaction difficult, and would need to be moisture conditioned to within 2% of their OMC prior to re-use.

The wet soil removed from the bases of the existing dam could potentially be re-used, provided they are free of organic material, however extensive drying times must be expected.

Upon excavation, the extremely low to very low strength rock will most likely deteriorate to have similar properties as to clayey sand soil and would be considered suitable for use in general fill and controlled fill areas provided rock particles are broken down to less than 75 – 100 mm in size. As excavation proceeds into low or greater strength rock, it would be expected that cobble and boulder sized rock pieces would be removed, which would need to be crushed to a general maximum particle size of 75mm prior to use within filling areas. Some rock particles, say up to 150 mm would be considered acceptable however only in a small percentage of the overall filling volume, say 5 – 10%.

Soils that are extensively affected by tree roots would be considered unsuitable.

Prior to offsite reuse of material excavated from site, a waste classification assessment should be undertaken in accordance with current NSW Environment Protection Unit guidelines.

7.1.5 Filling Placement and Compaction

Prior to placement of filling, stripped surfaces must be test rolled in the presence of a geotechnical engineer. Any areas exhibiting significant deflections under test rolling should be appropriately treated by over-excavation and replaced with approved filling or other methods recommended by a geotechnical engineer.

Select subgrade filling should be placed in near-horizontal layers of maximum loose thickness of 250 mm and compacted to achieve at least 100% standard maximum dry density ratio. The material should have a moisture content within the range of $\pm 2\%$ of modified optimum at the time of placement.

To validate the filling quality, field inspections and in-situ testing of future earthworks must be undertaken in order to satisfy the requirements for Level 1 controlled filling as indicated in AS 3798 – 2007.

7.2 Pavement Design Considerations

Based on the results of the field investigation and laboratory testing it is suggested that a design subgrade value of 3% be adopted for the natural clays expected at subgrade level over the majority of the site. Should weathered rock be exposed at subgrade level, a CBR of 5% could be adopted. Some subgrade replacement is likely (for example in the vicinity of Pits 6 and 36 where a CBR of 2.5 and 1.0%, respectively, was obtained), however, the extent of which will need to be confirmed by geotechnical engineering inspections and further CBR testing at the time of construction. Depending on the proposed cut/fill depths, the design CBR adopted may need to be amended.

All earthworks should be undertaken under close supervision and consultation with the geotechnical consultant in order to avoid any unnecessary over-excavation.

Prevailing weather conditions at the time of construction and the control that can be exercised over construction traffic will be critical in achieving satisfactory subgrade performance. If pavement construction does not immediately follow subgrade preparation (thus exposing the subgrade to weather and traffic), subgrade deterioration would be expected, thus requiring rectification.

Consideration must be given to installation of subsoil drains either side of the road to protect the pavement and subgrade. Subsoil drains should extend a minimum of 0.5 m depth below the top of subgrade level.

7.3 Site Classification

Classification of residential lots within the site should comply with the requirements of AS 2870 – 2011. Based on the fieldwork carried out during the current investigation, the natural subsurface profiles in areas of shallow bedrock would be expected to be Class M (moderately reactive) to Class H1 (highly reactive), and where deeper soil profiles are present, would be expected to be Class M, Class H1 and possibly Class H2 where extensive high plasticity soils are present.

Residential lots, which are subject to filling, are also likely to receive a range of site classifications (Class M* or Class H1*/H2*) depending on the depth and type of filling material. All filling, which is to be placed within residential allotments, will need to be undertaken as controlled fill (Level 1) to avoid a Class P (problem) site classification.

The presence of mature trees, either existing or removed, would also influence the site classifications, with additional shrink/swell movements caused by the tree root system, and technically require Class P site classifications. In some cases, it may increase the site classification to the next higher classification from a reactivity perspective. Furthermore, lots that are impacted by existing uncontrolled fill, moisture impacted soils or groundwater seepages (if encountered), would also technically require a Class site classification.

8. References

- Thomas O.D., Johnston A.J., Scott M.M., Pogson D.J., Sherwin L. and MacRae G.P., 2013, Goulburn 1:100 000 Geological Sheet 8828, 1st edition. Geological Survey of New South Wales, Sydney.
- AS 3798-2007 'Guidelines on Earthworks for Commercial and Residential Developments', Standards Association of Australia.
- AS 2870 – 2011 'Residential Slabs and Footings', Standards Association of Australia.

9. Limitations

Douglas Partners (DP) has prepared this report for this project at Goulburn Street, Marulan in accordance with DP's proposal dated 15 March 2022 and purchase order 039 received from David Matthews of Darraby Pty Ltd dated 21 March 2022. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Darraby Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope of work for this investigation/report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of fill of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such fill may contain contaminants and hazardous building materials.

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

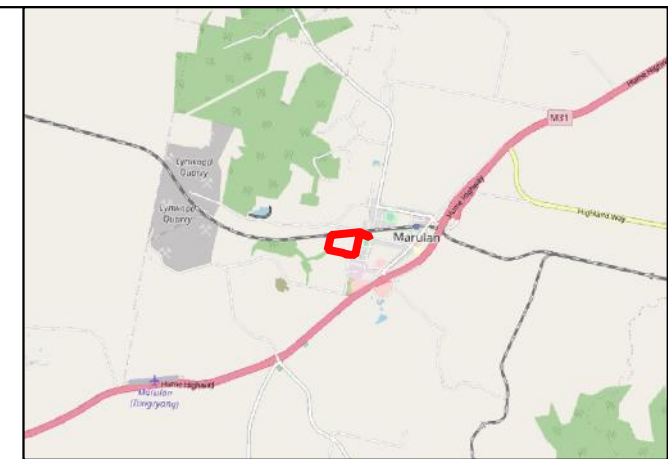
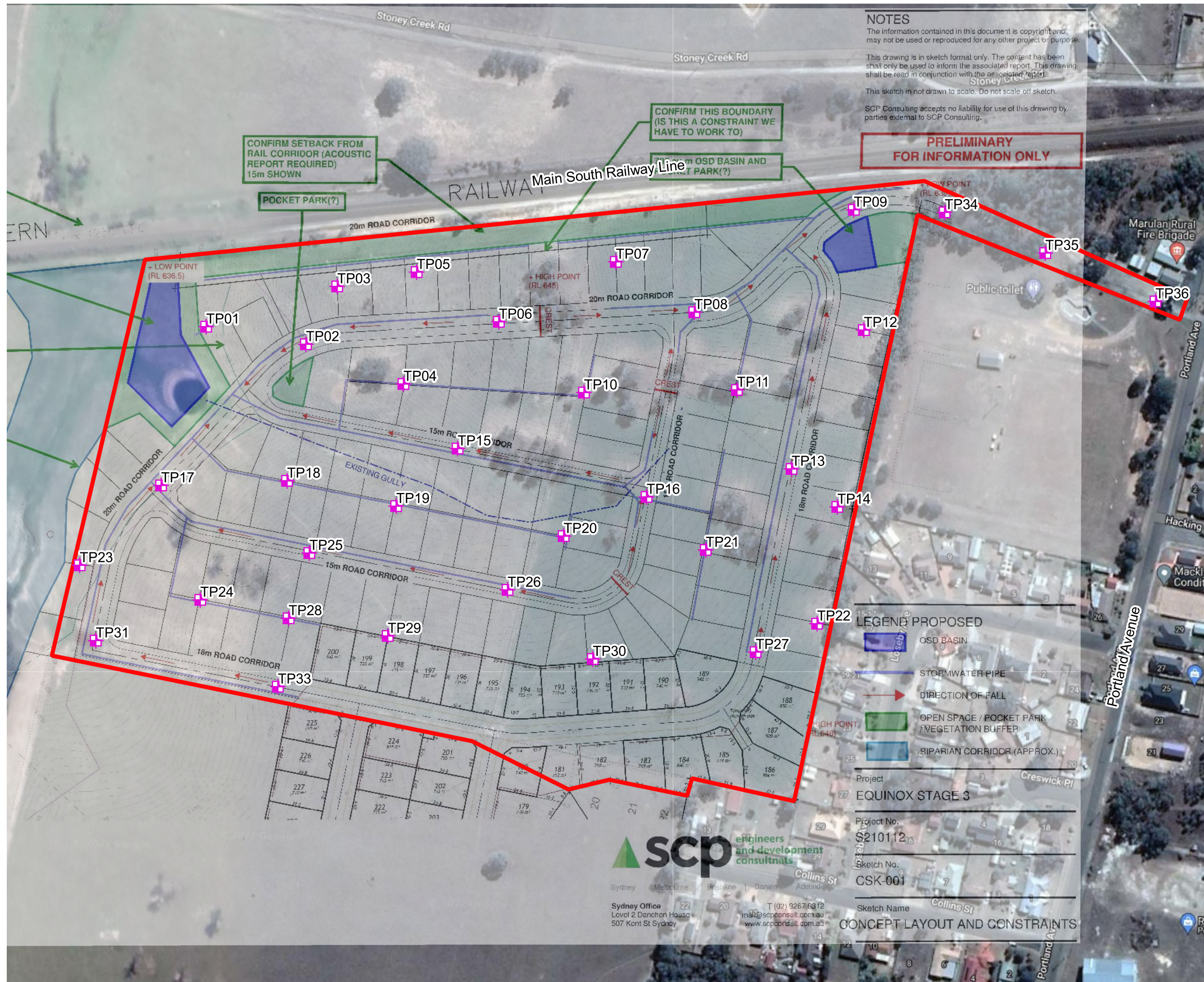
Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

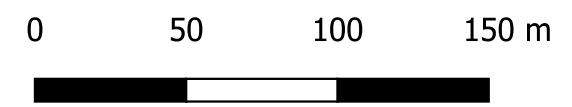
Drawing 1



LOCALITY MAP

- Notes:
1. Basemap from Google Earth
 2. Test locations shown are approximate only

- Legend
- Approximate Site Boundary
 - Proposed Test Pit Locations



Appendix C

Explanatory Notes
Test Pit Logs



Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low

reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:
4,6,7
N=13
- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:
15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.



Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)

- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)

- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;

- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
Soil tends to stick together.
Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- 'Moist, dry of plastic limit' or 'w < PL' (i.e. hard and friable or powdery).
- 'Moist, near plastic limit' or 'w ≈ PL' (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- 'Moist, wet of plastic limit' or 'w > PL' (i.e. soils usually weakened and free water forms on the hands when handling).
- 'Wet' or 'w ≈ LL' (i.e. near the liquid limit).
- 'Wet' or 'w > LL' (i.e. wet of the liquid limit).



Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $Is_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
Highly weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately weathered	MW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	No signs of decomposition or staining.
<i>Note: If HW and MW cannot be differentiated use DW (see below)</i>		
Distinctly weathered	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Douglas Partners



Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U ₅₀	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

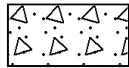
General



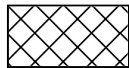
Asphalt



Road base



Concrete



Filling

Soils



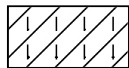
Topsoil



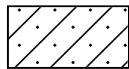
Peat



Clay



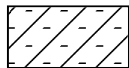
Silty clay



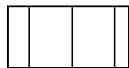
Sandy clay



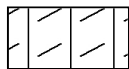
Gravelly clay



Shaly clay



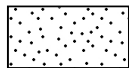
Silt



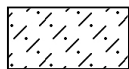
Clayey silt



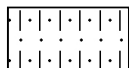
Sandy silt



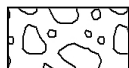
Sand



Clayey sand



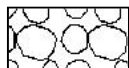
Silty sand



Gravel



Sandy gravel



Cobbles, boulders



Talus

Sedimentary Rocks



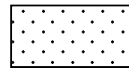
Boulder conglomerate



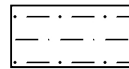
Conglomerate



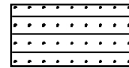
Conglomeratic sandstone



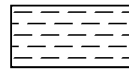
Sandstone



Siltstone



Laminite



Mudstone, claystone, shale

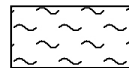


Coal

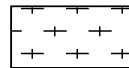


Limestone

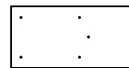
Metamorphic Rocks



Slate, phyllite, schist

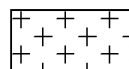


Gneiss

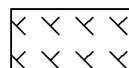


Quartzite

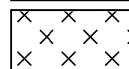
Igneous Rocks



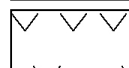
Granite



Dolerite, basalt, andesite



Dacite, epidote



Tuff, breccia



Porphyry

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 773930
NORTHING: 6154852

PIT No: 1
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1								
	0.3	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Aluvial		E	0.5								
	0.8	Silty CLAY (CH): high plasticity, pale orange, mottled grey, trace fine to coarse grained sand, moist, w~PL, stiff, Residual		E	1.0								
	0.9	Silty CLAY (CI/CH): medium to high plasticity, orange brown, mottled yellow, with fine to coarse grained sand, moist, w~PL, stiff, Residual		E	1.0								
	1	GRANODIORITE: fine to coarse grained, orange brown, mottled grey, low strength, highly weathered, highly fractured		E	1.0								
	1.8	-from 1.6m, grey, mottled orange brown, low to medium strength, moderately to high weathered, fractured											
	2	Pit discontinued at 1.8m -slow progress											

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 773932
NORTHING: 6154851

PIT No: 2
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1									
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Alluvial												
		Silty CLAY (CH): high plasticity, pale orange, mottled grey, trace fine to coarse grained sand, moist, w~PL, stiff, Residual		B D E	0.4 0.5 0.6									
	0.8	Silty CLAY (CI/CH): medium to high plasticity, orange brown, mottled yellow, with fine to coarse grained sand, moist, w~PL, Residual												
1	1.0	GRANODIORITE: fine to coarse grained, yellow brown, low to medium strength, moderately to highly weathered, fractured		E D	1.0 1.1									
	1.3	Pit discontinued at 1.3m -slow progress												
	2													

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774020
NORTHING: 6154877

PIT No: 3
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1									
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Alluvial												
		Silty CLAY (CH): high plasticity, pale orange, mottled grey, trace fine to coarse grained sand, moist, w~PL, stiff, Residual		D	0.5									
	0.6	Silty CLAY (CI/CH): medium to high plasticity, orange brown, mottled yellow, with fine to coarse grained sand, moist, w~PL, stiff, Residual		E										
	0.8	GRANODIORITE: fine to coarse grained, yellow brown, very low to low strength strength, highly weathered, fractured		E	1.0									
		-from 1.2m, low to medium strength, highly to moderately weathered		D	1.2									
	1.4	Pit discontinued at 1.4m -slow progress												

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774057
NORTHING: 6154815

PIT No: 4
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1									
	0.3	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, trace cobbles and boulders, moist to wet, w>PL, firm, Alluvial		E	0.1									
	0.3	Silty CLAY (CI/CH): medium to high plasticity, orange brown, mottled yellow, with fine to coarse grained sand, moist, w~PL, stiff, Residual		D	0.4									
	0.6	Pit discontinued at 0.6m -refusal		E	0.5									
	1													
	2													

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon, surface boulder and rocky outcrop

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774070
NORTHING: 6154884

PIT No: 5
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1									
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Alluvial												
		Silty CLAY (CH): high plasticity, pale orange, mottled grey, trace fine to coarse grained sand, moist, w~PL, stiff, Residual		E	0.5									
	0.7	Silty CLAY (CI/CH): medium to high plasticity, orange brown, mottled yellow, with fine to coarse grained sand, moist, w~PL, stiff, Residual												
	0.9	GRANODIORITE: fine to coarse grained, yellow brown, low to medium strength, moderately to highly weathered, fractured		E	1.0									
	1.2	-from 1.1m, medium to high strength, moderately weathered												
		Pit discontinued at 1.2m -refusal												

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774118
NORTHING: 6154854

PIT No: 6
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)										
				Type	Depth	Sample	Results & Comments		5	10	15	20							
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1														
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Alluvial																	
		Silty CLAY (CH): high plasticity, pale orange, mottled grey, trace fine to coarse grained sand, moist, w~PL, stiff, Residual			0.4		pp = 280-310												
				B	0.5														
				E	0.6														
	0.8	Sandy CLAY (CI): medium plasticity, orange, mottled grey, fine to coarse grained sand, moist to dry, w<PL, stiff, Residual																	
	1			D	1.0														
				E															
	1.2	GRANODIORITE: fine to coarse grained, yellow brown, low strength, highly weathered, highly fractured																	
2	2.0	Pit discontinued at 2.0m -slow progress																	

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774194
NORTHING: 6154893

PIT No: 7
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1									
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Alluvial												
		Silty CLAY (CH): high plasticity, orange brown, mottled grey, with fine to coarse grained sand, moist to dry, w~PL, very stiff, Residual		D	0.5		pp = 280-350							
	0.8	Silty CLAY (CI/CH): medium to high plasticity, grey, mottled orange, trace fine to coarse grained sand, moist to dry, w~PL, stiff to very stiff, extremely weathered, Residual		E	1.0									
	1.1	Silty CLAY (CI): medium plasticity, grey white, mottled red, with fine to coarse grained sand, trace fine gravel and granodiorite fragments, moist to dry, w~PL, stiff to very stiff, extremely weathered		D	1.5									
	2.0	GRANODIORITE: fine to coarse grained, grey white, low to medium strength, moderately weathered, fractured												
	2.2	Pit discontinued at 2.2m -slow progress												

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774243
NORTHING: 6154861

PIT No: 8
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1								
	0.3	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Alluvial		E	0.3								
	0.7	Sandy CLAY (CI): medium plasticity, orange, mottled grey, fine to coarse grained sand, moist to dry, w~PL, stiff, Residual		B E	0.4 0.5 0.6								
	1.0	Silty CLAY (CH): high plasticity, grey, mottled orange, with fine to coarse grained sand, moist to dry, w~PL, stiff to very stiff		D E	0.8 1.0								
	1.2	GRANODIORITE: fine to coarse grained, orange brown, low to medium strength, highly to moderately weathered, fractured											
	1.4	Pit discontinued at 1.4m -slow progress											

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
PID	Photo ionisation detector (ppm)	PL(A)	Point load axial test Is(50) (MPa)
PL(D)	Point load diametral test Is(50) (MPa)	pp	Pocket penetrometer (kPa)
S	Standard penetration test	S	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774343.9
NORTHING: 6154926

PIT No: 9
PROJECT No: 88505.06
DATE: 28/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, with rootlets, moist to wet, TOPSOIL		E	0.1									
	0.3	Clayey SAND (SC): fine to coarse grained, grey mottled orange, moist to wet, medium dense, alluvial												
	0.4	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, very stiff, residual		B	0.4		pp = 220-250							
	0.5			D	0.5									
	0.6			E	0.6			pp = 220-250						
	0.7	Silty CLAY (CI/CH): medium to high plasticity, grey mottled orange, trace fine to coarse grained sand and fine gravel, moist to dry, w<PL, very stiff, extremely weathered		D	0.7									
	0.8			D	0.8			pp = 260-290						
	1.0			D	1.0									
	1.1	GRANODIORITE: fine to coarse grained, orange brown, medium strength, moderately weathered												
	1.2	Pit discontinued at 1.2m -slow progress												

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774174
NORTHING: 6154819

PIT No: 10
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1									
	0.3	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Alluvial												
	0.8	Silty CLAY (CH): high plasticity, orange brown, mottled grey, with fine to coarse grained sand, moist, w~PL, stiff, Residual		D	0.5		pp = 200-210 pp = 150-190							
	1.0	Silty CLAY (CI): medium plasticity, grey, mottled orange, with fine to coarse grained sand, trace fine gravel and granodiorite fragments, moist, w~PL, stiff to very stiff		D	0.9		pp = 180-210							
	1.0	GRANODIORITE: fine to coarse grained, grey, mottled orange, low to medium strength, moderately to highly weathered, fractured		E	1.0									
	1.2	Pit discontinued at 1.2m -slow progress												

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774269.7
NORTHING: 6154811

PIT No: 11
PROJECT No: 88505.06
DATE: 28/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1								
	0.25	Clayey SAND (SC): fine to coarse grained, grey mottled orange, moist to wet, medium dense, alluvial		D	0.3								
	0.4	Silty CLAY (CH): high plasticity, pale brown, mottled orange, trace fine grained sand, moist to dry, w~PL, stiff, alluvial		E	0.5								
	0.7	Silty CLAY (CI/CH): medium to high plasticity, grey mottled orange, trace fine to coarse grained sand and fine gravel, moist to dry, w<PL, very stiff, extremely weathered		D	0.6								
	0.9	GRANODIORITE: fine to coarse grained, orange brown, low strength, moderately weathered		E	1.0								
1	1.0	Pit discontinued at 1.0m -slow progress											
	2												

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

- Sand Penetrometer AS1289.6.3.3
- Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774350
NORTHING: 6154842

PIT No: 12
PROJECT No: 88505.06
DATE: 28/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)									
				Type	Depth	Sample	Results & Comments		5	10	15	20						
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1													
	0.2	Clayey SAND (SC): fine to coarse grained, grey mottled orange, moist to wet, medium dense, alluvial																
		Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, very stiff, residual		D	0.4		pp = 250-300											
				E	0.5		pp = 250-300											
	0.6	Silty CLAY (CI/CH): medium to high plasticity, grey mottled orange, trace fine to coarse grained sand and fine gravel, moist to dry, w<PL, very stiff, extremely weathered																
	0.8	GRANODIORITE: fine grained, orange brown, mottled grey, very low to low strength, highly weathered																
	1			D	1.0													
		-from 1.1m, highly to moderately weathered		E														
	1.4	Pit discontinued at 1.4m -slow progress																

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774304.4
NORTHING: 6154761

PIT No: 13
PROJECT No: 88505.06
DATE: 28/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1		PID=1.2						
	0.3	Clayey SAND (SC): fine to coarse grained, grey mottled orange, moist to wet, medium dense, alluvial		E	0.3								
	0.4	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist, w~PL, soft to firm, alluvial		E	0.4		pp = 200-250						
	0.5	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, very stiff, residual		B D E	0.5		pp = 250-290						
	0.6	Sandy CLAY (CI/CH): grey brown, mottled orange, fine to coarse grained sand, moist to dry, w~PL, stiff to very stiff		E	0.6								
	0.8			D	0.8		pp = 180-250						
	1.0	GRANODIORITE: fine to coarse grained, grey brown mottled orange, medium strength, moderately weathered		E	1.0								
	1.2	Pit discontinued at 1.2m -slow progress											

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 77433.5
NORTHING: 6154737

PIT No: 14
PROJECT No: 88505.06
DATE: 28/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1								
	0.2	Clayey SAND (SC): fine to coarse grained, grey mottled orange, moist to wet, medium dense, alluvial											
		Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, very stiff, residual											
	0.6			D	0.5								
	0.7	Silty CLAY (CI/CH): medium to high plasticity, grey mottled orange, trace fine to coarse grained sand and fine gravel, moist to dry, w<PL, very stiff, extremely weathered											
	0.8	GRANODIORITE: fine to coarse grained, grey, mottled orange, medium strength, moderately weathered Pit discontinued at 0.8m -slow progress		E	0.8								
1													
2													

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774092
NORTHING: 6154774

PIT No: 15
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1									
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Alluvial												
	0.3	Clayey SAND (SC): fine to coarse grained, pale brown, trace fine gravel, wet, medium dense, Alluvial												
	0.4	Silty CLAY (CH): high plasticity, pale orange, mottled grey, trace fine to coarse grained sand, moist, w~PL, stiff, Residual		B			pp = 180-200							
	0.5			D										
	0.6			E										
	0.7	Silty CLAY (CH): high plasticity, grey white, mottled orange, trace fine to coarse grained sand, moist to dry, w~PL, stiff to very stiff		D	0.9		pp = 340-360							
	1.0	-from 1.0m, trace granodiorite fragments		E	1.0									
	1.1	GRANODIORITE: fine to coarse grained, orange brown, mottled grey white, very low to low strength, highly weathered, highly fractured												
	1.8			D	1.8									
	2.6	Pit discontinued at 2.6m -limit of investigation												

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774212
NORTHING: 6154743

PIT No: 16
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1								
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Alluvial											
	0.4	Clayey SAND (SC): fine to coarse grained, pale brown, trace fine gravel, wet, medium dense, Alluvial											
	0.6	Silty CLAY (CH): high plasticity, orange brown, mottled grey, with fine to coarse grained sand, moist, w~PL, stiff, Residual		B	0.5								
	0.8	Sandy CLAY (CI): medium plasticity, orange brown, mottled grey, fine to coarse grained sand, moist, w~PL, stiff		E	0.6								
	1.0	GRANODIORITE: fine to coarse grained, grey, mottled orange, low to medium strength, moderately to highly weathered, fractured											
1	1.0	Pit discontinued at 1.0m -slow progress		E	1.0								
	2												

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 773897
NORTHING: 6154750

PIT No: 17
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1									
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w=PL, soft, alluvial		E	0.2									
	0.3	Clayey SAND (SC): fine to coarse grained, pale grey brown, with fine gravel, wet, medium dense, alluvial		E	0.3									
	0.4	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual		B	0.4		pp = 160-180							
	0.5			E	0.5									
	0.6			D	0.6		pp = 200-250							
	1.0	-from 0.8m, yellow brown, mottled grey		E	1.0									
	1.1	Silty CLAY (CI/CH): medium to high plasticity, yellow brown, mottled grey, with fine to coarse grained sand, moist, w~PL, stiff, extremely weathered												
	1.2													
	1.6	GRANODIORITE: fine to coarse grained, orange brown, low to medium strength, moderately weathered												
	1.6	Pit discontinued at 1.6m -slow progress												

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 773983
NORTHING: 6154758

PIT No: 18
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1								
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w=PL, soft, alluvial											
	0.3	Clayey SAND (SC): fine to coarse grained, pale grey brown, with fine gravel, wet, medium dense, alluvial											
	0.5	Silty CLAY (CH): high plasticity, yellow brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual		E	0.5								
	0.7			D	0.7								
	0.8												
	1.0	Silty CLAY (CI): medium plasticity, yellow brown, mottled grey, with fine to coarse grained sand, moist, w~PL, extremely weathered											
1	1.0	GRANODIORITE: fine to coarse grained, grey mottled yellow brown, low to medium strength, moderately to highly weathered, fractured		E	1.0								
	1.2	Pit discontinued at 1.2m -slow progress											
	2												

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 770404.9
NORTHING: 6154739

PIT No: 19
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1								
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w=PL, soft, alluvial											
	0.3	Clayey SAND (SC): fine to coarse grained, pale grey brown, with fine gravel, wet, medium dense, alluvial											
	0.4	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual			0.4		pp = 110-150						
	0.5			D	0.5		pp = 130-150						
	0.8	Silty CLAY (CI): medium plasticity, grey mottled orange, with fine to coarse grained sand, moist, w~PL, stiff, extremely weathered granodiorite			0.8		pp = 150-160						
	0.9			D	0.9		pp = 150-200						
	1.2	granodiorite: fine to coarse grained, grey brown mottled orange, low strength, highly weathered, highly fractured			1.0								
	1.4			D	1.4								
	1.8	-from 1.6m, low to medium strength											
	2.0	Pit discontinued at 1.8m -slow progress											

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774160
NORTHING: 6154718

PIT No: 20
PROJECT No: 88505.06
DATE: 14/4/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)										
				Type	Depth	Sample	Results & Comments			5	10	15	20						
	0.1	TOPSOIL/Sandy SILT (ML): dark brown, fine to coarse grained sand, with rootlets, moist to wet, w>PL		E	0.1														
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w>PL, firm, Alluvial																	
	0.4	Clayey SAND (SC): fine to coarse grained, pale brown, trace fine gravel, wet, medium dense, Alluvial																	
	0.6	Silty CLAY (CH): high plasticity, orange brown, mottled grey, with fine to coarse grained sand, moist, w~PL, stiff, Residual		E	0.5		pp = 150-200												
	0.9	Sandy CLAY (CI): medium plasticity, orange brown, mottled grey, fine to coarse grained sand, moist, w~PL, stiff		D	0.7		pp = 180-200												
1	0.9	GRANODIORITE: fine to coarse grained, grey, mottled orange, low to medium strength, moderately to highly weathered, fractured		E	1.0														
	1.1	Pit discontinued at 1.1m -slow progress																	
	2																		

RIG: Hitachi 160LC mini-excavator fitted with a 600mm wide bucket

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774244
NORTHING: 6154710

PIT No: 21
PROJECT No: 88505.06
DATE: 28/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)									
				Type	Depth	Sample	Results & Comments		5	10	15	20						
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1													
	0.2	Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with fine gravel, moist, w~PL, firm, alluvial		E	0.2													
	0.4	Clayey SAND (SC): fine to coarse grained, grey mottled orange, moist to wet, medium dense, alluvial			0.4		pp = 240-250											
	0.5	Silty CLAY (CH): high plasticity, grey, mottled orange trace fine to coarse grained sand, moist, w~PL, very stiff, residual		D	0.5													
	0.6			E	0.6		pp = 250-280											
	0.7	Silty CLAY (CI/CH): medium to high plasticity, grey mottled orange, trace fine to coarse grained sand and fine gravel, moist to dry, w<PL, very stiff, extremely weathered			0.7													
	0.8				0.8													
	1.0	GRANODIORITE: fine to coarse grained, grey, mottled orange, low to medium strength, moderately weathered, highly fractured		E	1.0													
		Pit discontinued at 1.0m -slow progress																

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
PID	Photo ionisation detector (ppm)	PL(A)	Point load axial test Is(50) (MPa)
PL(D)	Point load diametral test Is(50) (MPa)	pp	Pocket penetrometer (kPa)
S	Standard penetration test	S	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774320.6
NORTHING: 6154663

PIT No: 22
PROJECT No: 88505.06
DATE: 28/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1								
	0.2	Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with fine gravel, moist, w~PL											
	0.3	Clayey SAND (SC): fine to coarse grained, grey mottled orange, moist to wet, medium dense, alluvial											
		Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, very stiff, residual		D	0.5								
	0.7	Silty CLAY (CH): grey mottled orange, trace fine to coarse grained sand, moist, w~PL, stiff, extremely weathered		D	0.8								
	1.0	GRANODIORITE: fine to coarse grained, grey, mottled orange, low to medium strength, moderately weathered, highly fractured		E	1.0								
	1.2	Pit discontinued at 1.2m -slow progress											

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 773849
NORTHING: 6154699

PIT No: 23
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)									
				Type	Depth	Sample	Results & Comments		5	10	15	20						
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist to wet, TOPSOIL		E	0.1													
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w=PL, soft to firm, alluvial																
	0.3	Clayey SAND (SC): fine to coarse grained, pale grey brown, with fine gravel, wet, medium dense, alluvial																
		Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual		E	0.5													
				D	0.8													
	0.9	Silty CLAY (CH): high plasticity, grey, mottled yellow brown, trace fine to coarse grained sand, moist, w~PL, stiff, extremely weathered		E	1.0													
	1.1	GRANODIORITE: grey, mottled white, fine to coarse grained, low to medium strength, moderately weathered, fractured																
	1.4	Pit discontinued at 1.4m -slow progress																
	2																	

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 773928
NORTHING: 6154675

PIT No: 24
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist to wet, TOPSOIL		E	0.1								
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w=PL, soft to firm, alluvial											
	0.3	Clayey SAND (SC): fine to coarse grained, pale grey brown, with fine gravel, wet, medium dense, alluvial											
	0.4	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual		D	0.4								
	0.5			E	0.5								
	0.6	Silty CLAY (CH): high plasticity, grey, mottled white red orange, trace fine to coarse grained sand, rock fragments, moist, w~PL, stiff		D	0.7								
	0.9	GRANODIORITE: fine grained, white grey, medium strength, slightly weathered, highly fractured, trace silty clay pockets		E	1.0								
	1.1			D	1.1								
	1.3	Pit discontinued at 1.3m -slow progress											
	2												

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774010
NORTHING: 6154721

PIT No: 25
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): dark brown, fine to coarse grained, trace fine to medium gravel, brick fragments		E	0.1								
	0.3	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, with silt, trace fine gravel and brick fragments, moist to dry, w~PL, possible Fill											
	0.4	Clayey SAND (SC): fine to coarse grained, pale grey brown, with fine gravel, wet, medium dense, alluvial											
	0.6	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual		E	0.5								
	1.0	Silty CLAY (CI/CH): medium to high plasticity, yellow brown, mottled grey, fine to coarse grained, fine to medium gravel, trace granodiorite fragments, moist, w~PL, stiff, extremely weathered		D	0.8								
	1.0	GRANODIORITE: fine to coarse grained, grey mottled yellow brown, low strength to medium strength, moderately weathered to highly weathered, fractured		E	1.0								
	1.2	Pit discontinued at 1.2m -slow progress											
	2.0												

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774123.8
NORTHING: 6154684

PIT No: 26
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)									
				Type	Depth	Sample	Results & Comments		5	10	15	20						
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, wet, TOPSOIL		E	0.1													
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w=PL, soft, alluvial		E	0.2													
	0.3	Clayey SAND (SC): fine to coarse grained, pale grey brown, with fine gravel, wet, medium dense, alluvial		E	0.3													
	0.4	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual		B	0.4		pp = 220-260											
	0.5			D	0.5													
	0.6			E	0.6		pp = 260-280											
	0.7	Silty CLAY (CI): medium plasticity, grey mottled orange, with fine to coarse grained sand, moist, w~PL, stiff, extremely weathered granodiorite		D	0.7		pp = 210-250											
	0.8	GRANODIORITE: fine to coarse grained, grey mottled orange brown, low to medium strength, moderately to highly weathered, fractured Pit discontinued at 0.8m -refusal		E	0.8		pp = 260-310											
1																		
2																		

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
PID	Photo ionisation detector (ppm)	PL(A)	Point load axial test Is(50) (MPa)
PL(D)	Point load diametral test Is(50) (MPa)	pp	Pocket penetrometer (kPa)
S	Standard penetration test	S	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774281
NORTHING: 6154664

PIT No: 27
PROJECT No: 88505.06
DATE: 28/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1								
	0.3	Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with fine gravel, moist, w~PL		E	0.5								
	0.7	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, very stiff, residual		E	1.0								
	1.0	GRANODIORITE: fine to coarse grained, grey, mottled orange, low to medium strength, moderately weathered, highly fractured		E	1.0								
	1.2	Pit discontinued at 1.2m -slow progress											

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 773984.7
NORTHING: 6154666

PIT No: 28
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)									
				Type	Depth	Sample	Results & Comments		5	10	15	20						
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1													
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w=PL, soft, alluvial																
		Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual		E	0.5													
	0.6	Silty CLAY (CH): grey, mottled yellow brown, trace fine to coarse grained sand, moist, w~PL, stiff																
	0.8	GRANODIORITE: fine to coarse grained, grey mottled yellow brown, low strength to medium strength, moderately weathered to highly weathered, fractured																
1	1.0	Pit discontinued at 1.0m -slow progress		E	1.0													
	2																	

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774054
NORTHING: 6154660

PIT No: 29
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)									
				Type	Depth	Sample	Results & Comments		5	10	15	20						
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1													
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w=PL, soft, alluvial																
		Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual		D	0.5		pp = 180-250											
	0.7	Silty CLAY (CI/CH): medium to high plasticity, grey white mottled orange brown, with fine to coarse grained sand, trace granodiorite fragments, moist, w~PL, stiff, ?origin?		D	0.7													
	0.8	GRANODIORITE: fine to coarse grained, grey mottled yellow brown, low strength to medium strength, moderately weathered to highly weathered, fractured																
1	1.0	Pit discontinued at 1.0m -slow progress		E	1.0													
	2																	

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774190
NORTHING: 6154644

PIT No: 30
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)									
				Type	Depth	Sample	Results & Comments		5	10	15	20						
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1													
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w=PL, soft, alluvial																
	0.3	Clayey SAND (SC): fine to coarse grained, pale grey brown, with fine gravel, wet, medium dense, alluvial																
		Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual		E	0.5		pp = 220-300											
	0.9	Silty CLAY (CI/CH): medium to high plasticity, grey white mottled orange brown, with fine to coarse grained sand, trace granodiorite fragments, moist, w~PL, stiff, extremely weathered		E	1.0													
	1.2	GRANODIORITE: fine to coarse grained, grey mottled orange brown, low to medium strength, moderately to highly weathered, fractured		D	1.1		pp = 250-300											
	1.5	Pit discontinued at 1.5m -slow progress																
	2																	

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 773866
NORTHING: 6154649

PIT No: 31
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)											
				Type	Depth	Sample	Results & Comments			5	10	15	20							
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL																		
	0.2	Silty CLAY (CL): low plasticity, pale grey brown, with fine to coarse grained sand and fine gravel, moist, w~PL, firm, alluvial		E	0.1															
	0.3	Clayey SAND (SC): fine to coarse grained, pale grey brown, with fine gravel, wet, medium dense, alluvial																		
	0.4	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, firm to stiff, residual			0.4		pp = 180-200													
	0.5			B	0.5															
	0.6			D	0.6		pp = 220-250													
	0.9	Silty CLAY (CI/CH): medium to high plasticity, grey mottled orange brown, trace fine to coarse grained sand, granodiorite fragments, moist, w~PL, stiff, extremely weathered granodiorite		E	1.0		pp = 220-250													
	1.1			D	1.1															
	1.4	GRANODIORITE: fine to coarse grained, grey mottled yellow brown, low to medium strength, moderately to highly weathered, fractured																		
	1.6	Pit discontinued at 1.6m -slow progress																		
	2																			

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 773975
NORTHING: 6154616

PIT No: 33
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist to wet, TOPSOIL		E	0.1								
	0.2	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace fine gravel, moist to wet, w=PL, soft, alluvial											
		Clayey SAND (SC): fine to coarse grained, pale grey brown, with fine gravel, wet, medium dense, alluvial			0.4								
	0.5	Silty CLAY (CH): high plasticity, grey mottled yellow brown, trace fine to coarse grained sand, moist, w~PL, stiff, extremely weathered		B									
	0.6			D	0.5								
	0.7	GRANODIORITE: fine to coarse grained, orange brown mottled grey, low to medium strength, moderately weathered, fractured		E									
		Pit discontinued at 0.7m -slow progress											
1													
2													

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774401.7
NORTHING: 6154924

PIT No: 34
PROJECT No: 88505.06
DATE: 28/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL/Silty SAND (SM): fine to coarse grained, dark brown, moist, TOPSOIL		E	0.1		PID = 1.4						
	0.4	Clayey SAND (SC): fine to coarse grained, grey mottled orange, moist to dry, medium dense, alluvial		E	0.1		PID = 1.4						
	0.4	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, very stiff, residual		B	0.4		pp = 250-280						
	0.5			E	0.5		PID = 16.5						
	0.6			D	0.6		pp = 200-250						
	0.9	Silty CLAY (CI/CH): medium to high plasticity, grey mottled orange, trace fine to coarse grained sand and fine gravel, moist to dry, w<PL, very stiff, extremely weathered		D	1.0		pp = 300-400						
	1.1												
	1.1	GRANODIORITE: fine to coarse grained, orange brown, low strength, moderately weathered											
	1.4	-from 1.3m, low to medium strength											
	1.4	Pit discontinued at 1.4m -slow progress											

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774481
NORTHING: 6154906

PIT No: 35
PROJECT No: 88505.06
DATE: 29/3/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
	0.1	TOPSOIL FILL/Sandy GRAVEL (GW): fine to coarse gravel, pale brown, fine to coarse grained sand, moist, FILL		E	0.1								
	0.2	Silty CLAY (CL): low plasticity, dark grey brown, with fine to coarse grained sand, trace fine gravel, moist, w~PL, stiff, alluvial											
		Clayey SAND (SC): fine to coarse grained, grey mottled orange, moist to wet, medium dense, alluvial		D	0.4								
				B	0.5								
	0.6			E	0.6								
	0.6	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, very stiff, extremely weathered		D	0.7								
	0.9												
	0.9	GRANODIORITE: fine to coarse grained, orange brown, low to medium strength, moderately weathered											
1	1.0	Pit discontinued at 1.0m -slow progress		E	1.0								
	2												

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Darraby Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Goulburn Street, Marulan

SURFACE LEVEL: --
EASTING: 774523
NORTHING: 6154869

PIT No: 36
PROJECT No: 88505.06
DATE: 28/3/2002
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)					
				Type	Depth	Sample	Results & Comments		5	10	15	20		
	0.1	TOPSOIL FILL/Sandy GRAVEL (GW): fine to coarse gravel, pale brown, fine to coarse grained sand, moist, FILL	[Cross-hatched pattern]	E	0.1		pp = 280-300							
		FILL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with fine gravel, moist to dry, w<PL, very stiff, FILL		D	0.3									
	0.4	Silty CLAY (CH): high plasticity, orange brown mottled grey, trace fine to coarse grained sand, moist, w~PL, very stiff, residual	[Diagonal lines pattern]	B	0.5									
				D	0.6									
				E	0.6									
	0.8	Silty CLAY (CI): medium plasticity, orange brown mottled grey, with fine to coarse grained sand, trace fine gravel, moist, w~PL, stiff, extremely weathered material	[Diagonal lines pattern]	D	0.9									
	1.0	GRANODIORITE: fine to coarse grained, orange brown, medium strength, moderately weathered		D	1.0									
	1.1	Pit discontinued at 1.1m -refusal	[Cross-hatched pattern]	E										
	2													

RIG: Bobcat E50 mini excavator

LOGGED: EAGL

SURVEY DATUM: MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon

Sand Penetrometer AS1289.6.3.3
 Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

Appendix D

Laboratory Test Results

Material Test Report

Report Number: 88505.06-1B
Issue Number: 1
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062A
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 30/05/2022
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 6 , Depth: 0.4-0.6m
Material: Silty Clay

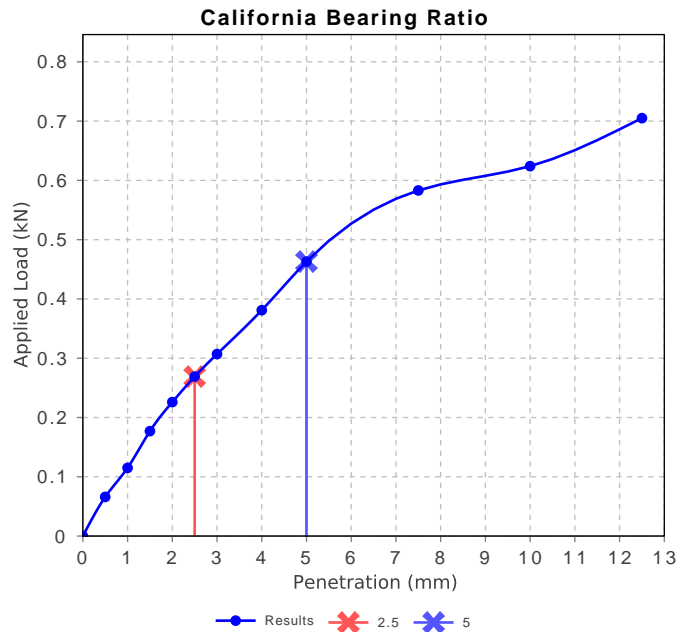


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Approved Signatory: Kevin Spicer
 Laboratory Manager

Laboratory Accreditation Number: 828

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	2.5		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m ³)	1.50		
Optimum Moisture Content (%)	27.5		
Laboratory Density Ratio (%)	99.0		
Laboratory Moisture Ratio (%)	99.0		
Moisture Content at Placement (%)	27.3		
Moisture Content Top 30mm (%)	35.6		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	120.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		



Material Test Report

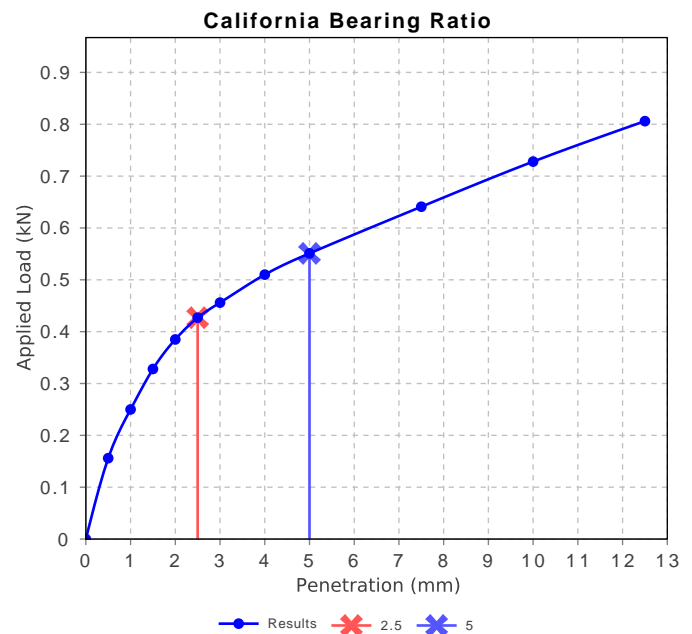
Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062B
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 31/05/2022
Sampling Method: Sampled by Engineering Department
 The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 9 , Depth: 0.4-0.6m
Material: Silty Clay



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 Laboratory Manager
 Laboratory Accreditation Number: 828

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	3.0		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m ³)	1.50		
Optimum Moisture Content (%)	25.5		
Laboratory Density Ratio (%)	100.0		
Laboratory Moisture Ratio (%)	107.0		
Moisture Content at Placement (%)	27.5		
Moisture Content Top 30mm (%)	32.7		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	100.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		



Material Test Report

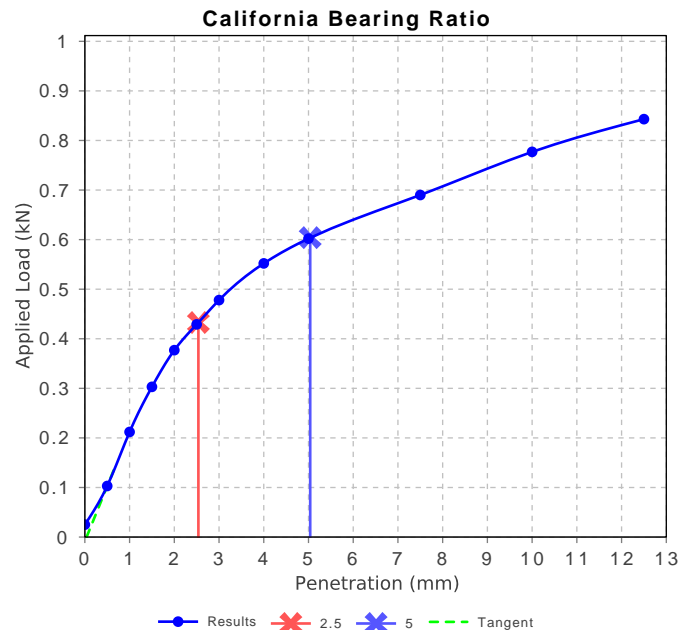
Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062C
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 28/05/2022
Sampling Method: Sampled by Engineering Department
 The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 13 , Depth: 0.4-0.6m
Material: Silty Clay



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 Laboratory Manager
 Laboratory Accreditation Number: 828

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	3.5		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m ³)	1.59		
Optimum Moisture Content (%)	22.5		
Laboratory Density Ratio (%)	98.5		
Laboratory Moisture Ratio (%)	107.5		
Moisture Content at Placement (%)	24.0		
Moisture Content Top 30mm (%)	26.6		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	120.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		



Material Test Report

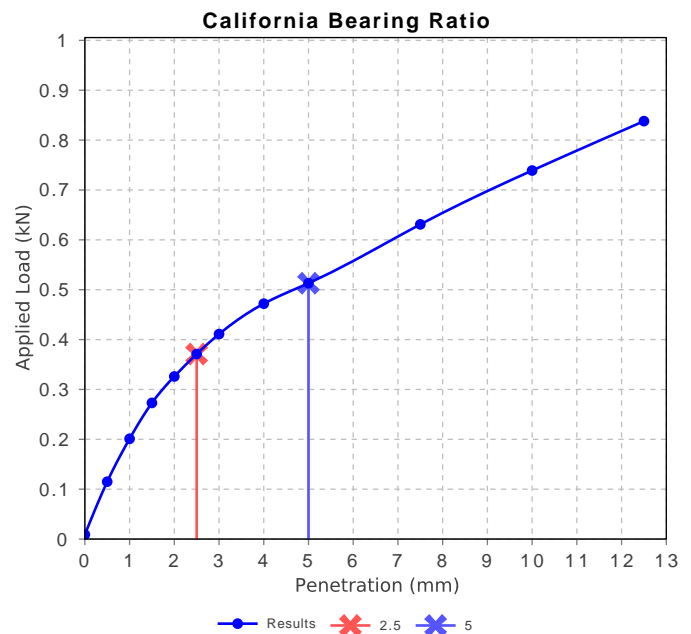
Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062D
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 28/05/2022
Sampling Method: Sampled by Engineering Department
 The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 15 , Depth: 0.4-0.6m
Material: Silty Clay



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California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	3.0		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m ³)	1.54		
Optimum Moisture Content (%)	27.0		
Laboratory Density Ratio (%)	99.5		
Laboratory Moisture Ratio (%)	101.5		
Moisture Content at Placement (%)	27.3		
Moisture Content Top 30mm (%)	30.6		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	112.9		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		



Material Test Report

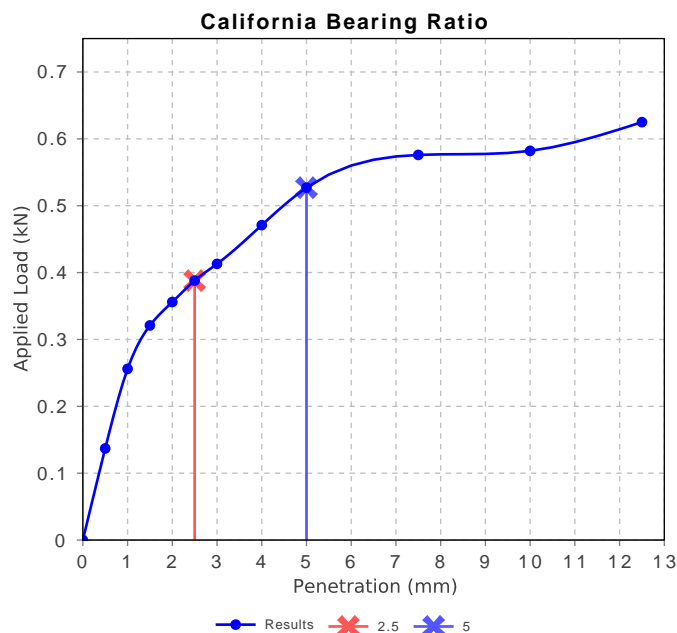
Report Number: 88505.06-1B
Issue Number: 1
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062E
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 30/05/2022
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 17 , Depth: 0.4-0.6m
Material: Silty Clay



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 Laboratory Manager
 Laboratory Accreditation Number: 828

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	3.0		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m ³)	1.53		
Optimum Moisture Content (%)	27.0		
Laboratory Density Ratio (%)	99.5		
Laboratory Moisture Ratio (%)	100.5		
Moisture Content at Placement (%)	27.2		
Moisture Content Top 30mm (%)	31.7		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	120.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0.0		



Material Test Report

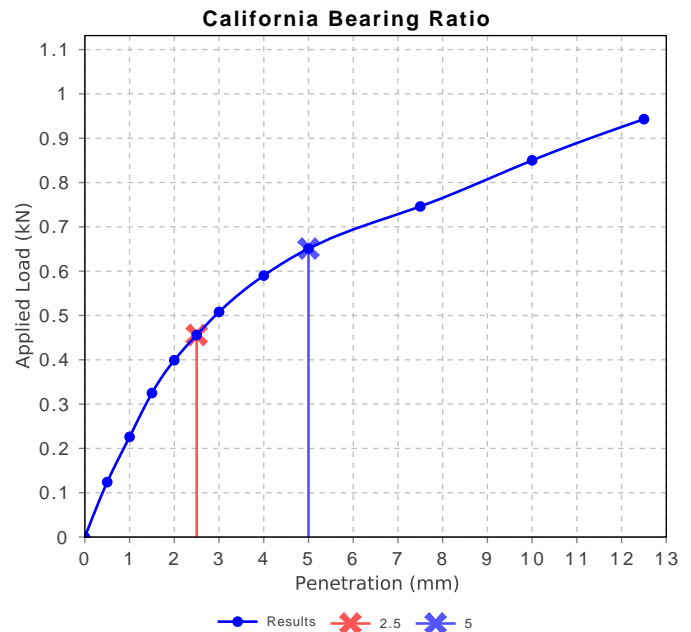
Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062F
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 27/05/2022
Sampling Method: Sampled by Engineering Department
 The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 26 , Depth: 0.4-0.6m
Material: Silty Clay



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 Laboratory Manager
 Laboratory Accreditation Number: 828

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	3.5		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m ³)	1.64		
Optimum Moisture Content (%)	20.0		
Laboratory Density Ratio (%)	99.5		
Laboratory Moisture Ratio (%)	111.5		
Moisture Content at Placement (%)	22.2		
Moisture Content Top 30mm (%)	27.4		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	168.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		



Material Test Report

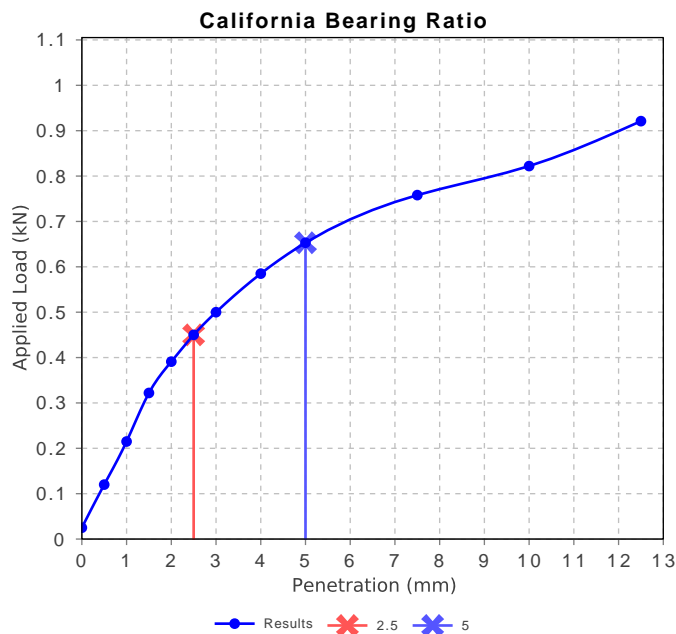
Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062G
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 27/05/2022
Sampling Method: Sampled by Engineering Department
 The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 33 , Depth: 04-0.5m
Material: Clayey Sand



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California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	3.5		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m ³)	1.61		
Optimum Moisture Content (%)	22.5		
Laboratory Density Ratio (%)	100.0		
Laboratory Moisture Ratio (%)	100.0		
Moisture Content at Placement (%)	22.7		
Moisture Content Top 30mm (%)	28.6		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	99.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		



Material Test Report

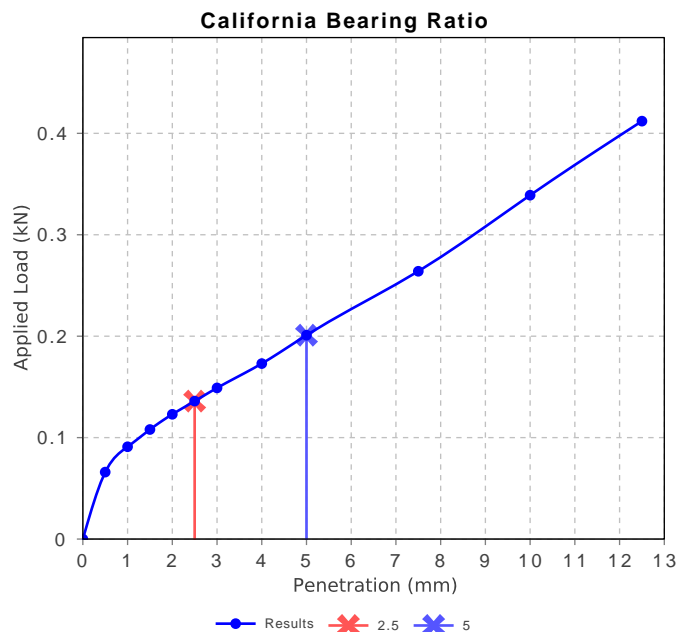
Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062H
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 27/05/2022
Sampling Method: Sampled by Engineering Department
 The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 36 , Depth: 0.4-0.6m
Material: Silty Clay



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California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	1.0		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m ³)	1.58		
Optimum Moisture Content (%)	22.0		
Laboratory Density Ratio (%)	100.5		
Laboratory Moisture Ratio (%)	100.5		
Moisture Content at Placement (%)	21.9		
Moisture Content Top 30mm (%)	32.4		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	99.1		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		



Material Test Report



Geotechnics | Environment | Groundwater

Douglas Partners Pty Ltd

Unanderra Laboratory

Unit 1/1 Luso Drive Unanderra NSW 2526

Phone: (02) 4271 1836

Email: kevin.spicer@douglaspartners.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Kevin Spicer
Laboratory Manager

Laboratory Accreditation Number: 828

Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062I
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 31/05/2022
Sampling Method: Sampled by Engineering Department
 The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 3 , Depth: 0.5m
Material: Silty Clay

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	72		
Plastic Limit (%)	29		
Plasticity Index (%)	43		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	11.0		
Cracking Crumbling Curling	Curling		
Moisture Content (AS 1289 2.1.1)			
Moisture Content (%)		33.0	

Material Test Report

Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062J
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 31/05/2022
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 11 , Depth: 0.6m
Material: Silty Clay



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Laboratory Manager

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Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	67		
Plastic Limit (%)	29		
Plasticity Index (%)	38		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	9.0		
Cracking Crumbling Curling	Cracking & Curling		

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)		21.4	

Material Test Report

Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062K
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 31/05/2022
Sampling Method: Sampled by Engineering Department
 The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 15 , Depth: 0.9m
Material: Silty Clay



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 Laboratory Manager

Laboratory Accreditation Number: 828

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	52		
Plastic Limit (%)	27		
Plasticity Index (%)	25		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	8.5		
Cracking Crumbling Curling	None		
Moisture Content (AS 1289 2.1.1)			
Moisture Content (%)		24.8	

Material Test Report

Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062L
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 31/05/2022
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 30 , Depth: 1.1m
Material: Silty Clay



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 Laboratory Manager
 Laboratory Accreditation Number: 828

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	44		
Plastic Limit (%)	22		
Plasticity Index (%)	22		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	5.5		
Cracking Crumbling Curling	Cracking & Curling		
Moisture Content (AS 1289 2.1.1)			
Moisture Content (%)		15.3	

Material Test Report



Geotechnics | Environment | Groundwater

Douglas Partners Pty Ltd

Unanderra Laboratory

Unit 1/1 Luso Drive Unanderra NSW 2526

Phone: (02) 4271 1836

Email: kevin.spicer@douglaspartners.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Kevin Spicer
Laboratory Manager

Laboratory Accreditation Number: 828

Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062M
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 31/05/2022
Sampling Method: Sampled by Engineering Department
 The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 31 , Depth: 0.6m
Material: Silty Clay

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	61		
Plastic Limit (%)	21		
Plasticity Index (%)	40		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	21.0		
Cracking Crumbling Curling	Curling		
Moisture Content (AS 1289 2.1.1)			
Moisture Content (%)		24.4	

Material Test Report



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Approved Signatory: Kevin Spicer
Laboratory Manager

Laboratory Accreditation Number: 828

Report Number: 88505.06-1
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Test results added
Date Issued: 06/06/2022
Client: Darraby Pty Ltd
 22-24 Junction Street, Forest Lodge NSW 2037
Contact: David Matthews
Project Number: 88505.06
Project Name: Proposed Subdivision
Project Location: Goulburn Street, Marulan NSW
Work Request: 7062
Sample Number: GU-7062N
Date Sampled: 28/03/2022
Dates Tested: 23/05/2022 - 31/05/2022
Sampling Method: Sampled by Engineering Department
 The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and preparation of soils
Sample Location: 35 , Depth: 0.4m
Material: Clayey Sand

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	15		
Plastic Limit (%)	13		
Plasticity Index (%)	2		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	2.5		
Cracking Crumbling Curling	Cracking		
Moisture Content (AS 1289 2.1.1)			
Moisture Content (%)		11.1	