Douglas PARTNERS

GROUNDED EXPERTISE

Specialist Advice
Report on Geotechnical Investigation

Proposed Mixed-Use Residential Redevelopment

88 Waterloo Road, Macquarie Park NSW

Prepared for Cottonwood Development Pty Ltd

Project 222462.01

22 January 2026

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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.

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Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

Planning Summary

This Geotechnical Investigation Report has been prepared by Douglas Partners Pty Ltd to accompany a State Significant Development Application (**SSDA**) and concurrent Rezoning Proposal – SSD-94006708 for a mixed use development identified at 15-21 Cottonwood Crescent, Macquarie Park (the **site**).

The proposal includes provision for the demolition of existing buildings and construction of a residential development comprising two residential flat buildings above a common basement car park and podium. The legal description of the site is outlined below.

Property Address	Title Description
15 Cottonwood Crescent, Macquarie Park	SP8144
17 Cottonwood Crescent, Macquarie Park	SP7630
19 Cottonwood Crescent, Macquarie Park	SP7892
21 Cottonwood Crescent, Macquarie Park	SP7984

For the purposes of this report, the site is also referred to as '**88 Waterloo Road, Macquarie Park**'.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (**SEARs**) issued for the project (SSD-94006708).

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 8 October 2025 and issued for the SSDA (SSD-94006708). Specifically, this report has been prepared to respond to the SEARs requirement below.

Item	Description of Requirement
12 – Geotechnical Assessment	• Assess potential impacts on soil resources and related infrastructure and riparian lands on and near the site and including soil erosion

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Specialist Advice Report on Geotechnical Investigation
Proposed Mixed-Use Residential Redevelopment
88 Waterloo Road, Macquarie Park NSW

1. Introduction

This report presents the consolidated results of geotechnical investigations undertaken for a proposed mixed-use development at 88 Waterloo Road, Macquarie Park NSW (currently 15-21 Cottonwood Crescent). Preparation of this report was commissioned by Cottonwood Development Pty Ltd.

It is understood that the proposed development of the site includes demolition of the existing residential flat buildings on the site and construction of two mixed-use residential towers with a joint six level basement.

Two separate geotechnical investigations have been undertaken on the site between January 2024 and June 2025, with the aim of assessing the subsurface conditions across the site in order to provide information for the development application and design purposes. Although the investigations completed in 2024 were originally undertaken at an earlier project stage for a different proposed development, the results from those investigations are considered relevant to the updated proposal to which this report pertains and have been used (together with the 2025 investigation results) to inform the advice provided in this report.

Together, the investigations included the drilling of ten (10) boreholes, in-situ testing, and laboratory testing of selected samples. The details of the field work are presented in this report, together with comments and recommendations on relevant geotechnical considerations.

2. Proposed Development

The proposed development is understood to include:

- Demolition of the existing residential apartment buildings on the site;
- Excavation across about two thirds of the site, to lowest levels of approximately RL 24 m AHD to form the proposed six level basement;
- Construction of two mixed-use residential towers of up to 60 storeys, with a joint podium.

The proposed basement excavation will involve excavation to maximum depths of up to approximately 26 m below existing site levels, decreasing to approximately 20 m towards the northeast.

Excavation is proposed within approximately 20-30 m of existing Sydney Metro tunnels below Waterloo Road. Reference should be made to the TTW report *"231396-TTW-STR-RPT-001 [1] Sydney Metro Impact Assessment"* for additional information regarding the Sydney Metro tunnels.

3. Site Description

The site located at 15-21 Cottonwood Crescent is a rectangular shaped area with plan dimensions of approximately 100 m by 45 m and an area of 5,130 m^2. The site stretches across four lots (SP8144, SP7630, SP7892 and SP7984).

The site is bounded by:

- Cottonwood Crescent, then three storey residential buildings (apparently of brick construction) to the southeast;
- Waterloo Road, then Macquarie Shopping Centre, to the northeast;
- A public park (Elouera Reserve) to the northwest; and
- Residential three to four storey residential buildings (apparently of brick construction) to the southwest.

The site is currently occupied by four 4-storey unit buildings with on-grade parking and driveways located around each building. The unit buildings are also surrounded by multiple large trees and garden beds.

Casual observation at the time of the investigation indicated the following:

- The existing on-grade concrete pavements were cracked in many locations across the site;
- Evidence of trenching (for buried services) and patching of the pavements was prevalent; and
- The external facades of the existing buildings appeared to generally be in fair condition (e.g., no evidence of major cracking etc.).

There are several retaining walls on the site:

- Two walls along the northwest site boundary, set in about 4 m from the site boundary, with a maximum retained height of about 2 m in the southwest, gradually tapering off to zero in the northeast. The wall construction is brick on 15 Cottonwood Crescent, and changes to masonry block at the 'internal' boundary between 15 and 17, continuing through to 21;
- A brick wall along the southwest site boundary, set in about 2 m from the site boundary, with a maximum retained height of about 1.5 m. This wall terminates with a return towards the southwest about two thirds of the way along the southwest site boundary (measured from the northwest corner); and
- A masonry block wall along the 'internal' boundary between 15 and 17 Cottonwood Crescent, with a maximum retained height of about 2 m at the northwest end, gradually tapering off to zero in the southeast (near Cottonwood Crescent).

At the time of the investigation, the retaining walls appeared to generally be in fair condition, with no signs of major distress, although some minor bulging was observed in proximity to large trees.

Surface elevations on the site generally fall towards the east, with several steps in elevation due to the retaining structures across the site.

- The maximum elevation across the site is approximately RL 50 m AHD, in the west of the site at the top of the existing retaining wall on 15 Cottonwood Crescent;
- The surface level across most of No. 15 varies between RL 49 m (in the northwest) and RL 46 m (in the southeast), falling towards Cottonwood Crescent;
- The surface level across 17 Cottonwood Crescent varies between approximately RL 48.5 m in the northwest (at the top of the existing retaining wall), RL 46.5 m in the northwest (in front of the retaining wall), and RL 45.5 m in the southeast, near Cottonwood Crescent; and
- The surface levels across 19 and 21 Cottonwood Crescent vary between approximately RL 47 m in the northwest (at the top of the existing retaining wall), RL 45 m in the northwest (in front of the retaining wall), and RL 43 m in the southeast, near Cottonwood Crescent.

Broadly around the site, surface elevations generally fall towards the south-east (towards Shrimptons Creek). Sydney Metro tunnels run parallel to and below Waterloo Road, to the northeast of the site. The tunnels are (horizontally) very close to the northeast site boundary, with the first and second reserves intersecting the site as shown approximately on Drawing 1 in Appendix B. It is understood that the tunnels are approximately 7 m diameter, and the tunnel centreline RLs are in the order of 28.78 m AHD adjacent to the site.

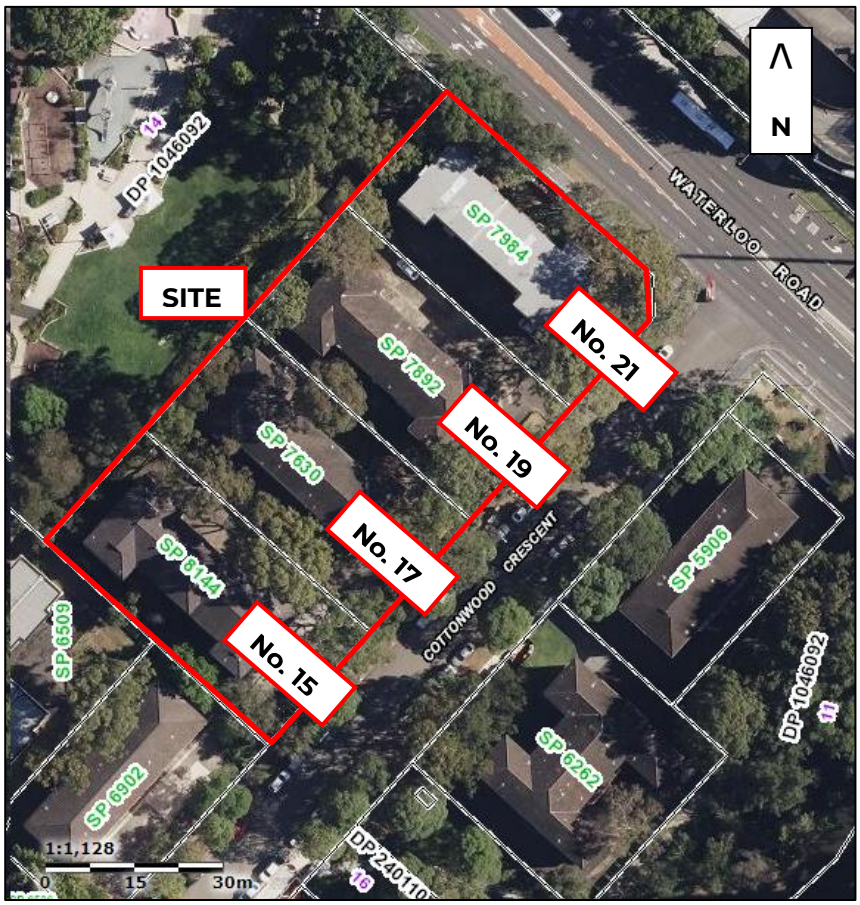

Figure 1: Map depicting approximate site boundary, lots, and residential addresses.

4. Regional Geology

Reference to the Sydney 1:100 000 Series Geological Sheet indicates that the site is underlain by Hawkesbury Sandstone which typically comprises medium to coarse grained quartz sandstone with some shale bands or lenses. The results on the site investigation confirmed the regional mapping with sandstone bedrock intersected at shallow depth.

Within the Sydney area the most common defects within the Hawkesbury Sandstone are widely spaced horizontal bedding planes, typically spaced at 1-3 m, and two orthogonal sets of steeply dipping joints. The joints typically have dips of 75 to 90 degrees from horizontal (i.e. close to vertical) and are oriented with strikes just east of north (about 010 degrees) and just south of east (about 110 degrees). Apart from these main defect sets there are likely to be other less common joints or faults with moderate dips of 20 – 30 degrees and 40 – 60 degrees.

5. Previous Investigations

Douglas has previously completed an investigation across several nearby sites, and including the drilling of one borehole (BH2-2018) at 21 Cottonwood Crescent, in 2018.

The location of the borehole is shown on Drawing 1 in Appendix B, and the borehole log is presented in Appendix E.

The previously drilled borehole was also converted into a groundwater monitoring well.

The results from this borehole have been considered in our assessments and preparation of this report.

6. Field Work Methods

6.1 Drilling and Packer Testing

The field work for the investigation drilling completed in 2024 and 2025 included:

- Drilling of ten (10) boreholes (BH1 to BH7 and BH101 to BH103) using a tracked, truck mounted or bobcat mounted drilling rig;
  - The boreholes were drilled into weathered rock at depths of between 0.6 m and 1.7 m using a combination of diatube coring, continuous solid flight augers and rotary wash bore methods; and
  - The boreholes were then continued to depths of between 14.2 m and 45.2 m using NMLC or HQ diamond core drilling methods to obtain continuous core samples of the bedrock;
  - During drilling of BH101-BH103, packer tests were completed at selected intervals in the rock to assess the permeability of the rock mass. Packer testing involves inflating a rubber bladder to seal off a section of the borehole and pumping water through to the sealed section at set pressures while monitoring the volume of water lost to assess the rock mass permeability in sections of the borehole;
- On completion of the borehole drilling, installation of seven (7) groundwater monitoring wells in BH1, BH2, BH5, BH6, BH101, BH102 and BH103 to allow for the measurement of groundwater levels, which were developed (purged) following installation;

- Supervision of drilling by a geotechnical engineer, who logged the encountered subsurface conditions, collected samples for subsequent testing, and completed Point Load Strength Index ($Is_{(50)}$) testing on recovered rock cores;
- Laboratory testing of select samples for Atterberg Limits and aggressivity to buried steel and concrete.

The borehole locations (in GDA2020 MGA Zone 56) and elevations (relative to Australian Height Datum) were recorded using a differential GPS with a stated accuracy of ±0.1 m in the vertical and horizontal directions.

The borehole locations are shown on Drawing 1 in Appendix B. The results of the Point Load Strength Index tests are shown on the borehole logs.

6.2 Groundwater Monitoring and Piezometer Testing

Several discrete groundwater level measurements have been recorded in the installed monitoring wells between February 2024 and November 2025.

Regular groundwater monitoring using data loggers was completed in BH1, BH2, BH5, BH6 and BH2-2018 between June and September 2024.

More recently, regular groundwater monitoring in BH1, BH2 BH5, BH101, BH102 and BH103 using data loggers has been underway since 21 October 2025 and is ongoing. The first month of this more recent monitoring data is included in this report. It is noted that more recent groundwater monitoring is not being undertaken in BH6, as the monitoring well has become blocked since installation.

Rising or falling head tests were completed in BH1, BH2, BH5 and BH6 in May 2025; and in BH101, BH102 and BH103 in October 2025. A rising head test involves removing water from the monitoring well and measuring the time taken for the water level to recharge (rise to the original level) to estimate the hydraulic conductivity of the surrounding soil or rock mass. A falling head test is similar but involves adding water and measuring the time taken for the water level to fall to the original level.

7. Field Work Results

7.1 Drilling

Details of the subsurface conditions encountered are given in the borehole logs in Appendix C, together with notes defining classification methods and descriptive terms used in their preparation, and colour photographs of the rock core.

The sequence of subsurface materials encountered within the boreholes encountered generally across the site may be summarised as follows:

- **FILL**: Concrete pavement and/or uncontrolled sand or clay fill with varying proportions of silt, gravel, organic matter and building rubble to shallow depths of up to 0.85 m; overlying,
- **RESIDUAL SOILS AND EXTREMELY WEATHERED SANDSTONE**: sand, clayey sand and extremely weathered sandstone to depths of up to 1.7 m; overlying,

- **SANDSTONE BEDROCK**: initially very low, low, or medium strength, highly weathered Hawkesbury Sandstone encountered at depths between 0.2 m (underneath the pavement) and 1.7 m, generally becoming medium to high and high strength and generally less weathered with depth.

The sandstone bedrock was typically slightly fractured to unbroken, with discrete zones of fractured rock. Occasional steeply dipping (75-90°) to moderately dipping (45-60°) joints were observed within the sandstone bedrock, within both the weathered and fresh rock.

No groundwater was observed during the auger drilling of the boreholes.

The results of the packer tests completed during drilling are summarised in Table 1. All tests were completed within the sandstone bedrock.

Table 1: Summary of Packer Test Results

Borehole	Date of Test	Depth Interval (m)	Houlsby Lugeon Value	Estimated Hydraulic Conductivity (m/s)
BH101	2 June 2025	12-18	20	2×10^{-6}
BH101	2 June 2025	24-30	< 0.1	1×10^{-8}
BH101	3 June 2025	30-36.1	0.7	7×10^{-8}
BH101	4 June 2025	36-42.1	0.1	1×10^{-8}
BH102	14 April 2025	13-19	0.2	2×10^{-8}
BH102	15 April 2025	21-27	0.2	2×10^{-8}
BH102	15 April 2025	33-39	0.2	2×10^{-8}
BH102	16 April 2025	38-44	0.2	2×10^{-8}
BH103	9 April 2025	14-20.2	0.3	3×10^{-8}
BH103	9 April 2025	21.2-27.2	1	1×10^{-7}
BH103	10 April 2025	33.2-39.2	0.3	3×10^{-8}
BH103	10 April 2025	39.2-45.2	0.1	1×10^{-8}

7.2 Groundwater Monitoring and Piezometer Testing

The discrete groundwater level observations to-date are summarised in Table 2.

Table 2: Summary of Discrete Groundwater Level Measurements

Location	Date	Groundwater Depth (m BGL)	Groundwater Elevation (m AHD)
BH1	8 February 2024	12.4	35.7
BH1	15 February 2024	12.36	35.74
BH1	20 October 2025	12.38	35.72
BH1	17 November 2025	12.40	35.70
BH2	8 February 2024	13.05	35.45
BH2	15 February 2024	13.02	35.48
BH2	20 October 2025	13.25	35.35
BH2	17 November 2025	13.10	35.40
BH5	8 February 2024	10.15	33.45
BH5	15 February 2024	10.02	33.58
BH5	20 October 2025	16.13	27.47
BH5	17 November 2025	16.16	27.44
BH6	8 February 2024	10.85	34.75
BH6	15 February 2024	10.82	34.78
BH2-2018	8 February 2024	Dry to 13.1	-
BH2-2018	15 February 2024	12.68	32.02
BH101	20 October 2025	11.27	33.43
BH101	17 November 2025	11.46	33.24
BH102	20 October 2025	12.87	33.43
BH102	17 November 2025	13.00	33.30
BH103	20 October 2025	13.71	33.69
BH103	17 November 2025	13.69	33.71

Notes: 1. BH6 was blocked / obstructed during the 2025 groundwater monitoring visits and no readings could be made

The results of the regular groundwater monitoring using data loggers are presented in Appendix C. It is noted that the monitoring results from 2024 (BH1, BH2, BH5, BH6 and BH2-2018 only) are presented separately to the first month of more recent monitoring results. The monitoring results (including consideration of the 2024 and 2025 data, where relevant) are summarised in Table 3.

Table 3: Summary of Groundwater Monitoring Results

Monitoring Well Location	Surface RL (m AHD)	Minimum Recorded Groundwater RL (m AHD)	Maximum Recorded Groundwater RL (m AHD)	Average Recorded Groundwater RL (m AHD)	Range (m)
BH1	48.1	35.4	35.9	35.6	0.5
BH2	48.5	35.3	35.6	35.5	0.3
BH5	43.6	26.7	34.1	31.8	7.1
BH6[1]	45.6	34.4	34.8	34.6	0.4
BH2-2018[1]	44.7	29.8	30.2	30.0	0.4
BH101	44.7	33.1	33.3	33.2	0.2
BH102	46.3	33.1	33.3	33.2	0.2
BH103	47.4	33.6	33.8	33.7	0.2

Notes: 1. BH6 and BH2-2018 data from 2024 only

The water level observed in BH2-2018 was consistently near the base of the standpipe during the monitoring period and may be associated with a small volume of water trapped in the bottom of the standpipe. It is potentially not representative of an actual groundwater level, which may be below the standpipe in this location. The significant variation in observed groundwater level in BH5 is discussed in Section 9.9.

It is noted that groundwater levels are transient and may vary over time due to climatic, seasonal, and other factors.

The results of the rising and falling head tests are presented in Appendix C and are summarised in Table 4.

Table 4: Summary of Rising Head Test Results

Monitoring Well Location	Estimated Hydraulic Conductivity (m/s)
BH1	3.9×10^{-8}
BH2	3.4×10^{-8}
BH5	1.8×10^{-8}
BH6	3.6×10^{-8}
BH101	2.9×10^{-8}
BH102	1.6×10^{-8}
BH103	5.3×10^{-8}

8. Laboratory Testing

Laboratory testing was undertaken following completion of the 2024 investigation on selected samples for the following:

- Atterberg Limits; and,
- Aggressivity to buried steel and concrete (pH, electrical conductivity, sulphate and chloride ion content).

The laboratory results are summarised in Table 5 and Table 6. The detailed laboratory certificates of analysis are included in Appendix D.

Table 5: Summary of Plasticity Laboratory Tests

Borehole	Material	Depth (m)	LL (%)	PL (%)	PI (%)
BH7	Fill / Sandy Clay	0.15-0.55	17	14	3

Notes: LL=Liquid Limit, PL=Plastic Limit, PI=Plasticity Index

Table 6: Summary of Chemical Laboratory Tests

Borehole	Material	Depth (m)	Conductivity (µS/cm)	pH	Cl (PPM)	SO_4 (PPM)
BH3	Clayey Sand	0.5-0.6	190	4.8	150	150
BH7	Sand (extremely weathered rock)	0.9-1.0	92	7.9	20	41

9. Comments

9.1 Geotechnical Model

The subsurface profile observed during the investigations has been grouped into four geotechnical units as summarised in Table 7.

Table 7: Summary of Geotechnical Model Units

Unit	Name	Description
1	FILL	Concrete pavements, and/or sand or clay fill with varying proportions of silt, gravel, organic matter and building rubble.
2	RESIDUAL SOIL & EXTREMELY WEATHERED SANDSTONE	Residual sand and clayey sand, and extremely weathered sandstone. Includes a relatively thin layer of very low strength weathered sandstone near the top of the rock profile, encountered in some locations.
3	L-M & M STRENGTH SANDSTONE	Generally low to medium or medium strength, moderately and highly weathered sandstone. Includes some low strength sandstone near the top of the rock profile, and fractured high strength sandstone immediately above Unit 4
4	M-H and H STRENGTH SANDSTONE	Generally high strength, moderately weathered grading to fresh, slightly fractured and relatively unbroken sandstone, with some discrete low strength bands and zones of medium or medium to high strength.

Five cross-sections (A-A', B-B', C-C', D-D' and E-E') showing the interpreted subsurface profile between the borehole locations are shown on Drawings 2, 3, 4, 5 and 6 in Appendix B.

9.2 Dilapidation Surveys

Dilapidation surveys should be carried out on adjacent buildings, pavements and infrastructure that may be affected by the excavation works. The dilapidation surveys should be undertaken before the commencement of any excavation work in order to document any existing defects so that claims for damage due to construction related activities can be accurately assessed.

TfNSW may require a dilapidation survey of the existing Metro tunnels.

9.3 Excavation Conditions

It is expected that excavation for the basements will require the removal of soil and low to medium strength rock then mostly slightly fractured and unbroken, medium to high and high strength sandstone.

Excavation of soil and very low to low strength rock (if encountered) (i.e., Unit 1 and Unit 2) should be achievable using conventional earthmoving equipment, however, the assistance of rock hammering or ripping will probably be required for effective removal of any medium to high strength ironstone bands within the weathered rock profile. Excavation of low to medium, medium and high strength rock (Unit 3 and Unit 4) may require heavy ripping with a large bulldozer together with the use of hydraulic rock breakers for effective removal of this material. Some of the unbroken, high strength rock may be effectively unrippable with very low productivity.

The detailed excavation for footings, services and side walls within medium strength or stronger rock will generally require the use of a rotary rock saw or grinder, or hydraulic rock hammers.

The excavation rate that can be achieved, particularly within high strength rock, varies considerably and is dependent upon the degree of jointing in the rock, the rock strength, the type of machinery being used and the skill of the operator. It is suggested that bulk excavation tenderers be required to make their own assessment of the equipment required to carry out the work.

9.4 Vibrations

During excavation, it will be necessary to use appropriate methods and equipment to keep ground vibrations at adjacent buildings and structures within acceptable limits. The level of acceptable vibration is dependent on various factors including the type of structure (e.g. rail tunnels, reinforced concrete or brick structures etc.), its structural condition, the frequency range of vibrations produced by the construction equipment, the natural frequency of the structure and the vibration transmitting medium.

Ground vibration can be strongly perceptible to humans at levels above 2.5 mm/s peak particle velocity (PPVi). This is generally much lower than the vibration levels required to cause structural damage to buildings. The Australian Standard AS2670.2-1990 “Evaluation of human exposure to whole-body vibrations – continuous and shock induced vibrations in buildings (1-80 Hz)” indicates an acceptable day time limit of 8 mm/s PPVi for human comfort.

Based on the experience of DP and with reference to AS2670, it is suggested that a maximum PPVi of 8 mm/s (applicable at the foundation level of existing buildings) be employed at this site for both architectural and human comfort considerations, although this vibration limit may need to be reduced if there are sensitive buildings, structures or equipment in the area. The vibration limit should be reviewed once dilapidation surveys are completed.

In relation to rail tunnels below Waterloo Road, further advice on the vibration criteria will need to be sought from Transport for NSW (TfNSW). Based on our experience, it is anticipated that TfNSW may nominate a vibration limit of between 12.5 mm/s and 20 mm/s for the rail tunnels.

Douglas has carried out extensive monitoring of vibration levels from various earthmoving equipment over many years and maintains a database of recorded vibration levels at varying distances.

Based on Douglas’ experience, the attenuation distances summarised in Table 8 could be used as a starting point for the selection of excavation equipment, considering the likely minimum distances between operational plant during excavation and nearby receivers (i.e., the distance

between the excavation footprint and adjacent buildings). However, as the magnitude of vibration transmission is site specific, it is recommended that a vibration trial be undertaken at the commencement of rock excavation. The trial may indicate that smaller or different types of excavation equipment should be used for bulk (or detailed) excavation purposes.

Table 8: Approximate Attenuation Distances for Excavation Equipment

Plant / Hammer Size	Estimated average distance from plant by which vibration would attenuate to the provisional allowed limit of 8 mm/s
Rock Saw on Excavator	1.0 m
Rock hammer < 500 kg operating weight	3.0 m*
Rock hammer 501-1000 kg operating weight	3.5 m*
Rock hammer > 1000 kg operating weight	5.5 m*

Note: *Buffer distances for rock hammers may be reduced by prior saw cutting along / parallel to the excavation boundaries. The degree of reduction will need to be confirmed with a vibration trial.

9.5 Disposal of Excavated Material

All excavated materials will need to be disposed of in accordance with the provisions of the current legislation and guidelines including the *Waste Classification Guidelines* (EPA, 2014). This includes fill and natural materials that may be removed from the site.

9.6 Excavation Support

9.6.1 Batter Slopes and Vertical Rock Faces

Suggested temporary and permanent batter slopes for unsupported excavations (up to a maximum height of 4 m in Unit 1 and Unit 2) are shown in Table 9.

If surcharge loads are applied near the crest of the slope or taller batters are required, then further specific geotechnical review and probably flatter batters or stabilisation using rock bolts or soil nails may be required.

Table 9: Recommended Batter Slopes for Unsupported Material

Exposed Material	Maximum Temporary Batter Slope (H : V)	Maximum Permanent Batter Slope (H : V)
Unit 1 and Unit 2 (Fill, Residual Soil, Extremely Weathered and Very Low Strength Sandstone)	1 : 1	2 : 1**
Unit 3 and Unit 4 Low to medium, medium and high strength sandstone	Vertical*	Vertical*

Note: * Subject to jointing assessment by experienced Geotechnical Engineer/Engineering Geologist

** Permanent batters in soil may need to be reduced to 3H: 1V to facilitate maintenance of grassed slopes, if required

Competent low to medium strength or stronger sandstone (Unit 3 and Unit 4) will generally be stable when cut vertically provided there are no adversely oriented joints or other defects present. All vertical faces in rock should be inspected by a geotechnical engineer at 1.5 m depth intervals to check for adversely inclined joints and to assess whether additional stabilisation measures (such as rock bolts or shotcrete) are required.

It is noted that such additional stabilisation measures are expected to be required more frequently within the Unit 3 material (if cut vertically unsupported) due to the presence of seams and fractured zones observed in the boreholes but could also be required in localised areas of Unit 4.

Given that the typical main joint sets within Hawkesbury Sandstone in the Sydney region are oriented at a slight angle to the proposed excavation faces, it is expected that there will be some narrow wedges formed where these near vertical joints intersect the excavation faces and some rock bolts may be required to stabilise these wedges (or the wedges may need to be removed).

9.6.2 Retaining Walls / Shoring

Where batter slopes cannot be used, shoring walls will be required to support the filling, soils and very low to low strength rock. Anchored soldier pile walls are often used to provide temporary retaining support to soils and weathered rock. The soldier piles are usually spaced at approximately 2 m to 2.5 m centres, however, more closely spaced piles may be required to reduce wall movements, or prevent collapse of infill materials, particularly where pavements, structures or services are located in close proximity to the excavation.

It may be possible to terminate some or all of the shoring piles within unsupported Unit 4 high strength sandstone above the bulk excavation level. In this case it will be important for a geotechnical engineer to assess the stability of the rock directly beneath each pile. The toe of the piles which terminate above bulk excavation level will also need to be restrained with rock bolts or anchors. Any piles taking significant or permanent structural loads should be taken to below bulk excavation level.

It is suggested that preliminary design of cantilevered shoring systems (or shoring with one row of anchors or propping) be based on a triangular earth pressure distribution using the earth pressure coefficients provided in Table 10. 'Active' earth pressure coefficient (K_a) values may be used where some wall movement is acceptable, and 'at rest' earth pressure (K_o) values should be used where the wall movement needs to be reduced (i.e. adjacent to existing structures or utilities).

Table 10: Recommended Design Parameters for Shoring Systems

Material	Unit Weight (kN/m³)	Earth Pressure Coefficient	
		Active (Ka)	At Rest (Ko)
Unit 1: Fill	20	0.4	0.6
Unit 2: Residual soil and extremely weathered rock	20	0.3	0.5
Unit 3 and Unit 4: Low to medium, medium and high strength Sandstone	22	0*	0*

Note *subject to geotechnical inspection. 'at rest' coefficient does not account for stress relief movements in rock

Where multiple rows of anchors or propping are used it is suggested that preliminary design of shoring walls could be based a trapezoidal earth pressure distribution with a maximum pressure calculated based on 4H kPa where H is equal to the retained height of soil and very low to low strength rock. The maximum pressure should be increased to 6H where wall movement needs to be reduced. In each case the maximum pressure generally acts over the central 60% of the wall, reducing to zero at the top and base.

The design of the shoring should allow for all surcharge loads, including building footings, inclined slopes behind the wall, traffic, site sheds, and construction related activities.

Shoring walls should also be designed for full hydrostatic pressures unless drainage of the ground behind impermeable walls can be provided. Drainage could comprise 150 mm wide strip drains pinned to the face at 1 m to 2 m centres behind shotcrete in-fill panels. The base of the strip drains should extend out from the shoring wall to allow any seepage to flow into a perimeter toe drain which is connected to the stormwater drainage system.

Detailed design of retaining walls should be carried out using computer programs capable of modelling soil-structure interaction, such as WALLAP or PLAXIS, which can account for the effects of soil-structure interaction as well as behaviour during the progressive stages of wall construction, anchoring / propping and bulk excavation.

9.6.3 Passive Resistance

Passive resistance for piles founded in medium to high or high strength rock below the base of the bulk excavation (including allowance for services and/or footings) may be based on an ultimate passive restraint value of 6,000 kPa (subject to geotechnical inspection to assess for the presence of adversely oriented defects).

This ultimate value represents the pressure mobilised at high displacements and therefore it will be necessary to incorporate a factor of safety of at least 2 to limit wall movement. The top 0.5 m of the socket should be ignored due to possible disturbance and over-excavation.

9.6.4 Ground Anchors

The design of temporary and permanent ground anchors/rock bolts for the support of excavations and/or shoring systems may be carried out on the basis of the maximum bond stresses given in Table 11.

Table 11: Recommended Bond Stresses for Rock Anchor Design

Material Description	Maximum Allowable Bond Stress (kPa)	Maximum Ultimate Bond Stress (kPa)
Unit 3: Low to Medium and Medium strength Sandstone	350	700
Unit 4: High strength Sandstone	600-1,000	1,200-2,000

The parameters given in Table 11 assume that the drilled holes are clean and adequately flushed. The anchors should be bonded behind a line drawn up at 45 degrees from the base of the shoring or the top of free-standing medium strength or stronger rock, and "lift-off" tests should be carried out to confirm the anchor capacities. It is suggested that ground anchors should be proof loaded to 125% of the design Working load and locked-off at no higher than 80% of the Working load.

9.7 Excavation Induced Ground Movement

Horizontal movements due to stress relief will occur during the excavation works. Based on published literature and Douglas' experience, the lateral stress relief movements associated with excavation in Hawkesbury Sandstone is likely to be in the order of 0.05% to 0.15% of the excavation height in competent rock, (i.e., 0.5 mm to 1.5 mm per metre excavation height), which corresponds to approximately 12 mm to 36 mm for approximately 24 m depth of excavation in rock. The predicted deflections would generally be greatest at the centre of the excavated faces and would reduce with distance from the excavation face/boundary.

It is unlikely to be practical to provide restraint (i.e., anchoring) for the relatively high in-situ horizontal stresses associated with stress relief movements. Therefore, it is recommended that appropriate allowance be made for movements of this order in construction and planning.

Precise survey monitoring of excavation faces and nearby buildings/structures should be carried out to assess vertical and horizontal movements during the excavation. The survey should commence prior to excavation to provide a baseline and should continue every 1.5 m drop of the excavation. If surveyed deflections show a rapid increase in the rate of movement or exceed the predicted movements, then the structural engineer and geotechnical engineer should be contacted for immediate review.

9.8 Foundations

It is expected that the bulk excavation for the basement will expose medium to high and high strength sandstone at bulk level. The proposed structure should be founded uniformly on medium and medium to high strength sandstone.

Pads founded on rock in the base of the excavation may be designed using the values given in Table 12. For bored piles, if required, the same end bearing parameters may be adopted, and shaft adhesion values for uplift (tension) may be taken as being equal to 70% of the shaft adhesion values for compression in Table 12.

Table 12: Recommended Design Parameters for Foundation Design

Foundation Stratum	Maximum Allowable Pressure (Serviceability)		Maximum Ultimate Pressure (Ultimate)		Young's Modulus, E (MPa)
	End Bearing (kPa)	Shaft Adhesion (Compression) (kPa)	End Bearing (kPa)	Shaft Adhesion (Compression) (kPa)	
Unit 3: Low to Medium and Medium strength Sandstone	3,500	350	30,000	700	700
Unit 4: High strength Sandstone	3,500-6,000*	600-1,000	40,000-80,000	1,200-2,000	1,500-2,000

Note: *Higher bearing pressures allowable subject to additional investigation and/or spoon testing as per Table 13

Higher allowable bearing pressures of 6-8 MPa (and possibly higher) could be adopted in the Unit 4 medium to high and high strength sandstone provided that additional investigation (either prior to or during construction) and/or spoon testing is completed. Spoon testing involves drilling a 50 mm diameter hole below the base of the footing, to a depth of 1.5 times the footing width, followed by testing to check for the presence of weak/clay bands. If weak seams are detected, then footings may need to be taken deeper to reach suitable foundation material. It is noted that spoon testing is typically not practical beyond depths of 2 m to 2.5 m, and if verification is required for larger footings (e.g., building core rafts), then it may be necessary to drill a geotechnical cored borehole in lieu of spoon testing. This additional investigation would not be required for footings adopting an allowable bearing pressure of 3,500 kPa.

The recommended minimum required investigation and spoon testing depends on the design allowable bearing pressure. The minimum recommended investigation and testing requirements for higher bearing pressures are summarised in Table 13.

Table 13: Recommended Minimum Investigation Requirements for Higher Bearing Pressures

Allowable Bearing Pressure for Unit 4 High Strength Sandstone (kPa)	Minimum Recommended Validation Requirements
6,000-8,000	Cored bores at max 10m grid or cored bores for 50% of footings, and spoon testing for remainder (i.e., spoon testing or cored bore at **every** footing)

Footings (i.e., pads or piles) founded on the edge of vertical rock excavations in competent medium or high strength sandstone, if required, would be subject to assessment of jointing in the rock. Generally, the allowable bearing pressure for footings founded near the edge of vertical rock excavations on medium strength sandstone or stronger should be limited to about 1,000 kPa. If deeper excavation exposes adverse jointing in the rock below the footings, then stabilisation using rock bolts/anchors and/or underpinning may be required.

Foundations proportioned on the basis of the allowable bearing pressures in Table 12 and Table 13 would be expected to experience total settlements of less than 1% of the footing width under the applied working load, with differential settlements between adjacent columns expected to be less than half of this value.

Footings designed using ultimate values and Limit State Design will need to consider serviceability which usually governs the design in this case.

All footings should be inspected by a geotechnical engineer to confirm that foundation conditions are suitable for the design parameters.

9.9 Groundwater

Observations to date indicate that groundwater levels across most of the site have been relatively consistent over the periods of monitoring, and also between the separate instances of monitoring between 2024 and 2025, with fluctuations of generally less than 0.5 m, and with groundwater elevations broadly between RL 36 m in the southwest of the site and RL 33 m to 34 m in the northeast of the site.

An exception to this general trend of groundwater levels gradually falling towards the northeast was observed in BH5, where a significant drop of more than 6 m in the observed groundwater level between 2024 and 2025 is noted. It is noted that a similarly lowered groundwater level is not observed in BH101 (to-date), which is approximately 20 m from BH5. The lowered groundwater level observed in BH5 is interpreted to be associated with basement constructions ongoing to the northwest of the site (that had either only recently or not yet commenced in 2025). The behaviour of groundwater in rock masses is controlled primarily by flow through fractures (bedding, joints, etc.) in the rock mass, and whether these fractures form pathways establishing connectivity between monitoring wells and dewatering sites nearby is a major factor affecting the time lag between dewatering nearby commencing and being able to observe the resulting drawdown in monitoring wells.

The specifics of the groundwater related interactions between the proposed basement, existing nearby basements, Shrimpton's Creek to the southeast and the Metro tunnels to the northeast

are likely complex, but ultimately this complexity is not expected to present any significant complications for the proposed development.

It is expected that groundwater seepage inflows will occur through joints and along bedding planes within the rock exposed in the basement floor and walls above the groundwater table, particularly following periods of extended rainfall.

Additionally, it is expected that the proposed basement excavation (to approximately RL 24 m) will intercept the observed groundwater table in rock, and extend relatively far below it.

During construction and in the long term, it is anticipated that seepage into the excavation could be controlled by perimeter and subfloor drainage connected to a sump-and-pump system. On this basis, a drained basement may be considered for this site, however this will be subject to approval by Council and relevant authorities and will require additional monitoring and analysis for approval. It is expected that numerical analysis will be required to assess the impacts of dewatering.

Generally, water collected from dewatering operations should be suitable for disposal by pumping to stormwater drains subject to confirmation testing of groundwater quality and approval from the Council.

Given the proposed excavation depth below the observed groundwater levels on the site, it is expected that inflows will not be insignificant overall, and although inflow rates are expected to 'on-average' be manageable using conventional dewatering techniques, relatively large/rapid inflows (driven by large hydraulic gradients) may occur through discrete fractures in the rock as the excavation depth increases. Where higher than typical/expected inflows may occur locally in the rock faces (i.e., along fractured zones or defects), some form of grouting may be required to reduce inflow rates.

It is possible that seepage into the basement may give rise to precipitation of red brown iron oxide residue from the oxidisation of soluble iron likely to be present within the groundwater and therefore perimeter and subfloor drains should be designed for easy access to allow for inspection, maintenance and periodic cleaning.

If it is necessary or preferred to avoid issues with long term management of groundwater inflows, then a water-tight 'tanked' basement could be adopted. A tanked basement would need to be designed to resist uplift forces associated with hydrostatic groundwater pressures, which could be in the order of more than 25 m of hydraulic head. Alternatively, a partially tanked basement could be adopted eliminating inflows to lower floor but accepting some inflow (and overall reduced volume) to the upper floor.

9.10 Aggressivity

In accordance with AS2159-2009, the results of the chemical laboratory testing indicate that the tested samples have the following exposure classifications:

- "Mild" to "Non-aggressive" to buried concrete; and
- "Non-aggressive" to buried steel.

It would be prudent to adopt a minimum exposure classification of 'Mild' for all buried structural elements.

9.11 Seismic Design

In accordance with the earthquake loading standard, AS1170.4-2007, the site has a hazard factor (Z) of 0.08 and a site sub-soil class of shallow rock (B_e).

9.12 Adjacent Rail Infrastructure

On this site the design of the excavations and support systems will need to consider any requirements from Transport of NSW (TfNSW) in relation to the rail corridor.

A survey plan and section showing the rail corridor and infrastructure in relation to the site boundaries and proposed development will be required for detailed assessment and review by TfNSW.

The proposed excavations are expected to be greater than 2 m depth within the "second reserve" boundary, as outlined in the "Sydney Metro Underground Corridor Protection Technical Guidelines" (July 2025). The guidelines indicate that excavations for basements within the second reserve to depths greater than 2 m are allowed; but require assessment and approval by TfNSW.

Generally, TfNSW do not allow installation of anchors or bolts within the first reserve, but (subject to assessment) these may be allowed in the second reserve. Further review and discussion with TfNSW will be required to assess excavation and support requirements adjacent to the rail easement.

Footings are also typically not allowed within the first reserve and are allowed within the second reserve subject to assessment and load restrictions. It is expected that all footings for the proposed development would be outside the first reserve, and some would be inside the second reserve.

The proposed excavation depth is significant, and although the rail tunnels are set back significantly from the excavation; the proposed excavation depth extends below the tunnel invert level. The impacts on the tunnels due to the proposed development may not be negligible. The effects of the proposed excavation on the tunnels will need to be carefully assessed and it may be necessary to reduce/taper the excavation depth towards the northeast of the site (i.e., closer to the tunnels) to mitigate the effect of stress relief movements.

A separate assessment report discussing this in more detail has been prepared by TTW (reference: *231396-TTW-STR-RPT-001 [1] Sydney Metro Impact Assessment*) with geotechnical input from Douglas.

9.13 Site Preparation and Earthworks

Proposed finished surface levels around the proposed basement are not known at this stage. It is expected that finished levels will be similar to surrounding street levels and significant raising of site levels will not be necessary. Nonetheless, some minor earthworks for site levelling purposes, construction of working platforms, or pavement subgrade formation may be required.

The following general subgrade preparation measures are recommended for the placement of engineered fill for site levelling:

- Strip existing fill to expose natural material (residual soil or rock);
- Proof roll the exposed surface using a minimum 10 tonne smooth drum roller in non-vibration mode. The surface should be rolled a minimum of six times with the last two passes observed by an experienced geotechnical engineer to identify any 'soft spots';
- Any soft or heaving materials identified during proof rolling should be removed, or otherwise treated as directed by the geotechnical engineer;
- Fill should be placed in layers of 300 mm maximum loose thickness and compacted to a dry density ratio of between 98% and 102% Standard compaction, with a moisture content maintained within 2% of Standard Optimum Moisture Content (OMC); and
- Within the upper 300 mm of the design subgrade level, increase the minimum density ratio to 100% Standard compaction.

Geotechnical inspection and testing of the filling should be carried out in accordance with AS3798-2007.

Excavated fill and natural material from the site may be suitable for re-use as engineered fill from a geotechnical point of view, provided it does not contain peaty clays or excessively silty material, organic material, or other deleterious materials (e.g., rubbish). Oversize material (> 100 mm diameter) will inhibit compaction and should also be removed. The suitability for re-use will also depend on the contamination status of the material.

9.13.1 Subgrade Preparation

Subgrades formed in residual soil or controlled (i.e., engineered fill) should be compacted to a dry density ratio of 100% Standard compaction, with a moisture content maintained within 2% of Standard OMC.

If subgrades are formed in rock, the rock should be ripped to a depth of 300 mm below the design subgrade level and then recompacted to a dry density ratio of 100% Standard compaction, with a moisture content maintained within 2% of Standard OMC. Adequate provisions for sub-soil drainage in the ripped and replaced subgrade should be made.

9.13.2 Pavements

A design CBR value of 3% is suggested as a preliminary value for engineered clayey fill and residual soils at this site, based on Douglas' experience with similar materials subject to earthworks and the final condition of the soils within the upper 1 m of the design subgrade level. This value must be confirmed by undertaking CBR testing on the prepared subgrade material during construction.

To maintain this design value, or any other amended / alternate design value, it will be necessary to prepare the subgrade soils into a well-compacted condition, free of significant adverse long-term or differential settlements under service loading.

The pavement designer should consider the following:

- Undertaking CBR tests on the prepared surface after earthworks completion to confirm the ongoing validity of the preliminary design CBR value;
- The loads applied to the various pavements over their design life, including normal road vehicle pavements, commercial in-service truck loads and possibly construction machinery loads;
- The magnitude and frequency of load repetitions of the various vehicles using each pavement;
- The need to provide edge constraints to the pavement, particularly along the crest of batters, immediately behind retaining walls and along the edge of landscaped areas;
- The position and grading of subsurface drainage lines, particularly with reference to pavement edges and internal landscaped openings;
- Pavement surface gradients and water flow to drainage lines. One-way cross fall pavements may be beneficial, otherwise regularly spaced and centralised drainage collection pits should be installed;
- The backfilling and compaction of service trenches, particularly below heavily loaded pavements; and
- The ability of any filled subgrade to carry the load of the pavement.

Surface (cross-fall) and subsoil drainage should be incorporated into the pavement designs to prevent the ingress of moisture into the pavement layers and any subsequent weakening of the pavement and subgrade layers.

In addition, a regular and long-term inspection and maintenance programme should be adopted by the operator of the pavement. The maintenance program should be primarily aimed at limiting the amount of moisture infiltrating to the subgrade (e.g. inspecting drainage lines and repairing as required, maintaining construction joints and sealing or repairing cracks as they develop).

10. Limitations

Douglas Partners (Douglas) has prepared this report for this project at 88 Waterloo Road, Macquarie Park NSW in accordance with Douglas' proposal dated 14 March 2025 and acceptance received from Cottonwood Development Pty Ltd. The work was carried out under a mutual Consultancy Agreement. This report is provided for the exclusive use of Cottonwood Development 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 Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas 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 Douglas' field testing has been completed.

Douglas' advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by Douglas 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. Douglas 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 Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

This report provides specialist advice only and no part of it is considered a Regulated Design under the Design and Building Practitioner Act 2020 (NSW).

Appendix A

About this Report

Terminology, Symbols and Abbreviations

Soil Descriptions

Rock Descriptions

Sampling, Testing and Excavation Methodology

About this Report

November 2023

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.

Copyright

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.

continued next page

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.

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Sampling, Testing and Excavation Methodology

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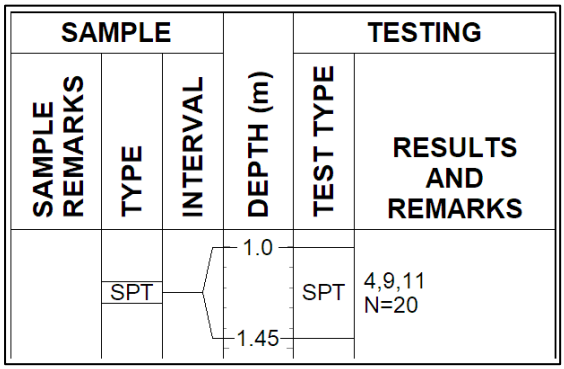
Sampling and Testing

A record of samples retained, and field testing performed is usually shown on a Douglas Partners' log with samples appearing to the left of a depth scale, and selected field and laboratory testing (including results, where relevant) appearing to the right of the scale, as illustrated below:



Sampling

The type or intended purpose for which a sample was taken is indicated by the following abbreviation codes.

Sample Type	Code
Auger sample	A
Bulk sample	B
Core sample	C
Disturbed sample	D
Sample from SPT test	SPT
Environmental sample	ES
Gas sample	G
Undisturbed tube sample	U[1]
Water sample	W
Piston sample	P
Core sample for unconfined compressive strength testing	UCS
Material Sample	MT

[1] – numeric suffixes indicate tube diameter/width in mm

The above codes only indicate that a sample was retained, and not that testing was scheduled or performed.

Field and Laboratory Testing

A record that field and laboratory testing was performed is indicated by the following abbreviation codes.

Test Type	Code
Pocket penetrometer (kPa)	PP
Photo ionisation detector (ppm)	PID
Standard Penetration Test x/y =x blows for y mm penetration HB = hammer bouncing HW = fell under weight of hammer	SPT
Shear vane (kPa)	V
Unconfined compressive strength, (MPa)	UCS

Field and laboratory testing (continued)

Test Type	Code
Point load test, (MPa), axial (A), diametric (D), irregular (I)	PLT(_)
Dynamic cone penetrometer, followed by blow count penetration increment in mm (cone tip, generally in accordance with AS1289.6.3.2)	DCP/150
Perth sand penetrometer, followed by blow count penetration increment in mm (flat tip, generally in accordance with AS1289.6.3.3)	PSP/150

Groundwater Observations

▷	seepage/inflow
▽	standing or observed water level
NFGWO	no free groundwater observed
OBS	observations obscured by drilling fluids

Drilling or Excavation Methods/Tools

The drilling/excavation methods used to perform the investigation may be shown either in a dedicated column down the left-hand edge of the log, or stated in the log footer. In some circumstances abbreviation codes may be used.

Method	Abbreviation Code
Toothed bucket	TB[1]
Mud/blade bucket	MB[1]
Ripping tyne/ripper	R
Rock breaker/hydraulic hammer	RB
Hand auger	HA[1]
NMLC series coring	NMLC
HMLC series coring	HMLC
NQ coring	NQ3
HQ coring	HQ3
PQ coring	PQ3
Push tube	PT[1]
Rock roller	RR[1]
Solid flight auger. Suffixes: /T = tungsten carbide tip, /V = v-shaped tip	AD[1]
Sonic drilling	SON[1]
Vibrocore	VC[1]
Wash bore (unspecified bit type)	WB[1]
Existing exposure	X
Hand tools (unspecified)	HAND
Predrilled	PD
Diatube	DT[1]
Hollow flight auger	HSA[1]
Vacuum excavation	VE

[1] – numeric suffixes indicate tool diameter/width in mm

Douglas PARTNERS

Terminology, Symbols and Abbreviations

November 2023

Introduction to Terminology, Symbols and Abbreviations

Douglas Partners' reports, investigation logs, and other correspondence may use terminology which has quantitative or qualitative connotations. To remove ambiguity or uncertainty surrounding the use of such terms, the following sets of notes pages may be attached Douglas Partners' reports, depending on the work performed and conditions encountered:

- Soil Descriptions;
- Rock Descriptions; and
- Sampling, insitu testing, and drilling methodologies

In addition to these pages, the following notes generally apply to most documents.

Abbreviation Codes

Site conditions may also be presented in a number of different formats, such as investigation logs, field mapping, or as a written summary. In some of these formats textual or symbolic terminology may be presented using textual abbreviation codes or graphic symbols, and, where commonly used, these are listed alongside the terminology definition. For ease of identification in these note pages, textual codes are presented in these notes in the following style `XW`. Code usage conforms with the following guidelines:

- Textual codes are case insensitive, although herein they are generally presented in upper case; and
- Textual codes are contextual (i.e. the same or similar combinations of characters may be used in different contexts with different meanings (for example `PL` is used for plastic limit in the context of soil moisture condition, as well as in `PL(A)` for point load test result in the testing results column)).

Data Integrity Codes

Subsurface investigation data recorded by Douglas Partners is generally managed in a highly structured database environment, where records "span" between a top and bottom depth interval. Depth interval "gaps" between records are considered to introduce ambiguity, and, where appropriate, our practice guidelines may require contiguous data sets. Recording meaningful data is not always appropriate (for example assigning a "strength" to a concrete pavement) and the following codes may be used to maintain contiguity in such circumstances.

Term	Description	Abbreviation Code
Core loss	No core recovery	`KL`
Unknown	Information was not available to allow classification of the property. For example, when auguring in loose, saturated sand auger cuttings may not be returned.	`UK`
No data	Information required to allow classification of the property was not available. For example, if drilling is commenced from the base of a hole predrilled by others	`ND`
Not Applicable	Derivation of the properties not appropriate or beyond the scope of the investigation. For example, providing a description of the strength of a concrete pavement	`NA`

Graphic Symbols

Douglas Partners' logs contain a "graphic" column which provides a pictorial representation of the basic composition of the material. The symbols used are directly representing the material name stated in the adjacent "Description of Strata" column, and as such no specific graphic symbology legend has been provided in these notes.

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Soil Descriptions

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All materials which are not considered to be "in-situ rock" are described in general accordance with the soil description model of AS 1726-2017 Part 6.1.3, and can be broken down into the following description structure:

The "classification" comprises a two character "group symbol" providing a general summary of dominant soil characteristics. The "name" summarises the particle sizes within the soil which most influence its behaviour. The detailed description presents more information about composition, condition, structure, and origin of the soil.

Classification, naming and description of soils require the relative proportion of particles of different sizes within the whole soil mixture to be considered.

Particle size designation and Behaviour Model

Solid particles within a soil are differentiated on the basis of size.

The engineering behaviour properties of a soil can subsequently be modelled to be either "fine grained" (also known as "cohesive" behaviour) or "coarse grained" ("non cohesive" behaviour), depending on the relative proportion of fine or coarse fractions in the soil mixture.

Particle Size Designation	Particle Size (mm)	Behaviour Model	
		Behaviour	Approximate Dry Mass
Boulder	>200	Excluded from particle behaviour model as "oversize"	
Cobble	63 - 200		
Gravel[1]	2.36 - 63	Coarse	>65%
Sand[1]	0.075 - 2.36		
Silt	0.002 - 0.075	Fine	>35%
Clay	<0.002		

[1] – refer grain size subdivision descriptions below

The behaviour model boundaries defined above are not precise, and the material behaviour should be assumed from the name given to the material (which considers the particle fraction which dominates the behaviour, refer "component proportions" below), rather than strict observance of the proportions of particle sizes. For example, if a material is named a "Sandy CLAY", this is indicative that the material exhibits fine grained behaviour, even if the dry mass of coarse grained material may exceed 65%.

Component proportions

The relative proportion of the dry mass of each particle size fraction is assessed to be a "primary", "secondary", or "minor" component of the soil mixture, depending on its influence over the soil behaviour.

Component Proportion Designation	Definition[1]	Relative Proportion	
		In Fine Grained Soil	In Coarse Grained Soil
Primary	The component (particle size designation, refer above) which dominates the engineering behaviour of the soil	The clay/silt component with the greater proportion	The sand/gravel component with the greater proportion
Secondary	Any component which is not the primary, but is significant to the engineering properties of the soil	Any component with greater than 30% proportion	Any granular component with greater than 30%; or Any fine component with greater than 12%
Minor[2]	Present in the soil, but not significant to its engineering properties	All other components	All other components

[1] As defined in AS1726-2017 6.1.4.4

[2] In the detailed material description, minor components are split into two further sub-categories. Refer "identification of minor components" below.

Composite Materials

In certain situations, a lithology description may describe more than one material, for example, collectively describing a layer of interbedded sand and clay. In such a scenario, the two materials would be described independently, with the names preceded or followed by a statement describing the arrangement by which the materials co-exist. For example, "INTERBEDDED Silty CLAY AND SAND".

Classification

The soil classification comprises a two character group symbol. The first character identifies the primary component. The second character identifies either the grading or presence of fines in a coarse grained soil, or the plasticity in a fine grained soil. Refer AS1726-2017 6.1.6 for further clarification.

Soil Name

For most soils, the name is derived with the primary component included as the noun (in upper case), preceded by any secondary components stated in an adjective form. In this way, the soil name also describes the general composition and indicates the dominant behaviour of the material.

Component [1]	Prominence in Soil Name
Primary	Noun (eg "CLAY")
Secondary	Adjective modifier (eg "Sandy")
Minor	No influence

[1] – for determination of component proportions, refer component proportions on previous page

For materials which cannot be disaggregated, or which are not comprised of rock or mineral fragments, the names "ORGANIC MATTER" or "ARTIFICIAL MATERIAL" may be used, in accordance with AS1726-2017 Table 14.

Commercial or colloquial names are not used for the soil name where a component derived name is possible (for example "Gravelly SAND" rather than "CRACKER DUST").

Materials of "fill" or "topsoil" origin are generally assigned a name derived from the primary/secondary component (where appropriate). In log descriptions this is preceded by uppercase "FILL" or "TOPSOIL". Origin uncertainty is indicated in the description by the characters (?), with the degree of uncertainty described (using the terms "probably" or "possibly" in the origin column, or at the end of the description).

Identification of minor components

Minor components are identified in the soil description immediately following the soil name. The minor component fraction is usually preceded with a term indicating the relative proportion of the component.

Minor Component Proportion Term	Relative Proportion	
	In Fine Grained Soil	In Coarse Grained Soil
With	All fractions: 15-30%	Clay/silt: 5-12% sand/gravel: 15-30%
Trace	All fractions: 0-15%	Clay/silt: 0-5% sand/gravel: 0-15%

The terms "with" and "trace" generally apply only to gravel or fine particle fractions. Where cobbles/boulders are encountered in minor proportions (generally less than about 12%) the term "occasional" may be used. This term describes the sporadic distribution of the material within the confines of the investigation excavation only, and there may be considerable variation in proportion over a wider area which is difficult to factually characterise due to the relative size of the particles and the investigation methods.

Soil Composition

Plasticity

Descriptive Term	Laboratory liquid limit range	
	Silt	Clay
Non-plastic materials	Not applicable	Not applicable
Low plasticity	≤50	≤35
Medium plasticity	Not applicable	>35 and ≤50
High plasticity	>50	>50

Note, Plasticity descriptions generally describe the plasticity behaviour of the whole of the fine grained soil, not individual fine grained fractions.

Grain Size

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

Grading

Grading Term	Particle size (mm)
Well	A good representation of all particle sizes
Poorly	An excess or deficiency of particular sizes within the specified range
Uniformly	Essentially of one size
Gap	A deficiency of a particular size or size range within the total range

Note, AS1726-2017 provides terminology for additional attributes not listed here.

Soil Condition

Moisture

The moisture condition of soils is assessed relative to the plastic limit for fine grained soils, while for coarse grained soils it is assessed based on the appearance and feel of the material. The moisture condition of a material is considered to be independent of stratigraphy (although commonly these are related), and this data is presented in its own column on logs.

Applicability	Term	Tactile Assessment	Abbreviation code
Fine	Dry of plastic limit	Hard and friable or powdery	w<PL
	Near plastic limit	Can be moulded	w=PL
	Wet of plastic limit	Water residue remains on hands when handling	w>PL
	Near liquid limit	"oozes" when agitated	w=LL
	Wet of liquid limit	"oozes"	w>LL
Coarse	Dry	Non-cohesive and free running	D
	Moist	Feels cool, darkened in colour, particles may stick together	M
	Wet	Feels cool, darkened in colour, particles may stick together, free water forms when handling	W

The abbreviation code NDF, meaning "not-assessable due to drilling fluid use" may also be used.

Note, observations relating to free ground water or drilling fluids are provided independent of soil moisture condition.

Consistency/Density/Compaction/Cementation/Extremely Weathered Material

These concepts give an indication of how the material may respond to applied forces (when considered in conjunction with other attributes of the soil). This behaviour can vary independent of the composition of the material, and on logs these are described in an independent column and are generally mutually exclusive (i.e it is inappropriate to describe both consistency and compaction at the same time). The method by which the behaviour is described depends on the behaviour model and other characteristics of the soil as follows:

- In fine grained soils, the "consistency" describes the ease with which the soil can be remoulded, and is generally correlated against the materials undrained shear strength;
- In granular materials, the relative density describes how tightly packed the particles are, and is generally correlated against the density index;
- In anthropogenically modified materials, the compaction of the material is described qualitatively;
- In cemented soils (both natural and anthropogenic), the cemented "strength" is described qualitatively, relative to the difficulty with which the material is disaggregated; and
- In soils of extremely weathered material origin, the engineering behaviour may be governed by relic rock features, and expected behaviour needs to be assessed based the overall material description.

Quantitative engineering performance of these materials may be determined by laboratory testing or estimated by correlated field tests (for example penetration or shear vane testing). In some cases, performance may be assessed by tactile or other subjective methods, in which case investigation logs will show the estimated value enclosed in round brackets, for example (VS).

Consistency (fine grained soils)

Consistency Term	Tactile Assessment	Undrained Shear Strength (kPa)	Abbreviation Code
Very soft	Extrudes between fingers when squeezed	<12	VS
Soft	Mouldable with light finger pressure	>12 - ≤25	S
Firm	Mouldable with strong finger pressure	>25 - ≤50	F
Stiff	Cannot be moulded by fingers	>50 - ≤100	St
Very stiff	Indented by thumbnail	>100 - ≤200	VSt
Hard	Indented by thumbnail with difficulty	>200	H
Friable	Easily crumbled or broken into small pieces by hand	-	Fr

Relative Density (coarse grained soils)

Relative Density Term	Density Index	Abbreviation Code
Very loose	<15	VL
Loose	>15 - ≤35	L
Medium dense	>35 - ≤65	MD
Dense	>65 - ≤85	D
Very dense	>85	VD

Note, tactile assessment of relative density is difficult, and generally requires penetration testing, hence a tactile assessment guide is not provided.

Compaction (anthropogenically modified soil)

Compaction Term	Abbreviation Code
Well compacted	WC
Poorly compacted	PC
Moderately compacted	MC
Variably compacted	VC

Cementation (natural and anthropogenic)

Cementation Term	Abbreviation Code
Moderately cemented	MOD
Weakly cemented	WEK

Extremely Weathered Material

AS1726-2017 considers weathered material to be soil if the unconfined compressive strength is less than 0.6 MPa (i.e. less than very low strength rock). These materials may be identified as "extremely weathered material" in reports and by the abbreviation code XWM on log sheets. This identification is not correlated to any specific qualitative or quantitative behaviour, and the engineering properties of this material must therefore be assessed according to engineering principles with reference to any relic rock structure, fabric, or texture described in the description.

Soil Origin

Term	Description	Abbreviation Code
Residual	Derived from in-situ weathering of the underlying rock	RS
Extremely weathered material	Formed from in-situ weathering of geological formations. Has strength of less than 'very low' as per as1726 but retains the structure or fabric of the parent rock.	XWM
Alluvial	Deposited by streams and rivers	ALV
Estuarine	Deposited in coastal estuaries	EST
Marine	Deposited in a marine environment	MAR
Lacustrine	Deposited in freshwater lakes	LAC
Aeolian	Carried and deposited by wind	AEO
Colluvial	Soil and rock debris transported down slopes by gravity	COL
Slopewash	Thin layers of soil and rock debris gradually and slowly deposited by gravity and possibly water	SW
Topsoil	Mantle of surface soil, often with high levels of organic material	TOP
Fill	Any material which has been moved by man	FILL
Littoral	Deposited on the lake or seashore	LIT
Unidentifiable	Not able to be identified	UID

Cobbles and Boulders

The presence of particles considered to be "oversize" may be described using one of the following strategies:

- Oversize encountered in a minor proportion (when considered relative to the wider area) are noted in the soil description; or
- Where a significant proportion of oversize is encountered, the cobbles/boulders are described independent of the soil description, in a similar manner to composite soils (described above) but qualified with "MIXTURE OF".

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

[1] Rock strength classification is based on UCS. The UCS to $I_{s(50)}$ ratio varies significantly for different rock types and specific ratios may be required for each site. The point load Index ranges shown above are as suggested in AS1726 and should not be relied upon without supporting evidence.

The following abbreviation codes are used for soil layers or seams of material "within rock" but for which the equivalent UCS strength is less than 0.6 MPa.

Scenario	Abbreviation Code
The material encountered has an equivalent UCS strength of less than 0.6 MPa, and therefore is considered to be soil (as per Note 1 of Table 20 of AS 1726-2017). The properties of the material encountered over this interval are described in the "Description of Strata" and soil properties columns.	SOIL
The material encountered has an equivalent UCS strength of less than 0.6 MPa, and therefore is considered to be soil (as per Note 1 of Table 20 of AS 1726-2017). The prominence of the material is such that it can be considered to be a seam (as defined in Table 22 of AS1726-2017) and the properties of the material are described in the defect column.	SEAM

Degree of Weathering

The degree of weathering of rock is classified as follows:

Weathering Term	Description	Abbreviation Code
Residual Soil[1]	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.	RS
Extremely weathered[1]	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	XW
Highly weathered	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.	HW
Moderately weathered	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.	MW
Slightly weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.	SW
Fresh	No signs of decomposition or staining.	FR
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	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.	DW

[1] The parent rock type, of which the residual/extremely weathered material is a derivative, will be stated in the description (where discernible).

Degree of Alteration

The degree of alteration of the rock material (physical or chemical changes caused by hot gasses or liquids at depth) is classified as follows:

Term	Description	Abbreviation Code
Extremely altered	Material is altered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.	XA
Highly altered	The whole of the rock material is discoloured, usually by staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is changed by alteration. Some primary minerals are altered to clay minerals. Porosity may be increased by leaching or may be decreased due to precipitation of secondary materials in pores.	HA
Moderately altered	The whole of the rock material is discoloured, usually by 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.	MA
Slightly altered	Rock is slightly discoloured but shows little or no change of strength from fresh rock	SA
Note: If HA and MA cannot be differentiated use DA (see below)		
Distinctly altered	Rock strength usually changed by alteration. The rock may be highly discoloured, usually by staining or bleaching. Porosity may be increased by leaching or may be decreased due to precipitation of secondary minerals in pores.	DA

Degree of Fracturing

The following descriptive classification apply to the spacing of natural occurring fractures in the rock mass. It includes bedding plane partings, joints and other defects, but excludes drilling breaks. These terms are generally not required on investigation logs where fracture spacing is presented as a histogram, and where used are presented in an unabbreviated format.

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:

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

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

These terms may be used to describe the spacing of bedding partings in sedimentary rocks. Where used, these terms are generally presented in an unabbreviated format

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

Defect Descriptions

Defect Type

Term	Abbreviation Code
Bedding plane	B
Infilled seam	IS
Cleavage	CV
Crushed zone	CZ
Decomposed seam	DS
Fault	F
Joint	JT
Lamination	LAM
Parting	P
Shear zone	SZ
Vein	VN
Drilling/handling break	DB , HB
Fracture	FC

Rock Defect Orientation

Term	Abbreviation Code
Horizontal	H
Vertical	V
Sub-horizontal	SH
Sub-vertical	SV

Rock Defect Coating

Term	Abbreviation Code
Clean	CN
Coating	CT
Healed	HE
Infilled	INF
Stained	SN
Tight	TI
Veneer	VNR

Rock Defect Infill

Term	Abbreviation Code
Calcite	CA
Carbonaceous	CBS
Clay	CLAY
Iron oxide	FE
Manganese	MN

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Rock Defect Shape/Planarity

Term	Abbreviation Code
Curved	CU
Irregular	IR
Planar	PR
Stepped	ST
Undulating	UN

Rock Defect Roughness

Term	Abbreviation Code
Polished	PO
Rough	RF
Slickensided	SL
Smooth	SM
Very rough	VR

Defect Orientation

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

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Appendix B

Drawings

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
3	222462.01.D.001.Rev3	02.07.2025	RMM/SA

SCALE: 0 8 16 24 32 m
1:500 @A3

Douglas PARTNERS
OFFICE: SYDNEY
96-98 Hermitage Rd, West Ryde NSW 2114
(02)9809 0666

CLIENT:
Cottonwood Development Pty Ltd

NOTE:
1: Basemap from MetroMap (Dated 13.03.2025)
2: 1st and 2nd reserves lines from CMS Surveyours Pty Ltd, Drawing No.22451 detail, Issue 1 (Dated 06.11.2023)
3: Approximate Proposed Bulk Excavation Exent from AJC Architects, Project 23024, Sheet DA2001, Rev 1 (Dated 07.06.2024)

COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 56

PROJECT NAME:
Proposed Mixed-Use Residential Redevelopment

PROJECT ADRESS:
88 Waterloo Road, Macquarie Park

DRAWING TITLE:
Test Location Plan

PROJECT NO: **222462.01**
DRAWING NO: **1**
REVISION: **3**

A

A'

ELEVATION (AHD)

APPROXIMATE SITE BOUNDARY

APPROXIMATE 2no RESERVE

APPROXIMATE 1st RESERVE

APPROXIMATE SITE BOUNDARY

UNIT 1: FILL

UNIT 2: RESIDUAL SOIL & XW SANDSTONE

UNIT 3: L-M AND M STRENGTH SANDSTONE

UNIT 4: M-H AND H STRENGTH SANDSTONE

BH7

BH6

BH5

WATERLOO ROAD

APPROXIMATE LOCATION OF METRO TUNNELS

APPROXIMATE LOWEST PROPOSED EXCAVATION LEVEL RL 24.0 m AHD

DISTANCE ALONG PROFILE (m)

LEGEND

CONCRETE
SANDSTONE
Water Level
NO CORE
SC - Clayey SAND
FILL
SP - Poorly Graded SAND

TESTS / OTHER

— ? — — - Interpreted geotechnical boundary

ROCK STRENGTH

VL- Very Low
L - Low
M - Medium
H - High

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	INITIAL ISSUE	19.02.2024	EC
1	R.005 UPDATE	04.07.2025	EC
2	BEL UPDATE	17.11.2025	MN

SCALE: 0 5 10 15 20

1:500 @ A3
Vertical Exaggeration = 2.0

Douglas PARTNERS
OFFICE: SYDNEY
96-98 Hermitage Rd, West Ryde NSW 2114
(02) 9809 0666

CLIENT:
Cottonwood Development Pty Ltd

NOTES
1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

PROJECT NAME:
Proposed Mixed-Use Residential Redevelopment

PROJECT ADDRESS:
88 Waterloo Road, Macquarie Park

DRAWING TITLE:
INTERPRETED GEOTECHNICAL CROSS SECTION A-A'

PROJECT No: **222462.01**

DRAWING No: **2**

REVISION: **2**

B

B'

ELEVATION (AHD)

DISTANCE ALONG PROFILE (m)

BH2

BH3

BH101

BH2-2018

APPROXIMATE SITE BOUNDARY

APPROXIMATE 2nd RESERVE

APPROXIMATE 1st RESERVE

APPROXIMATE SITE BOUNDARY

UNIT 1: FILL

UNIT 2: RESIDUAL SOIL & XW SANDSTONE

UNIT 3: L-M AND M STRENGTH SANDSTONE

UNIT 3: L-M AND M STRENGTH SANDSTONE

UNIT 4: M-H AND H STRENGTH SANDSTONE

WATERLOO ROAD

APPROXIMATE LOWEST PROPOSED EXCAVATION LEVEL RL 24.0 m AHD

APPROXIMATE LOCATION OF METRO TUNNELS

VL

L to M

M to H

H

LEGEND

CONCRETE

FILL

SAND

Clayey SAND

SANDSTONE

SP - Poorly Graded SAND

Water Level

TESTS / OTHER

— ? — — - Interpreted geotechnical boundary

ROCK STRENGTH

VL- Very Low
L - Low
M - Medium
H - High

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	INITIAL ISSUE	19.02.2024	EC
1	R.005 UPDATE	04.07.2025	EC
2	BEL UPDATE	17.11.2025	MN

SCALE: 0 5 10 15 20

1:500 @ A3
Vertical Exaggeration = 2.0

Douglas PARTNERS
OFFICE: SYDNEY
96-98 Hermitage Rd, West Ryde NSW 2114
(02) 9809 0666

CLIENT:
Cottonwood Development Pty Ltd

NOTES
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2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

PROJECT NAME:
Proposed Mixed-Use Residential Redevelopment

PROJECT ADDRESS:
88 Waterloo Road, Macquarie Park

DRAWING TITLE:
INTERPRETED CROSS SECTION B-B'

PROJECT No: **222462.01**

DRAWING No: **3**

REVISION: **2**

C

C'

APPROXIMATE SITE BOUNDARY

APPROXIMATE SITE BOUNDARY

UNIT 2: RESIDUAL SOIL & XW SANDSTONE

UNIT 1: FILL

BH101

BH4

BH5

COTTONWOOD CRESCENT

UNIT 3: L-M AND M STRENGTH SANDSTONE

UNIT 4: M-H AND H STRENGTH SANDSTONE

APPROXIMATE LOWEST PROPOSED EXCAVATION LEVEL RL 24.0 m AHD

ELEVATION (AHD)

DISTANCE ALONG PROFILE (m)

LEGEND

CONCRETE
SAND
NO CORE
SANDSTONE
FILL
Water Level

TESTS / OTHER

— ? — — - Interpreted geotechnical boundary

ROCK STRENGTH

VL- Very Low
L - Low
M - Medium
H - High

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	INITIAL ISSUE	19.02.2024	EC
1	R.005 UPDATE	04.07.2025	EC
2	BEL UPDATE	17.11.2025	MN

SCALE: 0 5 10 15 20

1:500 @ A3
Vertical Exaggeration = 2.0

Douglas PARTNERS

OFFICE: SYDNEY

96-98 Hermitage Rd, West Ryde NSW 2114

(02) 9809 0666

CLIENT:

Cottonwood Development Pty Ltd

NOTES

1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

PROJECT NAME:

Proposed Mixed-Use Residential Redevelopment

PROJECT ADDRESS:

88 Waterloo Road, Macquarie Park

DRAWING TITLE:

INTERPRETED GEOTECHNICAL CROSS SECTION C-C'

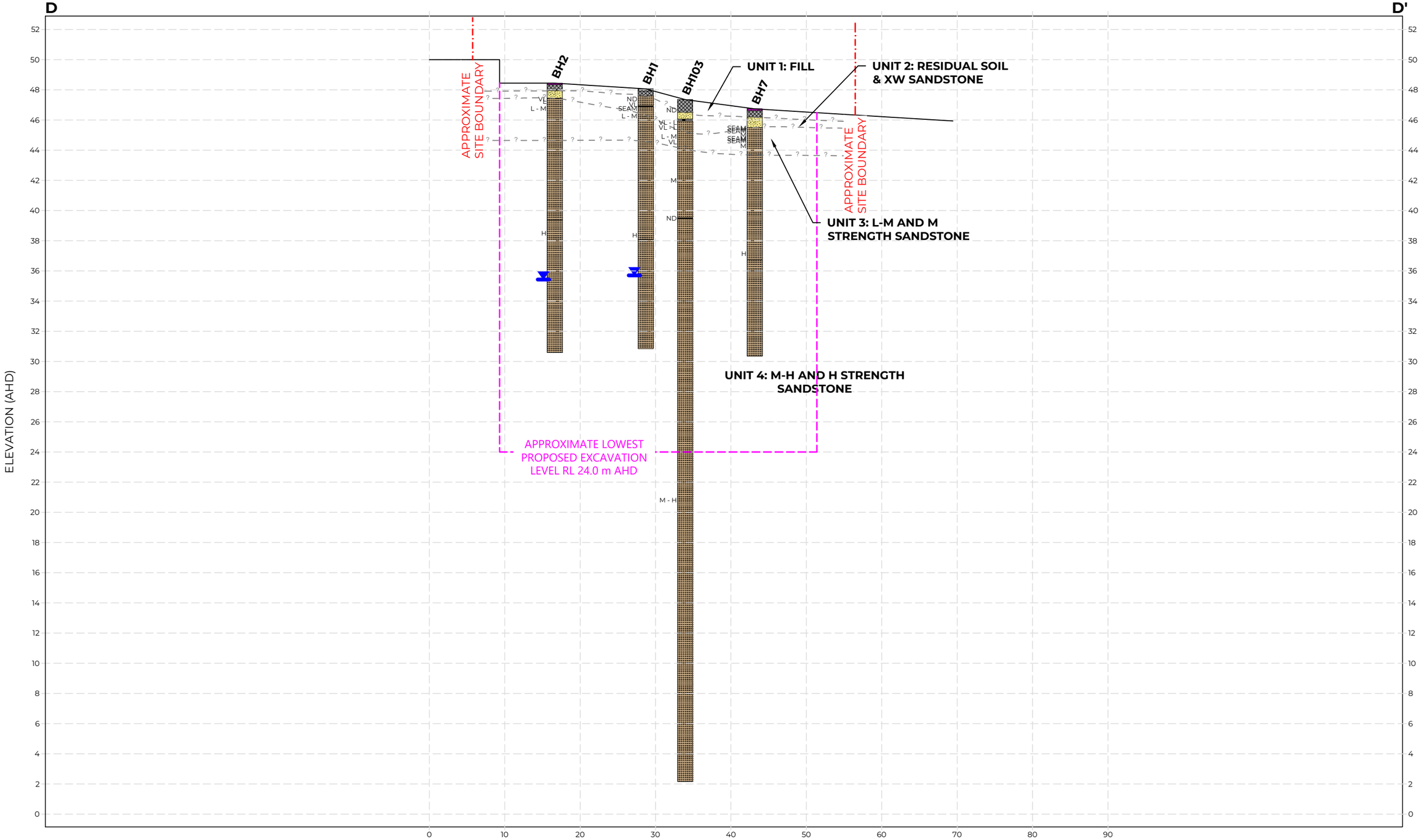
PROJECT No: **222462.01**

DRAWING No: **4**

REVISION: **2**

D

D'



LEGEND

- CONCRETE
- NO CORE
- FILL
- SAND
- SANDSTONE
- SP - Poorly Graded SAND
- Water Level

TESTS / OTHER

— ? — — - Interpreted geotechnical boundary

ROCK STRENGTH

VL- Very Low
L - Low
M - Medium
H - High

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	INITIAL ISSUE	19.02.2024	EC
1	R.005 UPDATE	04.07.2025	EC
2	BEL UPDATE	17.11.2025	MN

SCALE: 0 5 10 15 20
1:500 @ A3
Vertical Exaggeration = 2.0

Douglas PARTNERS
OFFICE: SYDNEY
96-98 Hermitage Rd, West Ryde NSW 2114

CLIENT:
Cottonwood Development Pty Ltd

NOTES
1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

PROJECT NAME:
Proposed Mixed-Use Residential Redevelopment

PROJECT ADDRESS:
88 Waterloo Road, Macquarie Park

DRAWING TITLE:
INTERPRETED GEOTECHNICAL CROSS SECTION D-D'

PROJECT No: **222462.01**
DRAWING No: **5**
REVISION: **2**

E

E'

BH1

BH103

BH102

BH3

BH101

BH4

APPROXIMATE SITE BOUNDARY

APPROXIMATE 2nd RESERVE

APPROXIMATE 1st RESERVE

APPROXIMATE SITE BOUNDARY

UNIT 1: FILL

UNIT 2: RESIDUAL SOIL & XW SANDSTONE

UNIT 3: L-M AND M STRENGTH SANDSTONE

UNIT 4: M-H AND H STRENGTH SANDSTONE

WATERLOO ROAD

APPROXIMATE LOWEST PROPOSED EXCAVATION LEVEL RL 24.0 m AHD

APPROXIMATE LOCATION OF METRO TUNNELS

ELEVATION (AHD)

DISTANCE ALONG PROFILE (m)

LEGEND

CONCRETE
NO CORE
FILL
SAND
SANDSTONE
SP - Poorly Graded SAND
Water Level

TESTS / OTHER

— ? — — - Interpreted geotechnical boundary

ROCK STRENGTH

VL- Very Low
L - Low
M - Medium
H - High

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	INITIAL ISSUE	19.02.2024	EC
1	R.005 UPDATE	04.07.2025	EC
2	BEL UPDATE	17.11.2025	MN

SCALE: 0 5 10 15 20

1:500 @ A3
Vertical Exaggeration = 2.0

Douglas PARTNERS
OFFICE: SYDNEY
96-98 Hermitage Rd, West Ryde NSW 2114

CLIENT:
Cottonwood Development Pty Ltd

NOTES
1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

PROJECT NAME:
Proposed Mixed-Use Residential Redevelopment

PROJECT ADDRESS:
88 Waterloo Road, Macquarie Park

DRAWING TITLE:
INTERPRETED GEOTECHNICAL CROSS SECTION E-E'

PROJECT No: **222462.01**

DRAWING No: **6**

REVISION: **2**

Appendix C

Field Work Results

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 48.1 AHD
COORDINATE: E:325791.8, N:6260745.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH1
PROJECT No: 222462.01
DATE: 29/01/24
SHEET: 1 of 3

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	48	0.15	FILL / Silty CLAY: dark brown; low to medium plasticity; trace rootlets; grass covered; topsoil.		FILL	NA	w>PL	Partial bulk sample 0-0.45	A		0.10			Bentonite	
		0.45	FILL / CLAY: orange-brown; medium to high plasticity; trace steel scrap. Slight paint odour.		FILL				A		0.30				
	47	1	Continued as rock								1				
	46	2									2				
	45	3									3				
	44	4									4				
	43	5									5				
	42	6									6				
	41	7									7				
	40	8									8				
	39	9									9			Gravel backfill	

NOTES: (#) Soil origin is "probable" unless otherwise stated. (*) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Bobcat
METHOD: HA to 0.45m, AD/T to 0.9m, NMLC to 17.22m
REMARKS:
OPERATOR: Groundtest (GM/JS)
LOGGED: AN
CASING: HWT to 0.8m

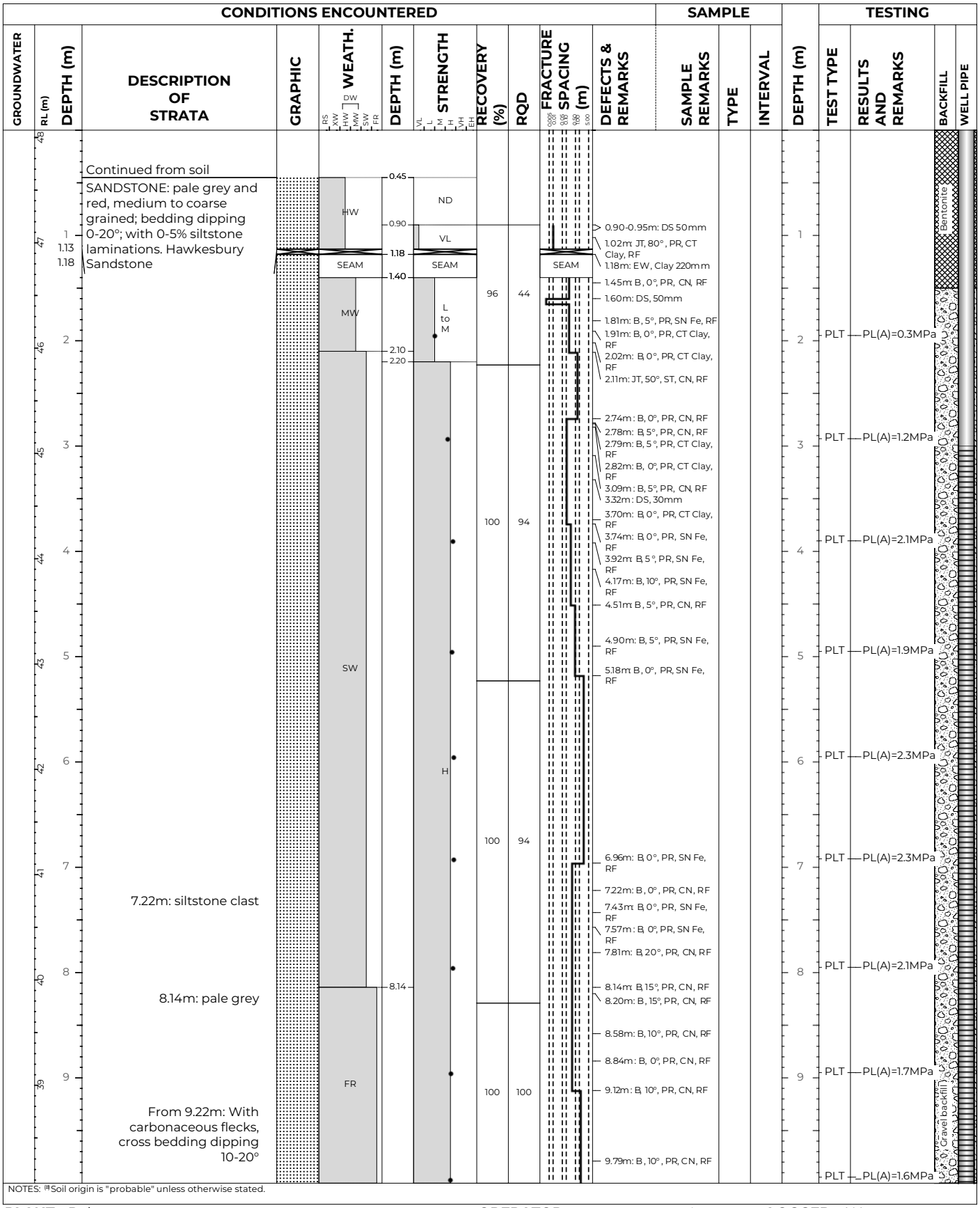
Generated with CORE-GS by Geroc - Split Soil-Rock Log

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 48.1 AHD
COORDINATE: E:325791.8, N:6260745.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH1
PROJECT No: 222462.01
DATE: 29/01/24
SHEET: 2 of 3



NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat
METHOD: HA to 0.45m, AD/T to 0.9m, NMLC to 17.22m
REMARKS:
OPERATOR: Groundtest (GM/JS)
LOGGED: AN
CASING: HWT to 0.8m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 48.1 AHD
COORDINATE: E:325791.8, N:6260745.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH1
PROJECT No: 222462.01
DATE: 29/01/24
SHEET: 3 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	38	10.00	SANDSTONE: pale grey, medium to coarse grained; bedding dipping 0-20°; with 0-5% siltstone laminations. Hawkesbury Sandstone		FR		H	100	100		10.32m: B, 10°, PR, CBS, RF 10.55m: B, 0°, PR, CT Clay, RF				11	PLT	PL(A)=1.9MPa		
	37	11																	
15/02/24 08:29	36	12						100	100		12.66m: JT, 80°, PR, CN, RF 12.78m: B, 0°, PR, CN, RF				12	PLT	PL(A)=1.2MPa		
	35	13													13	PLT	PL(A)=1.4MPa		
	34	14									13.75m: B, 0°, PR, CT Clay, RF 13.96m: B, 15°, PR, CN, RF				14	PLT	PL(A)=2MPa		
	33	15									14.76m: B, 0°, PR, CN, RF				15	PLT	PL(A)=1.4MPa		
	32	16						100	97		15.58m: B, 0°, PR, CT Clay, RF 15.73m: B, 0°, PR, VNR Clay, RF				16	PLT	PL(A)=1.6MPa		
	31	17	Borehole discontinued at 17.22m depth. Target depth reached.								16.78m: B, 0°, PR, CN, RF 16.86m: B, 0°, PR, VNR Clay, RF				17	PLT PLT	PL(A)=1.1MPa PL(A)=1.6MPa		
	30	18													18				
	29	19													19				

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat
METHOD: HA to 0.45m, AD/T to 0.9m, NMLC to 17.22m
REMARKS:
OPERATOR: Groundtest (GM/JS)
LOGGED: AN
CASING: HWT to 0.8m

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113

SURFACE LEVEL: 48.1 AHD
COORDINATE: E:325791.8, N:6260745.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH1
PROJECT No: 222462.01
DATE: 29/01/24
SHEET: 1 of 2

0.90-5.00 m depth

5.00-10.00 m depth

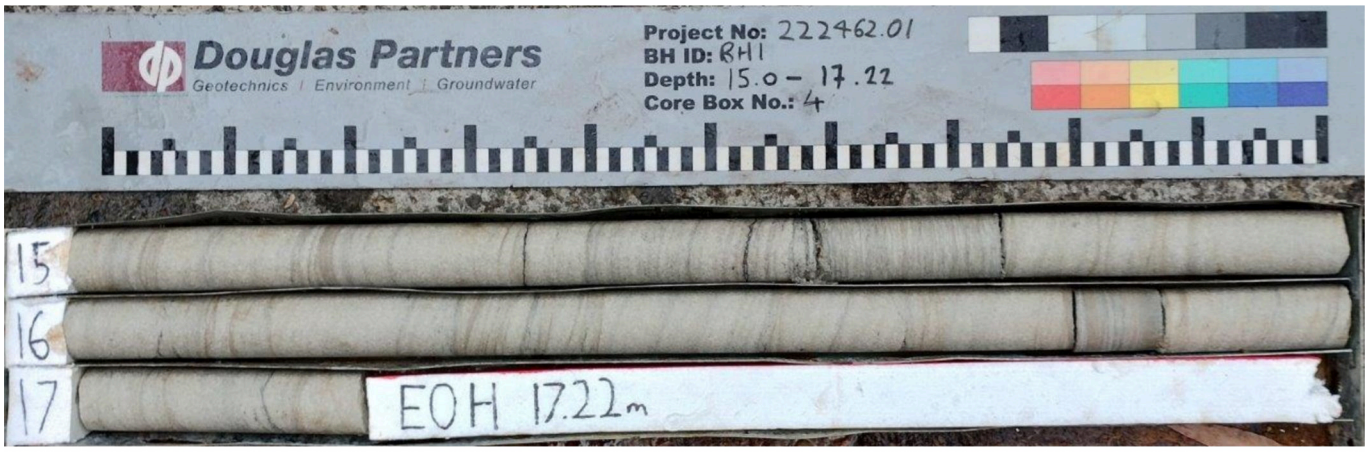
CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113

SURFACE LEVEL: 48.1 AHD
COORDINATE: E:325791.8, N:6260745.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH1
PROJECT No: 222462.01
DATE: 29/01/24
SHEET: 2 of 2

10.00-15.00 m depth



15.00-17.22 m depth

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 48.5 AHD
COORDINATE: E:325795.0, N:6260767.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH2
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 1 of 3

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS			
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	48 / 0.11	CONCRETE: pale grey; with igneous aggregates up to 15mm		FILL	(MD)	D		A		0.10			Bentonite	
	0.50	FILL / SAND: orange; coarse; with medium sub-angular sandstone and ironstone gravel.						A		0.40	SPT	20/130 (HB)		
		SAND (SP): orange; with medium sandstone and ironstone gravel.		possibly XWM	VD									
	1.00	Continued as rock												
	47 / 2									2				
	46 / 3									3				
	45 / 4									4				
	44 / 5									5				
	43 / 6									6				
	42 / 7									7				
	41 / 8									8				
	40 / 9									9				
	39												Gravel backfill	

NOTES: [#] Soil origin is "probable" unless otherwise stated. [*] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

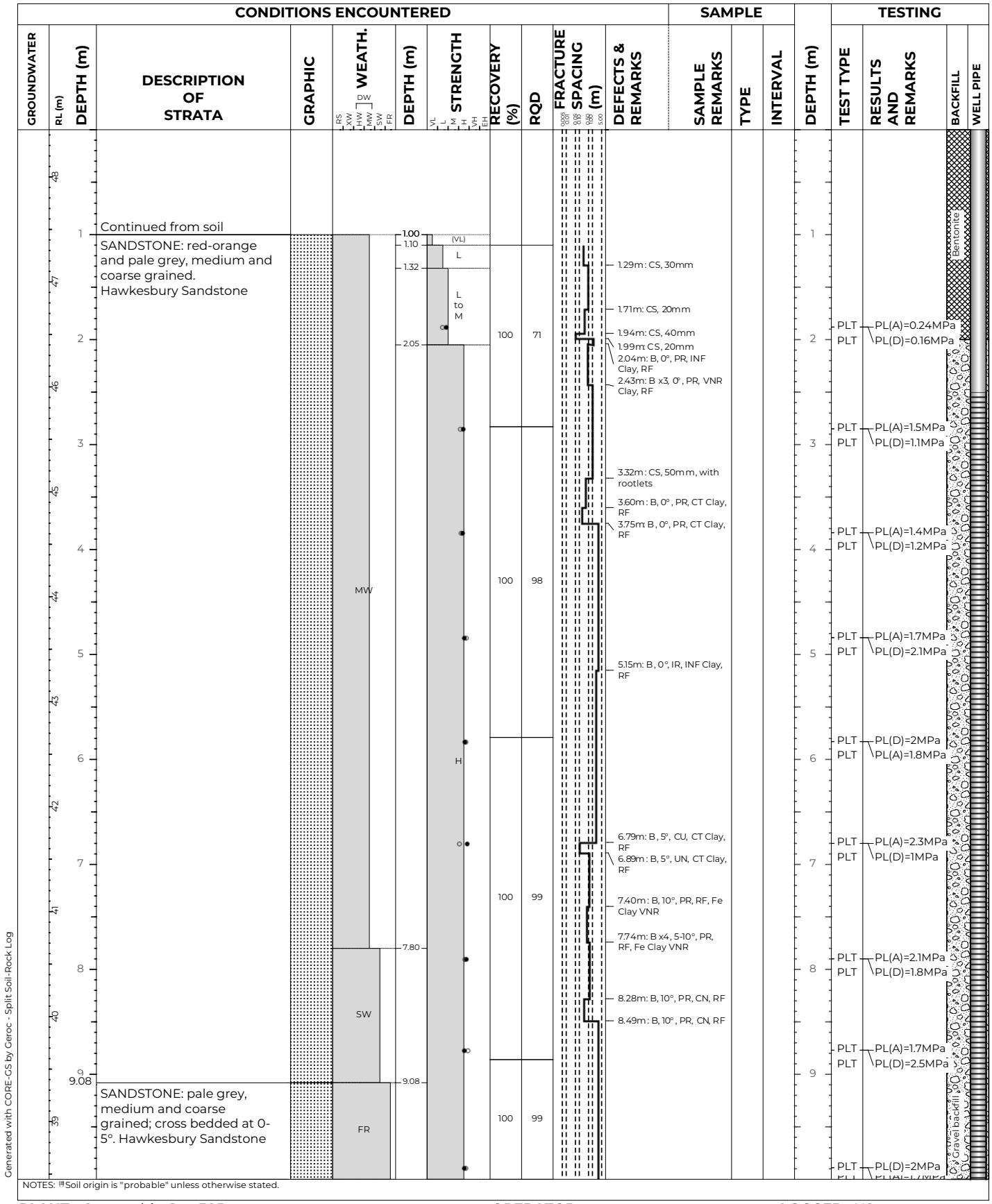
PLANT: Comacchio Geo 305
METHOD: DT to 0.11m, AD/T to 1.1m, NMLC to 17.86m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: HS
CASING: HWT to 1.1m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 48.5 AHD
COORDINATE: E:325795.0, N:6260767.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH2
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 2 of 3



Generated with CORE-GS by Geroc - Split Soil-Rock Log

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio Geo 305
METHOD: DT to 0.11m, AD/T to 1.1m, NMLC to 17.86m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: HS
CASING: HWT to 1.1m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 48.5 AHD
COORDINATE: E:325795.0, N:6260767.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH2
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 3 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
15/02/24 08:34	38	10	[CONT] SANDSTONE: pale grey, medium and coarse grained; cross bedded at 0-5°. Hawkesbury Sandstone												10	PLT	PL(A)=2.2MPa		
	37	11	11.30m: with 1% siltstone flecks and laminations 11.39m-11.41m: dark grey siltstone band					100	99		10.88m: B, 10°, PR, SN CBS, RF				11	PLT	PL(D)=1.8MPa		
											11.38m: B, 10°, PR, CN, RF								
	36	12													12	PLT	PL(A)=2.5MPa		
																PLT	PL(D)=2MPa		
	35	13						100	100		12.58m: B, 10°, PR, CN, RF				13	PLT	PL(A)=2.8MPa		
																PLT	PL(D)=2MPa		
	34	14			FR		H								14	PLT	PL(A)=2MPa		
																PLT	PL(D)=1.8MPa		
	33	15									14.71m: B, 15°, PR, CN, RF				15	PLT	PL(A)=2.3MPa		
																PLT	PL(D)=2MPa		
	32	16						100	100						16	PLT	PL(A)=2MPa		
																PLT	PL(D)=1.6MPa		
	31	17													17	PLT	PL(A)=1.3MPa	Bentonite	
																PLT	PL(D)=1.4MPa		
	30	18	Borehole discontinued at 17.86m depth. Target depth reached.												18	PLT	PL(A)=1.7MPa		
																PLT	PL(D)=1.5MPa		
	29	19													19				

NOTES: [a] Soil origin is "probable" unless otherwise stated.

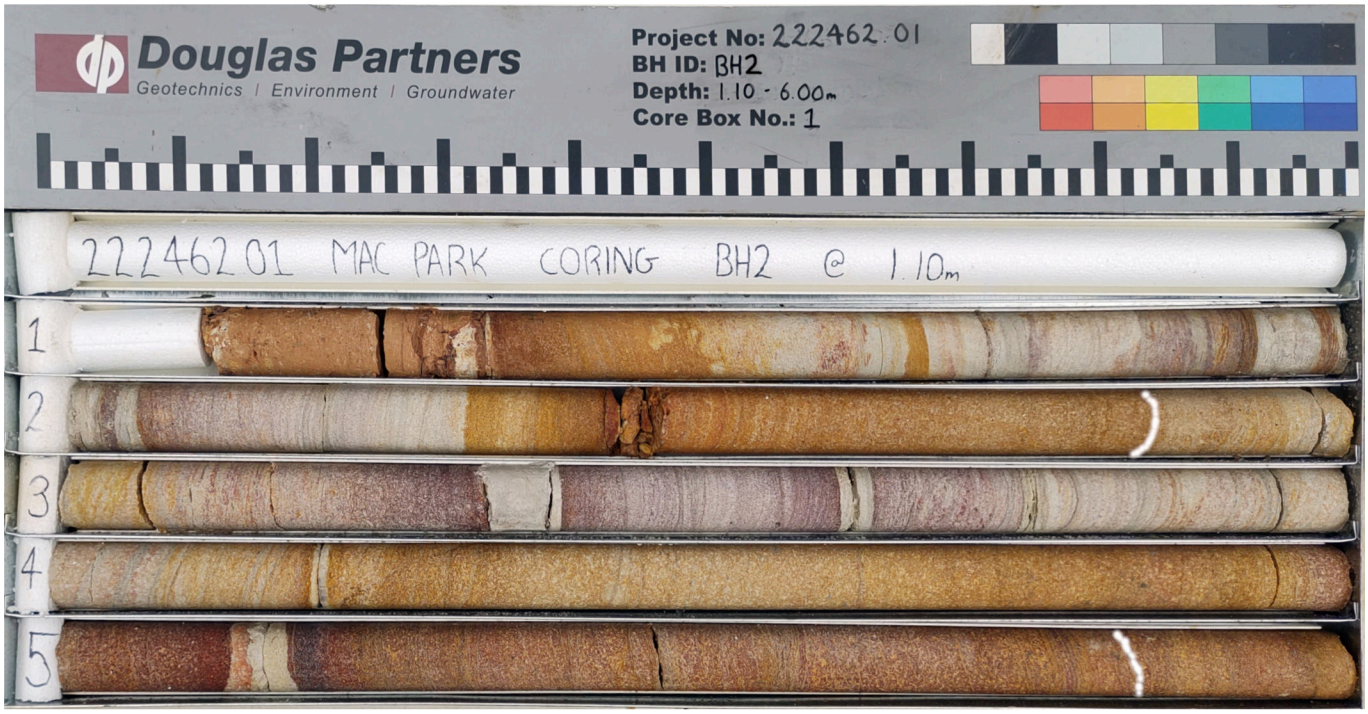
PLANT: Comacchio Geo 305
METHOD: DT to 0.11m, AD/T to 1.1m, NMLC to 17.86m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: HS
CASING: HWT to 1.1m

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 48.5 AHD
COORDINATE: E:325795.0, N:6260767.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH2
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 1 of 2



1.10-6.00 m depth

6.00-12.00 m depth

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 48.5 AHD
COORDINATE: E:325795.0, N:6260767.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH2
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 2 of 2

12.00-17.86 m depth

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.6 AHD
COORDINATE: E:325821.1, N:6260781.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH3
PROJECT No: 222462.01
DATE: 29/01/24
SHEET: 1 of 3

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
29/01/24 NFGWO while augering	46	0.25	FILL / Silty SAND: brown; fine; with rootlets, brick fragments and orange sandstone gravel.		FILL		D	Partial bulk sample 0-0.25	A	0.10	0.10		
			Clayey SAND (SP): dark orange; medium to coarse; medium plasticity clay.		RS	(MD)	D to M		A	0.50	0.50		
		1.00	Continued as rock								1		
	45	2									2		
	44	3									3		
	43	4									4		
	42	5									5		
	41	6									6		
	40	7									7		
	39	8									8		
	38	9									9		
	37												

NOTES: [#] Soil origin is "probable" unless otherwise stated. [*] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio Geo 305
METHOD: HA to 0.25m, AD/T to 1.0m, NMLC to 16.2m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: HS/AN
CASING: HWT to 1m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.6 AHD
COORDINATE: E:325821.1, N:6260781.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH3
PROJECT No: 222462.01
DATE: 29/01/24
SHEET: 2 of 3

CONDITIONS ENCOUNTERED | **SAMPLE** | **TESTING**

GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
29/01/24 NFGWO while augering	46 / 0	Continued from soil			1.00	(VL)								0				
	45 / 1	SANDSTONE: red-orange and pale grey, coarse grained. Hawkesbury Sandstone			1.12	M								1				
					1.58	VL				1.53m: CS, 20mm					PLT	PL(A)=1.9MPa		
					1.81					1.75m: CS, 20mm					PLT	PL(D)=0.78MPa		
	44 / 2									1.79m: CS, 20mm				2				
							100	82		2.18m: B, 0°, PR, CN, RF					PLT	PL(A)=0.9MPa		
	43 / 3			MW										3	PLT	PL(D)=1MPa		
										3.75m: B, 5°, PR, VNR Clay, RF					PLT	PL(A)=1.8MPa		
	42 / 4									4.13m: B, 15°, PR, VNR Clay, RF				4	PLT	PL(D)=1.3MPa		
							100	92							PLT	PL(A)=2.6MPa		
	41 / 5													5	PLT	PL(D)=2.3MPa		
										5.35-5.42m: B x4, 0-5°, PR, CT Fe, RF								
										5.60-5.70m: B x4, 0-5°, PR, CT Fe, RF								
					5.75										PLT	PL(A)=0.82MPa		
	40 / 6			SW										6	PLT	PL(D)=0.99MPa		
	6.66	SANDSTONE: pale grey, coarse grained; cross bedded at 5-10°. Hawkesbury Sandstone			6.66										PLT	PL(A)=1.4MPa		
							100	97							PLT	PL(D)=0.61MPa		
	39 / 7													7				
										7.72m: B, 15°, PR, CN, RF								
										7.79-7.81m: B x3, 5°, PR, Clay, RF					PLT	PL(A)=1.6MPa		
	38 / 8	From 8.38m: with 1% dark grey siltstone flecks and laminations		FR										8	PLT	PL(D)=1.7MPa		
															PLT	PL(A)=2.9MPa		
	37 / 9						100	100						9	PLT	PL(D)=0.93MPa		
															PLT	PL(A)=1MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

Generated with CORE-GS by Geroc - Split Soil-Rock Log

PLANT: Comacchio Geo 305
METHOD: HA to 0.25m, AD/T to 1.0m, NMLC to 16.2m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: HS/AN
CASING: HWT to 1m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.6 AHD
COORDINATE: E:325821.1, N:6260781.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH3
PROJECT No: 222462.01
DATE: 29/01/24
SHEET: 3 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	36	10	[CONT] SANDSTONE: pale grey, coarse grained; cross bedded at 5-10°. Hawkesbury Sandstone		FR	11.35	M to H	100	100		10.78m: B, 5°, PR, VNR Clay, RF 10.90m: B, 5°, IR, CT CBS, RF				10	PLT	PL(A)=0.99MPa PL(D)=0.68MPa		
	35	11													11	PLT	PL(A)=2.1MPa PL(D)=1.8MPa		
	34	12									12.66m: B, 5°, UN, CN, RF				12	PLT	PL(A)=1.9MPa PL(D)=2MPa		
	33	13						100	100						13	PLT	PL(A)=1.4MPa PL(D)=1.7MPa		
	32	14					H								14	PLT	PL(A)=1.9MPa PL(D)=2.1MPa		
	31	15						100	100		15.10-15.20m: JT, 30-45°, IR, CN, RF 15.50m: B, 10°, PR, CN, RF 15.63m: B, 0°, PR, CN, RF				15	PLT	PL(A)=1.2MPa PL(D)=1.5MPa		
	30	16	Borehole discontinued at 16.20m depth. Target depth reached.												16	PLT	PL(A)=1.7MPa PL(D)=1.3MPa		
	29	17													17				
	28	18													18				
	27	19													19				

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio Geo 305
METHOD: HA to 0.25m, AD/T to 1.0m, NMLC to 16.2m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: HS/AN
CASING: HWT to 1m

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113

SURFACE LEVEL: 46.6 AHD
COORDINATE: E:325821.1, N:6260781.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH3
PROJECT No: 222462.01
DATE: 29/01/24
SHEET: 1 of 2

1.00-6.00 m depth

6.00-12.00 m depth

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113

SURFACE LEVEL: 46.6 AHD
COORDINATE: E:325821.1, N:6260781.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH3
PROJECT No: 222462.01
DATE: 29/01/24
SHEET: 2 of 2

12.00-16.00 m depth

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 43.9 AHD
COORDINATE: E:325841.6, N:6260798.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH4
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 1 of 3

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
30/01/24 NFGWO while augering	43.9 / 0.00	CONCRETE: 5-20mm aggregate		FILL		M		A		0.10		
	43.8 / 0.10	FILL / SAND: pale orange-brown; fine to medium; with fine to medium, sub-rounded ripped sandstone gravel; with clay.										
	43.7 / 0.16	Continued as rock										
	43 / 1									1		
	42 / 2									2		
	41 / 3									3		
	40 / 4									4		
	39 / 5									5		
	38 / 6									6		
	37 / 7									7		
	36 / 8									8		
	35 / 9									9		
	34											

NOTES: [#] Soil origin is "probable" unless otherwise stated. [*] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Bobcat
OPERATOR: Groundtest (CS)
LOGGED: AN
METHOD: DT to 0.1m, HA to 0.16m, AD/T to 0.9m, WB to 1.02m; NMLC to 19.2m
CASING: HW to 1m, then HQ to 1.01m
REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 43.9 AHD
COORDINATE: E:325841.6, N:6260798.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH4
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 2 of 3

CONDITIONS ENCOUNTERED | **SAMPLE** | **TESTING**

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
30/01/24 NFGWO while augering	43	0	Continued from soil			0.16									0				
			SANDSTONE: orange-brown, medium to coarse grained; bedding dipping 0-20°; with 0-10% siltstone laminations. Hawkesbury Sandstone		ND		ND												
	42	1				1.02					1.46m: B, 5°, PR, CT Clay, RF 1.55m: B, 10°, PR, SN Fe, RF 1.78m: B, 10°, PR, SN Fe, RF				1				
							M												
	41	2				2.00		100	94		2.61-2.72m: B x2, 10°, PR, RF, patchy Clay VNR 2.89m: B, 10°, PR, SN Fe, RF				2	PLT	PL(A)=1MPa		
					SW - MW						3.05-3.44m: B x6, 5°, PR, SN Fe, RF								
	40	3									3.57m: B, 5°, PR, CN, RF 3.58-3.68m: B x2, 5°, PR, CT Clay, RF 3.82m: B, 5°, PR, CN, RF				3	PLT	PL(A)=2.3MPa		
											4.14m: B, 10°, PR, CN, RF 4.26m: B, 10°, PR, VNR Clay, RF								
	39	4									4.54m: B, 15°, PR, CN, RF				4	PLT	PL(A)=2.4MPa		
											4.88m: B, 15°, PR, CN, RF								
	38	5	From 5.20m: pale grey			5.20		100	91		5.28m: B, 5°, PR, CN, RF 5.51m: B, 15°, PR, CN, RF				5	PLT	PL(A)=2.6MPa		
							H				5.88-6.05m: B x2, 15°, PR, CN, RF								
	37	6									6.23m: B, 15°, PR, CT Clay, RF 6.25m: B, 15°, PR, CN, RF 6.39-6.49m: B x2, 15°, PR, VNR Clay, RF 6.73m: B, 15°, PR, CN, RF				6	PLT	PL(A)=1.6MPa		
											7.17m: B, 10°, PR, VNR Clay, RF								
	36	7			FR			100	100		7.58m: B, 10°, PR, CN, RF				7	PLT	PL(A)=1.5MPa		
	35	8													8	PLT	PL(A)=2.5MPa		
	34	9									9.48m: B, 15°, PR, CT Clay, RF 9.81m: B, 15°, PR, CN, RF				9	PLT	PL(A)=2.2MPa		
																PLT	PL(A)=1.5MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat
OPERATOR: Groundtest (CS)
LOGGED: AN
METHOD: DT to 0.1m, HA to 0.16m, AD/T to 0.9m, WB to 1.02m; NMLC to 19.2m
CASING: HW to 1m, then HQ to 1.01m
REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 43.9 AHD
COORDINATE: E:325841.6, N:6260798.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH4
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 3 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
		10.00	SANDSTONE: pale grey, medium to coarse grained; bedding dipping 0-20°; with 0-10% siltstone laminations. Hawkesbury Sandstone								10.78-10.84m: B x3, 5°, PR, VNR Clay, RF								
	33	11					H				11.23m: B, 0°, PR, RF, patchy Clay VNR				11	PLT	PL(A)=1.6MPa		
			11.45m-11.75m: coarse grained					100	97		11.45m: B, 20°, PR, CN, RF								
	32	12									11.70m: B, 5°, PR, CN, RF				12	PLT	PL(A)=1.2MPa		
											12.34-12.78m: B x3, 15°, PR, CN, RF								
	31	13	From 13.00m: cross bedded dipping 0-20°												13	PLT	PL(A)=1.9MPa		
											13.69m: B, 5°, PR, CT Clay, RF								
	30	14			FR		H	100	100						14	PLT	PL(A)=1.6MPa		
											14.84m: B, 5°, PR, VNR Clay, RF								
	29	15													15	PLT	PL(A)=0.98MPa		
	28	16									16.20m: water loss at 16.2m				16	PLT	PL(A)=1.3MPa		
											16.75m: B, 35°, CU, CN, RF								
	27	17						100	98						17	PLT	PL(A)=1.5MPa		
	26	18	18.95m: Siltstone band 40mm								17.90m: CS, Clay				18	PLT	PL(A)=1.4MPa		
											18.18-18.83m: B x2, 10°, PR, CN, RF								
	25	19	Borehole discontinued at 19.20m depth. Target depth reached.								19.14m: B, 5°, PR, CN, RF				19	PLT	PL(A)=1.5MPa		
																PLT	PL(A)=1.8MPa		
	24																		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat
OPERATOR: Groundtest (CS)
LOGGED: AN
METHOD: DT to 0.1m, HA to 0.16m, AD/T to 0.9m, WB to 1.02m; NMLC to 19.2m
CASING: HW to 1m, then HQ to 1.01m
REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 43.9 AHD
COORDINATE: E:325841.6, N:6260798.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH4
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 1 of 2

1.02-5.00 m depth

5.00-10.00 m depth

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 43.9 AHD
COORDINATE: E:325841.6, N:6260798.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH4
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 2 of 2

10.00-15.00 m depth

15.00-19.20 m depth

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 43.6 AHD
COORDINATE: E:325852.0, N:6260784.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH5
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 1 of 3

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(##)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL / WELL PIPE
	43	0.20	CONCRETE: 5-25mm aggregate						A		0.20			Backfill
		0.25	FILL / Sandy CLAY: pale brown; low plasticity; fine to medium sand; trace fine, sub-angular sandstone gravel; (diatube increased moisture content).											
			Continued as rock											
	42	1									1			
		2									2			Bentonite
	41	3									3			
	40	4									4			
	39	5									5			
	38	6									6			
	37	7									7			
	36	8									8			
	35	9									9			
	34													

NOTES: (##)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

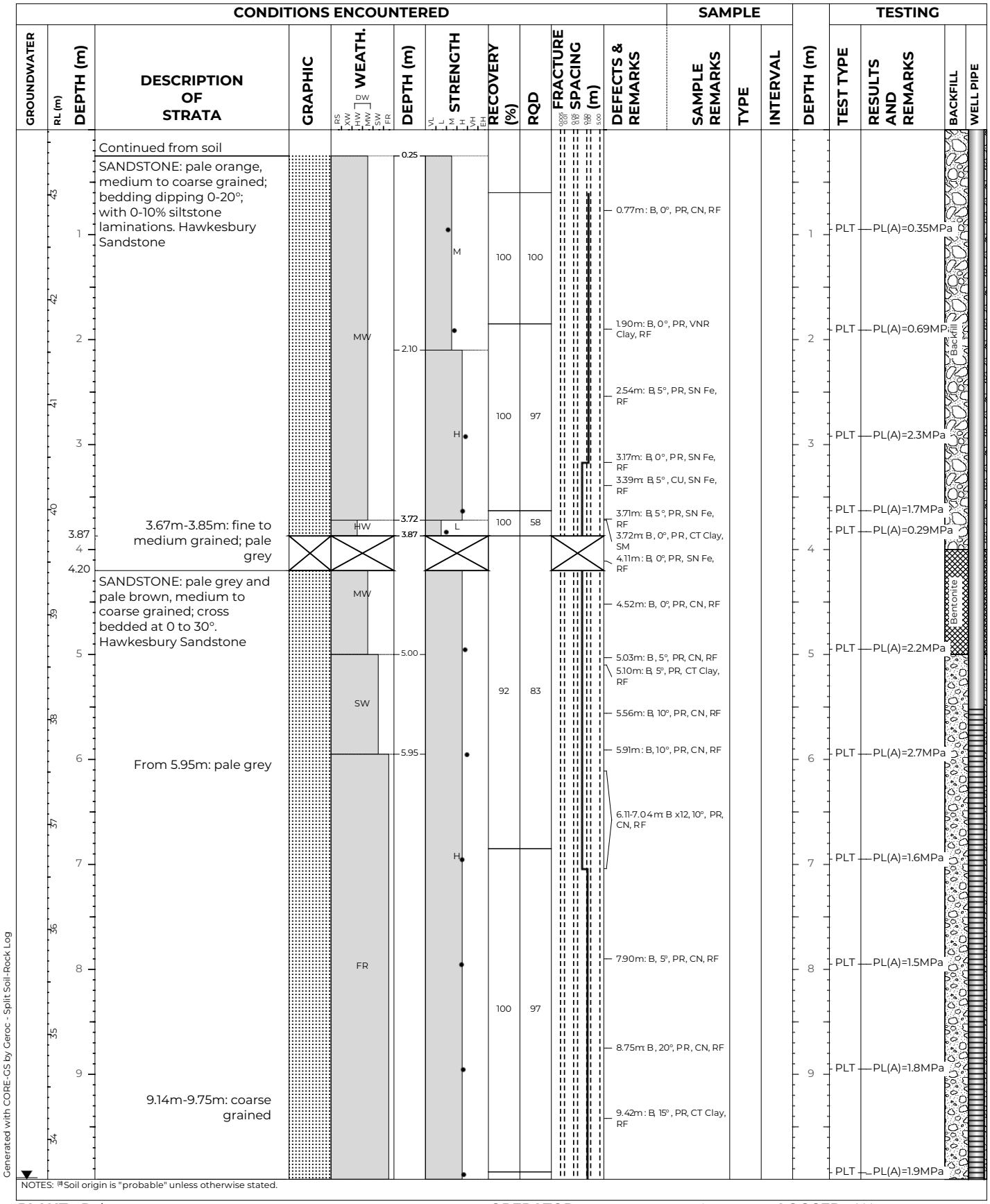
PLANT: Bobcat
METHOD: DT to 0.2m, HA to 0.25, AD/T to 0.6m, NMLC to 18.46m
REMARKS:
OPERATOR: Groundtest (GM/JS)
LOGGED: AN
CASING: HW to 0.65m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 43.6 AHD
COORDINATE: E:325852.0, N:6260784.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH5
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 2 of 3



NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat
METHOD: DT to 0.2m, HA to 0.25, AD/T to 0.6m, NMLC to 18.46m
REMARKS:
OPERATOR: Groundtest (GM/JS)
LOGGED: AN
CASING: HW to 0.65m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 43.6 AHD
COORDINATE: E:325852.0, N:6260784.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH5
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 3 of 3

CONDITIONS ENCOUNTERED													SAMPLE				TESTING			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH. (PS, XW, DW, HW, MW, SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
15/02/24 08:43	33	10.00	SANDSTONE: pale grey, medium to coarse grained; cross bedded at 0 to 30°. Hawkesbury Sandstone								10.41m: B, 5°, PR, CN, RF				10				
	32	11						100	100						11	PLT	PL(A)=1.9MPa	Gravel backfill	
	31	12													12	PLT	PL(A)=1.6MPa		
	30	13													13	PLT	PL(A)=1.5MPa		
	29	14			FR		H	100	100		14.02m: B, 0°, PR, CT Clay, RF 14.40m: B, 0°, PR, CN, RF				14	PLT	PL(A)=1.7MPa		
	28	15									15.21m: B, 5°, PR, CN, RF 15.42m: B, 10°, PR, CN, RF				15	PLT	PL(A)=1MPa		
	27	16									15.98m: B, 0°, IR, CBS, RF				16	PLT	PL(A)=1.2MPa		
	26	17						100	98						17	PLT	PL(A)=1.3MPa		
	25	18	18.04m-18.08m: with siltstone clasts								17.76m: B, 0°, PR, CT Clay, RF				18	PLT	PL(A)=1.3MPa		
	24	19	Borehole discontinued at 18.46m depth. Target depth reached.												19	PLT	PL(A)=1.5MPa		

NOTES: [H] Soil origin is "probable" unless otherwise stated.

PLANT: Bobcat
METHOD: DT to 0.2m, HA to 0.25, AD/T to 0.6m, NMLC to 18.46m
REMARKS:
OPERATOR: Groundtest (GM/JS)
LOGGED: AN
CASING: HW to 0.65m

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Douglas PARTNERS

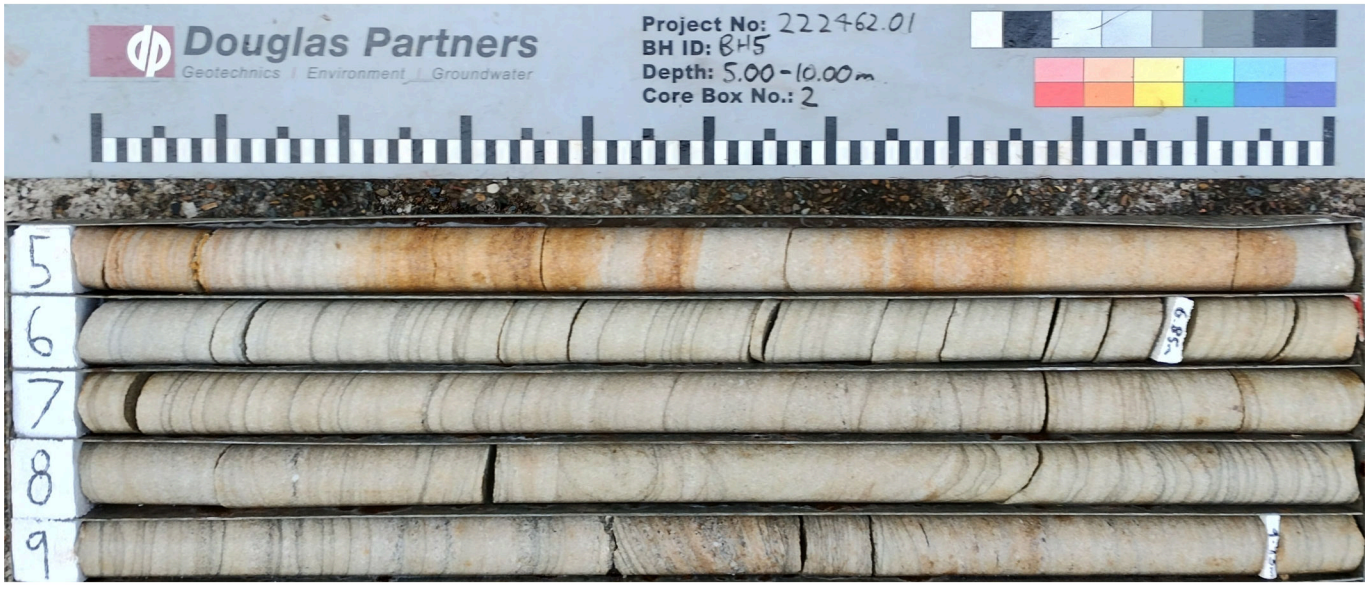
CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113

SURFACE LEVEL: 43.6 AHD
COORDINATE: E:325852.0, N:6260784.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH5
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 1 of 2

0.60-5.00 m depth



5.00-10.00 m depth

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113

SURFACE LEVEL: 43.6 AHD
COORDINATE: E:325852.0, N:6260784.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH5
PROJECT No: 222462.01
DATE: 30/01/24
SHEET: 2 of 2

10.00-15.00 m depth

15.00-18.46 m depth

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 45.6 AHD
COORDINATE: E:325833.7, N:6260762.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH6
PROJECT No: 222462.01
DATE: 01/02/24
SHEET: 1 of 3

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	45	0.14	CONCRETE: 5-25 mm aggregate; 1-5 mm voids												
			Clayey SAND (SC), with gravel: brown and red-brown; fine to medium; fine to medium, sandstone gravel; extremely weathered sandstone.		XWM	MD - D	D		A		0.40			Bentonite	
	44	1.70	Continued as rock						A		1.50	SPT	7,11,19/120		
												SPT	14 (HB)		
	43	2									2				
	42	3									3				
	41	4									4				
	40	5									5				
	39	6									6				
	38	7									7			Gravel backfill	
	37	8									8				
	36	9									9				

NOTES: [#] Soil origin is "probable" unless otherwise stated. [*] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio Geo 305
OPERATOR: Rockwell (TT)
LOGGED: AN
METHOD: DT to 0.14m, AD/T to 1.7m, NMLC to 14.24m
CASING: HQ to 1.75m
REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 45.6 AHD
COORDINATE: E:325833.7, N:6260762.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH6
PROJECT No: 222462.01
DATE: 01/02/24
SHEET: 2 of 3

CONDITIONS ENCOUNTERED | **SAMPLE** | **TESTING**

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH. (DW: PS, XW, HW, MW, SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m) (0.03, 0.06, 0.2, 0.6, 2.0, >2.0)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	45	0													0				
	44	1	Continued from soil												1			Bentonite	
	43	2	SANDSTONE: red, orange and pale grey, medium to coarse grained; bedding dipping 0° to 15°. Hawkesbury Sandstone			1.70	M	100	54		1.91-1.95m: DS, 40 mm 2.07m: B, 5°, PR, SN Fe, RF 2.13m: B, 15°, PR, SN Fe, RF 2.17m: B, 5°, PR, SN Fe, RF 2.24m: B, 0°, PR, CN, SM				2	PLT	PL(A)=0.66MPa		
	42	3				2.73					2.92m: B, 5°, PR, SN Fe, RF 3.13m: JT, 70°, PR, SN Fe, RF 3.26-3.35m: JT, UN, SN Fe, RF, HE 3.46m: JT, 60°, CU, SN Fe, RF				3	PLT	PL(A)=2MPa		
	41	4			MW			100	100						4	PLT	PL(A)=2.2MPa		
	40	5									4.54m: B, 0-5°, PR, SN Fe, RF				5	PLT	PL(A)=2.1MPa		
	39	6	6.03m: siltstone clast				H								6	PLT	PL(A)=2.1MPa		
	38	7	7.29m: pale-grey			7.29		100	85		6.62m: B, 20°, PR, CN, SM 6.82m: B, 5°, PR, SN Fe, RF 6.86m: B, 0°, PR, SN Fe, SM 7.25m: B, 10°, PR, VNR, SM 7.29m: B, 10°, CU, VNR, SM				7	PLT	PL(A)=1.9MPa		
	37	8			FR						7.52-8.68m: B x9, 10°, PR, VNR, RF				8	PLT	PL(A)=2MPa	Gravel backfill	
	36	9						100	100		8.97m: B, 0°, CBS, RF 9.10m: B, 10°, PR, VNR, RF				9	PLT	PL(A)=1.2MPa		
																PLT	PL(A)=2.3MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio Geo 305
METHOD: DT to 0.14m, AD/T to 1.7m, NMLC to 14.24m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: AN
CASING: HQ to 1.75m

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 45.6 AHD
COORDINATE: E:325833.7, N:6260762.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH6
PROJECT No: 222462.01
DATE: 01/02/24
SHEET: 3 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
▼ 15/02/24 08:39	35	10.00	SANDSTONE: pale grey, medium to coarse grained; bedding dipping 0° to 15°. Hawkesbury Sandstone												11	PLT	PL(A)=1.8MPa		
	34							100	100										
	33	12	12.02m-12.04m: siltstone clast		FR		H								12	PLT	PL(A)=1.9MPa		
	32	13						100	100		12.92m: B, 5°, PR, CT Clay, SM				13	PLT	PL(A)=1.7MPa		
	31	14	Borehole discontinued at 14.24m depth. Target depth reached.								13.78m: B, 10°, PR, CN, RF				14	PLT	PL(A)=1.7MPa		
																PLT	PL(A)=1.8MPa		
	30	15													15				
	29	16													16				
	28	17													17				
	27	18													18				
	26	19													19				

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio Geo 305
METHOD: DT to 0.14m, AD/T to 1.7m, NMLC to 14.24m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: AN
CASING: HQ to 1.75m

Refer to explanatory notes for symbol and abbreviation definitions

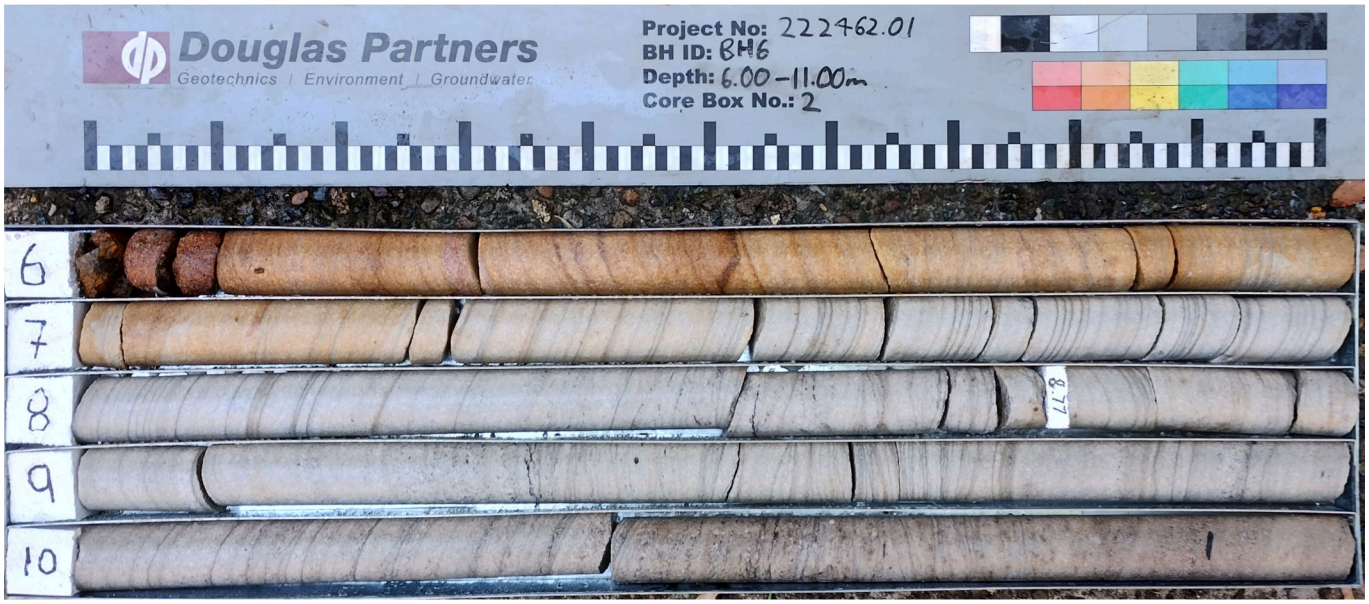
CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113

SURFACE LEVEL: 45.6 AHD
COORDINATE: E:325833.7, N:6260762.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH6
PROJECT No: 222462.01
DATE: 01/02/24
SHEET: 1 of 2

1.39-6.00 m depth



6.00-11.00 m depth

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 45.6 AHD
COORDINATE: E:325833.7, N:6260762.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH6
PROJECT No: 222462.01
DATE: 01/02/24
SHEET: 2 of 2

11.00-14.42 m depth

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.8 AHD
COORDINATE: E:325815.2, N:6260750.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH7
PROJECT No: 222462.01
DATE: 31/01/24
SHEET: 1 of 3

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
31/01/24 NFGWO while augering	46.8 / 0	CONCRETE: 5-20mm thick aggregate					Partial bulk sample 0-0.55	A		0.15		
	0.13	FILL / Sandy CLAY: pale brown; medium plasticity; fine to medium sand; with fine to medium, sub-rounded sandstone gravel; crushed sandstone fill. Slight organic odour.		FILL	(F)	w>PL		A		0.50		
	0.55 / 46	SAND (SP): orange; fine; with fine ironstone gravel; trace clay; inferred extremely weathered bedrock.		XWM	(D) to (VD)	M		A		0.90	SPT	15/50 (HB)
	1 / 45	Continued as rock								1		
	1.24 / 44											
	2 / 43									2		
	3 / 42									3		
	4 / 41									4		
	5 / 40									5		
	6 / 39									6		
	7 / 38									7		
	8 / 37									8		
	9									9		

NOTES: [#] Soil origin is "probable" unless otherwise stated. [*] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio Geo 305
METHOD: DT to 0.15m, AD/T to 1.1m, NMLC to 16.4m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: HS/AN
CASING: HWT to 1.1m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.8 AHD
COORDINATE: E:325815.2, N:6260750.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH7
PROJECT No: 222462.01
DATE: 31/01/24
SHEET: 2 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
31/01/24 NFGWO while augering	46	0	Continued from soil		SEAM	1.24	SEAM			SEAM					0				
	45	1	SANDSTONE: pale grey and red, medium to coarse grained, thinly bedded; bedding dipping 0-20°; with clay bands to 2.5m; with 0-10% shale laminations. Hawkesbury Sandstone		HW	1.33	M								1				
	44	2			SEAM	1.44	SEAM			SEAM	1.44m: DS 75mm				2	PLT	PL(A)=0.59MPa		
					HW	1.52	M												
					SEAM	1.94	SEAM	100	68	SEAM	1.94m: DS 60mm								
					HW	2.00	M												
					SEAM	2.08	SEAM			SEAM	2.08-2.15m DS, 70mm								
					HW	2.15	M				2.49m: B, 0°, PR, CT Clay, RF								
	43	3				2.80									3	PLT	PL(A)=1.7MPa		
			From 2.80m: orange																
	42	4						100	98						4	PLT	PL(A)=1.7MPa		
		5			MW						4.97m: DS				5	PLT	PL(A)=1.5MPa		
											5.61m: B, 0°, PR, SN Fe, RF								
	41	6									5.74m: B, 10°, PR, CN, RF				6	PLT	PL(A)=1.8MPa		
							H				6.65m: B, 15°, CU, SN Fe, RF								
	40	7				7.00					6.88m: B, 5°, PR, SN Fe, RF				7	PLT	PL(A)=2.8MPa		
											7.03m: B, 10°, IR, SN Fe, RF, patchy Clay VNR								
	39		From 7.39m: pale grey; with carbonaceous flecks		SW			100	83		7.11-7.84m: B x8, 15°, PR, CN, RF								
	38	8	From 7.59m: pale grey			7.90									8	PLT	PL(A)=2MPa		
											8.50m: B, 15°, PR, VNR Clay, RF								
											8.54m: B, 15°, PR, VNR Clay, RF								
		9			FR						8.69m: B, 15°, PR, CN, RF				9	PLT	PL(A)=1.7MPa		
	37							100	98										
											9.68m: B, 15°, PR, CN, RF								
											9.82m: B, 5°, PR, CBS, RF					PLT	PL(A)=2.2MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

Generated with CORE-GS by Geroc - Split Soil-Rock Log

PLANT: Comacchio Geo 305
METHOD: DT to 0.15m, AD/T to 1.1m, NMLC to 16.4m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: HS/AN
CASING: HWT to 1.1m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.8 AHD
COORDINATE: E:325815.2, N:6260750.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH7
PROJECT No: 222462.01
DATE: 31/01/24
SHEET: 3 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	36	10.00	SANDSTONE: pale grey, medium to coarse grained, thinly bedded; bedding dipping 0-20°; with 0-10% shale laminations. Hawkesbury Sandstone								10.20m: B, 0°, PR, CN, RF 10.35m: B, 0°, PR, CN, RF 10.40m: B, 0°, PR, CN, RF				10				
	35	11						100	98		11.09m: B, 0°, PR, CN, RF				11	PLT	PL(A)=1.7MPa		
	34	12									12.53m: B, 0°, PR, CN, RF				12	PLT	PL(A)=2MPa		
	33	13	12.86m: shale clast		FR		H	100	100		13.19m: B, 5°, PR, CT Clay, RF				13	PLT	PL(A)=2.2MPa		
	32	14													14	PLT	PL(A)=1.4MPa		
	31	15						100	100						15	PLT	PL(A)=2.1MPa		
	30	16									15.95m: B, 5°, PR, CBS, RF				16	PLT PLT	PL(A)=1.8MPa PL(A)=1.6MPa		
	29	17	Borehole discontinued at 16.40m depth. Target depth reached.												17				
	28	18													18				
	27	19													19				

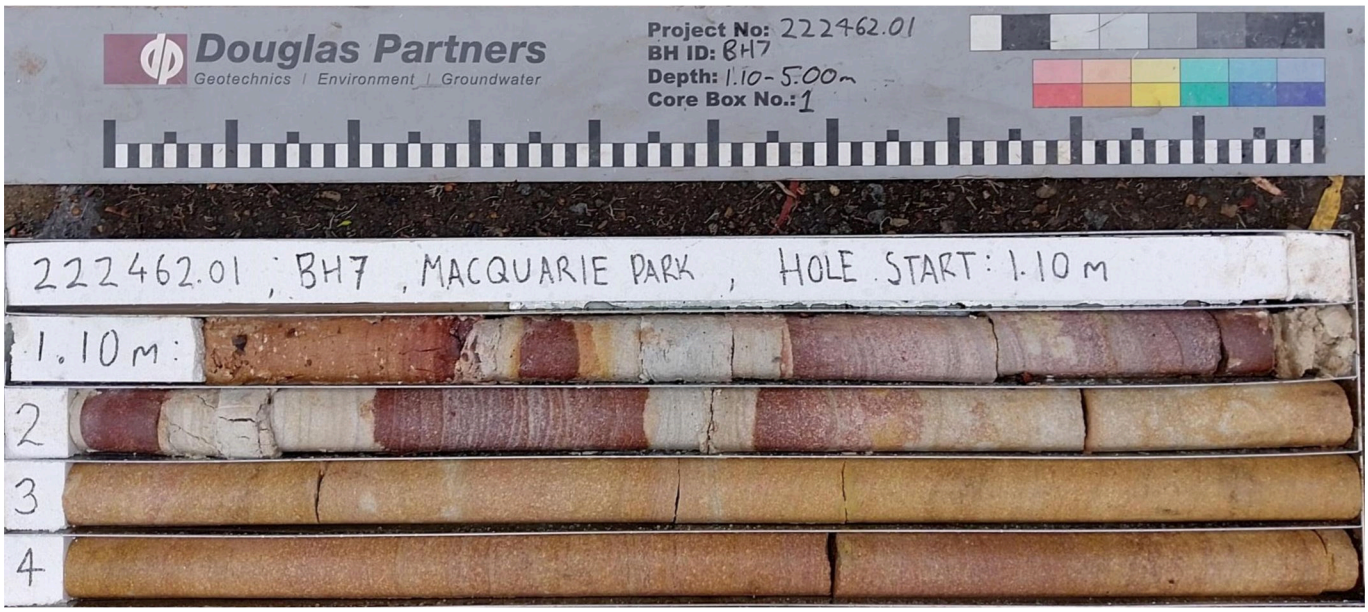
NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio Geo 305
METHOD: DT to 0.15m, AD/T to 1.1m, NMLC to 16.4m
REMARKS:
OPERATOR: Rockwell (TT)
LOGGED: HS/AN
CASING: HWT to 1.1m

Refer to explanatory notes for symbol and abbreviation definitions

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.8 AHD
COORDINATE: E:325815.2, N:6260750.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH7
PROJECT No: 222462.01
DATE: 31/01/24
SHEET: 1 of 2



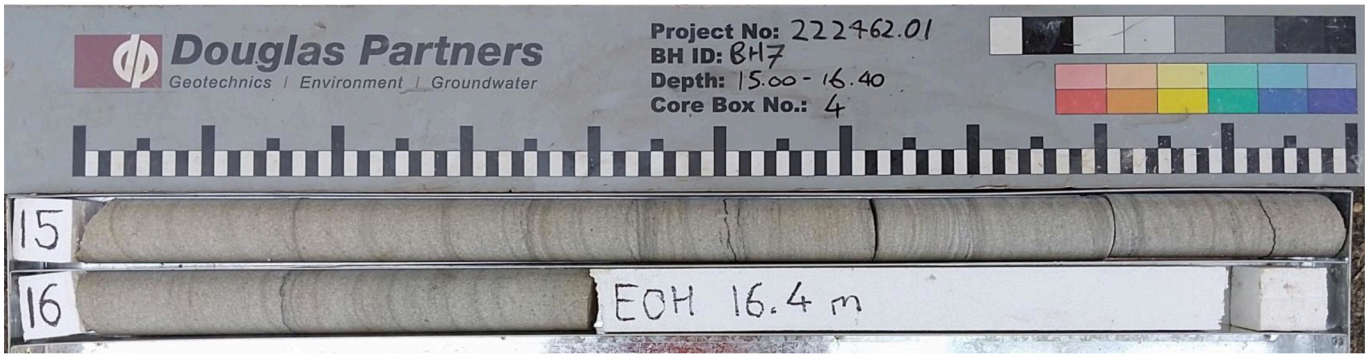
1.10-5.00 m depth

5.00-10.00 m depth

CORE PHOTO LOG

CLIENT: Legacy Property Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.8 AHD
COORDINATE: E:325815.2, N:6260750.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH7
PROJECT No: 222462.01
DATE: 31/01/24
SHEET: 2 of 2

10.00-15.00 m depth



15.00-16.40 m depth

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 1 of 6

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
04/06/25 No Free Groundwater Observed Whilst Augering	44.7	0.15	CONCRETE: pale grey; angular to sub-angular; dark grey, 5-10mm, igneous and crushed brick aggregate.				NA				0.15			Flush cover	
		0.40	FILL / Silty SAND with gravel: brown; medium to coarse; medium, igneous, 10-15mm gravel; trace crushed brick.		FILL		M		A		0.25				
		0.80	SAND (SP) trace gravel: red-brown; medium to coarse; sandstone, 2-5mm gravel; extremely weathered sandstone.		XWM	ND	M - D		A		0.40			Backfill	
	44	1	Continued as rock log								0.50				
	43	2							A		0.70				
	42	3									0.80				
	41	4									1				
	40	5									2				
	39	6									3				
	38	7									4				
	37	8									5				
	36	9									6				
	35										7				
											8				
											9				

NOTES: (#) Soil origin is "probable" unless otherwise stated. (*) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comachio 305
METHOD: DT to 0.15m, then AD/T to 0.8m, then HQ3 to 42.12m
REMARKS:
OPERATOR: Ground Test (LC/JJ)
LOGGED: S. Antoun
CASING: HWT to 0.8m

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 2 of 6

CONDITIONS ENCOUNTERED | **SAMPLE** | **TESTING**

GROUNDWATER: 04/06/25 No Free Groundwater Observed Whilst Augering

RL (m) | DEPTH (m) | DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE) | GRAPHIC | WEATH. (DW, RS, XW, HW, MW, SW, FR) | DEPTH (m) | STRENGTH (VL, L, M, H, VH, EH) | RECOVERY (%) | RQD | FRACTURE SPACING (m) | DEFECTS & REMARKS | SAMPLE REMARKS | TYPE | INTERVAL | DEPTH (m) | TEST TYPE | RESULTS AND REMARKS | BACKFILL | WELL PIPE

Continued from soil log

SANDSTONE: red-brown, mottled pale grey, medium - coarse grained; Hawkesbury Sandstone.

0.80

SANDSTONE: pale grey, medium - coarse grained; with dark grey siltstone flecks and laminations dipping 0-20°. Hawkesbury Sandstone.

5.35

6.50

Depth	Weath.	Strength	Recovery (%)	RQD
0.80 – 5.35	MW - HW	H	100	97
5.35 – 6.50	SW - FR	H	100	89
6.50 – 9.50	FR	H	100	94
9.50 – 9.50			100	97

Defects & Remarks:
- 0.85m: B, 0-5°, IR, CN, RF
- 1.58m: B, 0°, PR, SN Clay, RF, CU,
- 1.80m: B, 0°, PR, CN, RF
- 2.05m: B, 5°, PR, CN, RF
- 3.03m: B, 0°, IR, SN Fe, RF
- 3.21m: B, 10°, PR, SN Fe, healed
- 3.34m: B, 0°, PR, SN Fe, RF
- 3.75m: B, 0°, CU, SN Fe, RF
- 3.84m: B, 0°, IR, SN Fe, RF
- 3.87m: B, 0°, CU, SN Fe, RF, Clay
- 3.96m: B, 5-10°, ST, SN Fe, RF
- 4.13m: B, 5°, PR, SN Clay, RF
- 4.51m: B, 0-5°, UN, SN Clay, RF
- 4.53m: B, 0°, PR, SN Clay, RF
- 4.87-4.89m: B, 20°, IR, SN Fe, RF
- 5.10m: B, 20-30°, PR, SN Clay, RF
- 5.35m: B, 20-30°, UN, Clay, RF
- 5.60m: B, 0-5°, UN, SN Fe, RF
- 6.40m: B, 0-5°, PR, SN Clay, RF
- 6.75m: B, 0°, IR, SN Clay, RF
- 6.92m: B, 5-10°, PR, SN Clay, RF
- 7.55m: B, 0°, CU, SN Clay, RF
- 7.96m: B, 0°, PR, Clay, RF
- 8.73m: B, 0°, PR, SN Clay, RF
- 8.92m: B, 0°, PR Clay, RF, 2-3mm

Depth	Test Type	Results and Remarks
1	PLT	PL(A)=1.2MPa
2	PLT	PL(A)=1.3MPa
3	PLT	PL(A)=1.6MPa
4	PLT	PL(A)=3.0MPa
5	PLT	PL(A)=1.3MPa
6	PLT	PL(A)=1.8MPa
7	PLT	PL(A)=1.7MPa
8	PLT	PL(A)=1.5MPa
9	PLT	PL(A)=1.6MPa
9.5	PLT	PL(A)=1.9MPa

BACKFILL: Flush cover; Backfill
WELL PIPE: Gatic

Generated with CORE-GS by Geroc - Split Soil-Rock Log

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comachio 305
OPERATOR: Ground Test (LC/JJ)
LOGGED: S. Antoun
METHOD: DT to 0.15m, then AD/T to 0.8m, then HQ3 to 42.12m
CASING: HWT to 0.8m
REMARKS:

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 3 of 6

CONDITIONS ENCOUNTERED | **SAMPLE** | **TESTING**

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE)	GRAPHIC	WEATH. (PS, XW, DW, HW, MW, SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m) (0.03, 0.06, 0.20, 0.60, 2.00)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	34	10	[CONT] SANDSTONE: pale grey, medium - coarse grained; with dark grey siltstone flecks and laminations dipping 0-20°. Hawkesbury Sandstone.			10.27	H				9.96m: B, 0°, IR, Clay, RF 10.11-10.34m: B x4, 0°, INF Clay, RF, 0-8mm, PR-UN				10				
	33	11	10.27m-10.34m: Siltstone band; dark grey, low to medium strength			10.34		100	97		11.09m: B, 0-5°, ST, CN, RF				11	PLT	PL(A)=1.4MPa		
	32	12									12.20m: B, 5°, PR, HE CBS 2mm				12	PLT	PL(A)=2.1MPa		
	31	13									13.17m: B, 15-20°, PR, CN, RF				13	PLT	PL(A)=1.6MPa		
	30	14									14.27m: B, 0°, IR, CN, RF				14	PLT	PL(A)=1.5MPa		
	29	15			FR		H				14.83m: B, 5°, CU, SN Clay, RF				15	PLT	PL(A)=1.7MPa	Backfill	
	28	16	16.38m-16.42m: Siltstone clasts up to 20mm					100	94		15.42m: B, 10°, PR, SN CBS, RF 16.22m: B, 10°, PR CBS 20mm, RF 16.40m: B, 10°, PR, VNR Clay, RF				16	PLT	PL(A)=1.9MPa		
	27	17													17	PLT	PL(A)=1.8MPa		
	26	18									17.88m: B, 5-10°, IR, SN Clay, RF				18	PLT	PL(A)=2.0MPa		
	25	19						100	100		19.20m: B, 0°, PR, SN Clay, RF 19.26m: B x2, 0-5°, PR Clay, RF, 0-2mm				19	PLT	PL(A)=1.1MPa		
																PLT	PL(A)=1.8MPa		

NOTES: [H] Soil origin is "probable" unless otherwise stated.

Generated with CORE-GS by Geroc - Split Soil-Rock Log

PLANT: Comachio 305
OPERATOR: Ground Test (LC/JJ)
LOGGED: S. Antoun
METHOD: DT to 0.15m, then AD/T to 0.8m, then HQ3 to 42.12m
CASING: HWT to 0.8m
REMARKS:

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 4 of 6

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
		21	[CONT] SANDSTONE: pale grey, medium - coarse grained; with dark grey siltstone flecks and laminations dipping 0-20°. Hawkesbury Sandstone. 20.31m-20.36m: Siltstone clasts; 5-15mm		FR		H	100	100		20.40m: B, 5-10°, UN, SN Clay, RF				21	PLT	PL(A)=1.9MPa		
		22						100	100		22.65m: B, 5-10°, PR, CN, RF				22	PLT	PL(A)=1.9MPa		
		23													23	PLT	PL(A)=1.5MPa		
		24									23.67m: B, 15-20°, PR, SN Clay, RF 23.79m: B, 10-15°, PR, CT Clay, RF, 1-2mm				24	PLT	PL(A)=1.6MPa		
		25						100	100		24.76m: B, 5-10°, PR, SN Clay, RF				25	PLT	PL(A)=1.9MPa	Backfill	
		26									25.93m: B, 0°, PR, CN, SM				26	PLT	PL(A)=1.6MPa		
		27									27.33m: B, 0°, PR, CN, RF				27	PLT	PL(A)=1.7MPa		
		28													28	PLT	PL(A)=1.6MPa		
		29									29.12m: B, 0°, PR, CT Clay, SM, 2-3mm				29	PLT	PL(A)=1.6MPa		
																PLT	PL(A)=1.7MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comachio 305
METHOD: DT to 0.15m, then AD/T to 0.8m, then HQ3 to 42.12m
REMARKS:
OPERATOR: Ground Test (LC/JJ)
LOGGED: S. Antoun
CASING: HWT to 0.8m

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 5 of 6

CONDITIONS ENCOUNTERED

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	SOIL STRENGTH (where encountered) / SOIL MOISTURE	GRAPHIC	WEATH. (PS, XW, HW, MW, SW, FR; DW)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS
	14	31	[CONT] SANDSTONE: pale grey, medium - coarse grained; with dark grey siltstone flecks and laminations dipping 0-20°. Hawkesbury Sandstone. 30.25m-30.50m: Fine grained, grey, thinly laminated 31.47m-32.45m: Carbonaceous flecks					H	100	97		30.29m: B, 0°, PR, SN Clay, RF 30.59m: B, 0°, IR, SN Clay, RF
	13	32										32.25m: B, 0°, PR, Clay, RF
	12	33	32.50m-33.50m: 20-30% fine grained, grey, laminations				32.50					32.46m: B, 0°, PR, CN, RF 32.52m: B, 0°, PR, CN, RF
	11	34							100	96		33.49m: B, 0°, PR, SN Clay, RF
	10	35				FR		M H				
	9	36	35.90m-37.90m: With 20-30% siltstone clasts up to 50mm and wavy siltstone beds up to 40mm thick									35.54m: B x2, 0°, IR, SN Clay, RF 35.73-35.79m: JT, 45°, IR, CN, RF 35.94-35.98m: JT, 30-45°, IR, RF, UN 36.20m: B, 10-15°, IR, SN CBS, RF 36.48m: B, 5-10°, IR, CN, RF
	8	37										36.94m: B, 15-20°, IR, CN, RF 37.17-37.21m: JT, 35-45°, CU, CN, SM 37.38-37.41m: JT, 30-40°, CU, SN Clay, RF
	7	38					37.90		100	93		37.70m: B, 15-50°, IR, CN, RF
	6	39						H				38.78m: B, 0°, IR, CN, RF
	5								100	98		

SAMPLE

SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)
			31
			32
			33
			34
			35
			36
			37
			38
			39

TESTING

TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
PLT	PL(A)=1.9MPa	Backfill	
PLT	PL(A)=1.7MPa	Bentonite	
PLT	PL(A)=1.2MPa		
PLT	PL(A)=1.1MPa		
PLT	PL(A)=0.99MPa		
PLT	PL(A)=0.81MPa	Gravel - 5mm	
PLT	PL(A)=1.3MPa		
PLT	PL(A)=1.5MPa		
PLT	PL(A)=1.4MPa		
PLT	PL(A)=1.4MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comachio 305
OPERATOR: Ground Test (LC/JJ)
LOGGED: S. Antoun
METHOD: DT to 0.15m, then AD/T to 0.8m, then HQ3 to 42.12m
CASING: HWT to 0.8m
REMARKS:

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 6 of 6

CONDITIONS ENCOUNTERED														SAMPLE				TESTING			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE)	GRAPHIC	WEATH. (PS, XW, DW [HW, MW], SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m) (<0.06, 0.06-0.2, 0.2-0.6, 0.6-2, >2)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	44	0	[CONT] SANDSTONE: pale grey, medium - coarse grained; with dark grey siltstone flecks and laminations dipping 0-20°. Hawkesbury Sandstone.		FR	41	H	100	98		40.46m: B, 0°, PR, Clay, RF, UN 41.43m: B, 0°, PR, SN CBS, RF 41.62m: B, 0-5°, CU, VNR Clay, RF 41.68m: B, 0°, PR, VNR Clay, RF				41	PLT	PL(A)=1.8MPa	Gravel - 5mm	
	43	1													42	PLT	PL(A)=1.4MPa		
	42	2	Borehole discontinued at 42.12m depth. Target depth reached.																
	41	3																	
	40	4																	
	39	5																	
	38	6																	
	37	7																	
	36	8																	
	35	9																	
	34	10																	
	33	11																	
	32	12																	
	31	13																	
	30	14																	
	29	15																	
	28	16																	
	27	17																	
	26	18																	
	25	19																	
	24	20																	
	23	21																	
	22	22																	
	21	23																	
	20	24																	
	19	25																	
	18	26																	
	17	27																	
	16	28																	
	15	29																	
	14	30																	
	13	31																	
	12	32																	
	11	33																	
	10	34																	
	9	35																	
	8	36																	
	7	37																	
	6	38																	
	5	39																	
	4	40																	
	3	41																	
	2	42																	
	1	43																	
	0	44																	
	-1	45																	
	-2	46																	
	-3	47																	
	-4	48																	
	-5	49																	

NOTES: [H] Soil origin is "probable" unless otherwise stated.

PLANT: Comachio 305
METHOD: DT to 0.15m, then AD/T to 0.8m, then HQ3 to 42.12m
REMARKS:
OPERATOR: Ground Test (LC/JJ)
LOGGED: S. Antoun
CASING: HWT to 0.8m

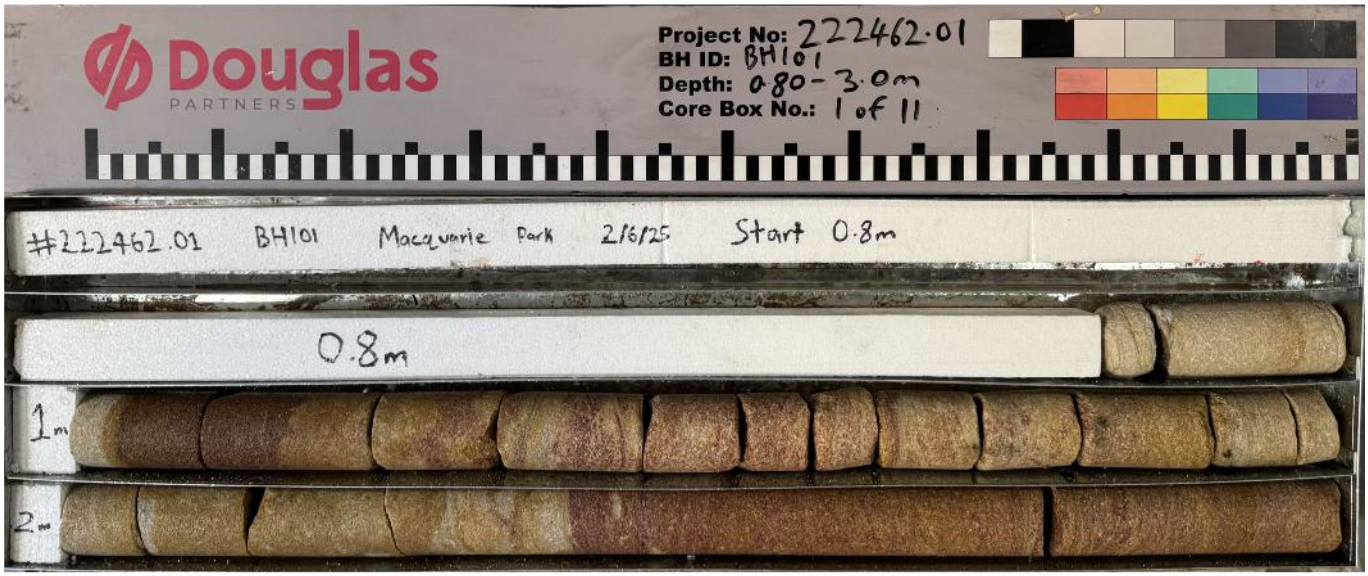
Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Douglas PARTNERS

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 1 of 6



0.80-3.00 m depth

3.00-7.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 2 of 6

7.00-11.00 m depth

11.00-15.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 3 of 6

15.00-19.00 m depth

19.00-23.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 4 of 6

23.00-27.00 m depth

27.00-31.00 m depth

CORE PHOTO LOG

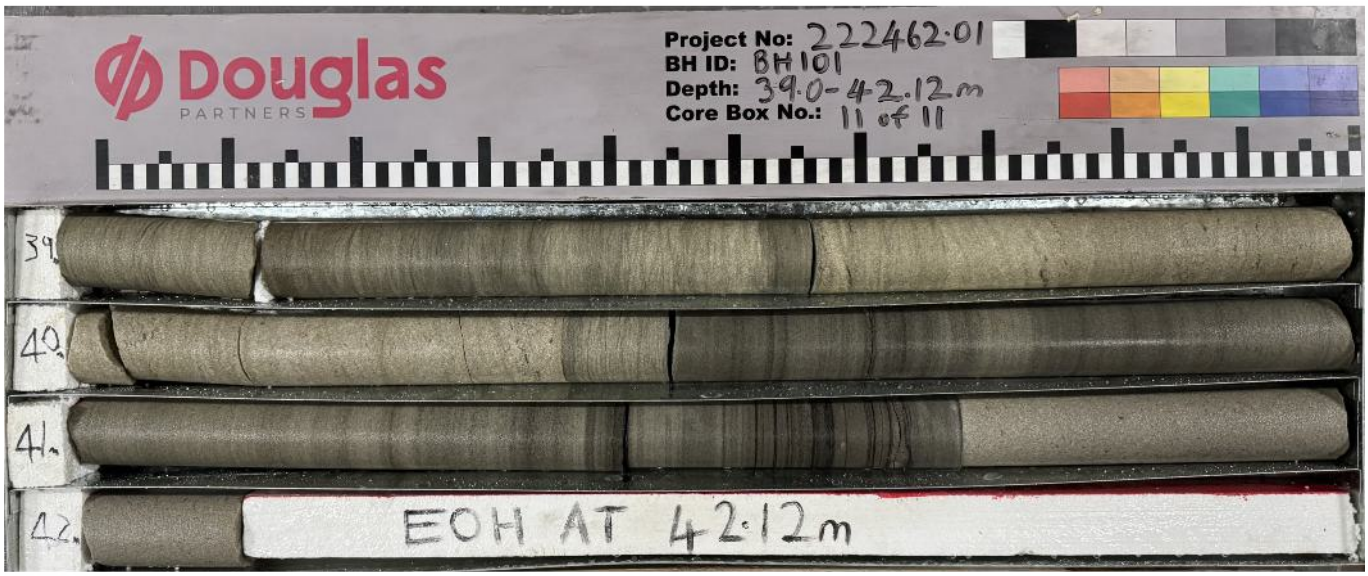
CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 5 of 6

31.00-35.00 m depth

35.00-39.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 44.7 AHD
COORDINATE: E:325832.5, N:6260801.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH101
PROJECT No: 222462.01
DATE: 02/06/25 - 04/06/25
SHEET: 6 of 6



39.00-42.12 m depth

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 1 of 6

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
11/04/25 No free groundwater observed whilst augering	46	0.00	FILL / Silty SAND trace gravel: dark brown; fine to medium; coarse to medium, igneous gravel; trace rootlets.		FILL TOP	ND	M		A		0.10			Backfill	
									A		0.50				
		0.65	SAND (SP): pale orange to brown; fine to medium.		XWM										
		1.06	Continued as rock log						A SPT		1.00 1.06	SPT	25/60		
	45	2									2				
	44	3									3				
	43	4									4				
	42	5									5				
	41	6									6				
	40	7									7				
	39	8									8				
	38	9									9				
	37														

NOTES: (#) Soil origin is "probable" unless otherwise stated. (*) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.06m, then HQ3 to 44m
CASING: HW to 1.06m
REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 2 of 6

CONDITIONS ENCOUNTERED | **SAMPLE** | **TESTING**

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE)	GRAPHIC	WEATH. (DW: PS, XW, HW, MW, SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m) (0.03, 0.06, 0.20, 0.60, 2.00, >2.00)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
11/04/25 No free groundwater observed whilst augering	46	0														0				
	45	1	Continued from soil log													1				
			SANDSTONE: pale grey and red brown, medium to coarse grained.		MW - HW	1.06	L				1.27m: B, 0°, IR, CN, RF 1.38m: B, 0°, PR, CN, RF 1.51m: B, 0°, PR, CN, RF 1.54m: B, 0°, PR, VNR Clay, RF 1.62m: B, 0°, PR Clay, RF 1.89m: B, 15°, PR, CN, RF 2.13m: B, 0°, PR, Clay 3mm, RF, CBS(2-3mm)							
						1.62	VL													
	44	2				1.77		100	91							2	PLT	PL(A)=0.76MPa		
		3									3.17m: B, 15°, PR, CN, RF					3	PLT	PL(A)=1.9MPa		
	43				MW - HW		M - H													
		4	4.22m: Dark grey siltstone clasts, 10-20mm								4.05m: B, 0°, PR, VNR Clay, RF 4.22m: B, 0°, IR, CN, RF 4.30m: B, 5°, CU, SN Fe, RF 4.50m: B, 0°, Clay 3mm, CBS(2-3mm)					4	PLT	PL(A)=1.6MPa		
	42		4.61m-4.64m: Brown siltstone clast,40-50mm					100	86		4.83m: B, 0°, PR, SN Fe, RF									
		5									5.16m: B, 5-10°, CU, SN Fe, RF 5.49m: B, 5°, UN, Clay, RF, PR 5.70m: B, 0-5°, CU, SN Clay, RF 5.75m: B, 0°, IR, SN Fe, RF 5.78m: B, 0°, IR, INF Clay 5mm, RF, Fe SN 5.82m: B, 10-15°, PR, CN, RF 5.94m: B, 0°, IR, SN Clay, RF 6.80m: B, 5°, PR, SN Fe, RF					5	PLT PLT PLT	PL(A)=2.0MPa PL(D)=0.17MPa PL(D)=0.16MPa		
	41		5.70m-5.75m: Dark grey siltstone clast, 5-15mm			5.80														
		5.92	SANDSTONE: pale grey, medium to coarse grained; with 5-10° dark grey siltstone laminations.		SW - FR											6	PLT PLT	PL(A)=1.0MPa PL(D)=1.9MPa		
	40	6																		
		7						100	98		7.42m: B, 0°, PR, SN Fe, partially healed					7	PLT PLT	PL(A)=2.1MPa PL(D)=4.9MPa		
	39						H													
		8				8.00					8.05m: B, 10-15°, PR, CN, RF					8	PLT PLT	PL(A)=1.7MPa PL(D)=2.3MPa		
	38																			
		9			FR						9.19m: B, 0°, PR, CN, SM					9	PLT PLT	PL(A)=1.5MPa PL(D)=3.1MPa		
	37							100	100		9.53m: B, 25°, PR, SN Clay, RF									
																	PLT	PL(A)=1.9MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

Generated with CORE-GS by Geroc - Split Soil-Rock Log

PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.06m, then HQ3 to 44m
CASING: HW to 1.06m
REMARKS:

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 3 of 6

CONDITIONS ENCOUNTERED | **SAMPLE** | **TESTING**

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE)	GRAPHIC	WEATH. (DW: PS, XW, HW, MW, SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m) (0.03, 0.06, 0.20, 0.60, 2.00, >2.00)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	36	10	[CONT] SANDSTONE: pale grey, medium to coarse grained; with 5-10° dark grey siltstone laminations.								10.20m: B, 0°, PR, INF Clay 2mm, RF 10.30m: B, 10-15°, PR, INF Clay 2mm, RF				10	PLT	PL(D)=1.5MPa		
	35	11						100	100						11	PLT	PL(A)=1.8MPa		
	34	12	12.35m-12.37m: Siltstone clast, dark grey, 40-50mm								12.72m: B, 5-10°, PR, INF Clay 2mm, RF				12	PLT PLT	PL(A)=1.8MPa PL(D)=2.5MPa		
	33	13					H	100	100		13.63m: B, 10-15°, IR, SN CBS, RF				13	PLT	PL(A)=2.1MPa		
	32	14													14	PLT PLT	PL(D)=2.6MPa PL(A)=1.5MPa		
	31	15			FR						14.90m: B, 5°, PR, Clay, SM 15.44m: B, 0°, PR, CN, RF				15	PLT	PL(A)=1.4MPa	Backfill	
	30	16						100	97		15.79m: B, 0°, PR, CN, RF 15.83m: B, 0°, PR, SN Clay, RF 16.49m: B, 0°, PR, SN Clay, RF				16	PLT	PL(A)=2.0MPa		
	29	17				17.00					17.60-17.61m: B x2, 0°, PR, INF Clay 3mm, RF				17	PLT	PL(A)=1.2MPa		
	28	18					M - H	100	100		18.64m: B, 10-15°, PR, SN Clay, RF				18	PLT	PL(A)=0.99MPa		
	27	19						100	100		19.76m: B, 5°, PR, SN Clay, RF 19.94m: B, 5°, PR, INF				19	PLT	PL(A)=1.0MPa		
																PLT	PL(A)=1.3MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.06m, then HQ3 to 44m
CASING: HW to 1.06m
REMARKS:

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 4 of 6

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	26	21	[CONT] SANDSTONE: pale grey, medium to coarse grained; with 5-10° dark grey siltstone laminations.			20.00		100	100		Clay 3mm, RF 20.07m: B, 0°, PR, SN CBS, RF 20.24m: B, 0°, PR, INF Clay 4mm, RF				21	PLT	PL(A)=1.4MPa		
	25	22													22	PLT	PL(A)=1.8MPa		
	24	23	22.64m-22.66m: Dark grey siltstone clasts, 20-30mm					100	100		22.63m: B, 0°, PR, SN Clay, RF 23.13m: B, 5-10°, PR, CN, RF 23.55m: B, 10-15°, IR, CN, RF				23	PLT	PL(A)=2.0MPa		
	23	24													24	PLT	PL(A)=2.1MPa		
	22	25			FR		H	100	100		24.77m: B, 5°, PR, INF Clay 2mm, RF				25	PLT	PL(A)=1.8MPa	Backfill	
	21	26									25.84m: B, 0°, PR, INF Clay 4mm, RF				26	PLT	PL(A)=1.9MPa		
	20	27													27	PLT	PL(A)=1.4MPa		
	19	28									27.80m: B, 5°, PR, CN, RF				28	PLT	PL(A)=1.8MPa		
	18	29						100	100		28.78m: B, 0°, PR, SN Clay, SM				29	PLT	PL(A)=2.4MPa		
	17										29.89m: B, 0°, PR, CN, RF					PLT	PL(A)=1.8MPa		

NOTES: [H] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.06m, then HQ3 to 44m
CASING: HW to 1.06m
REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 5 of 6

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE)	GRAPHIC	WEATH. (DW: PS, XW, HW, MW, SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m) (0.03, 0.06, 0.2, 0.6, >0.6)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	16	31	[CONT] SANDSTONE: pale grey, medium to coarse grained; with 5-10° dark grey siltstone laminations.			31									31	PLT	PL(A)=1.9MPa	Backfill	
	15							100	100										
		32	31.74m-31.82m: With dark grey siltstone clasts, 10-25mm			32									32	PLT	PL(A)=1.5MPa		
	14																		
		33	From 33.00m: With bands of fine to medium grained sandstone interlaminated with siltstone, up to 0.4m thick			33					33.06m: B, 0°, PR, VNR Clay, SM 33.28m: B, 0-5°, PR, SN Clay, SM 33.70m: B, 5°, PR, Clay, RF, 1-3mm				33	PLT	PL(A)=1.3MPa		
	13																	Bentonite	
		34				34									34	PLT	PL(A)=1.9MPa		
	12							100	100		34.36m: B, 10-15°, IR, SN CBS, RF								
		35	34.98m-35.00m: Dark grey siltstone clast, 20-25mm		FR	35	H				35.11m: B, 0-5°, IR, SN CBS, RF 35.21m: B, 5°, PR, CN, RF				35	PLT	PL(A)=1.3MPa		
	11																		
		36				36									36	PLT	PL(A)=1.2MPa		
	10																		
		37	37.23m-37.28m: With siltstone and quartz clasts 10-20mm			37					37.20m: B, 0°, IR, VNR Clay, RF				37	PLT	PL(A)=1.2MPa	Gravel	
	9							100	100		37.60m: B, 0°, PR, SN CBS, RF								
		38	37.42m-37.50m: Dark grey siltstone clasts, approximately 20-25mm			38					38.52m: B, 0-5°, PR, SN CBS, RF				38	PLT	PL(A)=1.4MPa		
	8																		
		39				39					39.18m: B, 5°, PR, SN CBS, RF				39	PLT	PL(A)=2.0MPa		
	7							100	100		39.52m: B, 5-10°, IR, SN CBS, RF								
																PLT	PL(A)=1.9MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.06m, then HQ3 to 44m
CASING: HW to 1.06m
REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 6 of 6

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	6	41	[CONT] SANDSTONE: pale grey, medium to coarse grained; with 5-10° dark grey siltstone laminations.			40.50	H	100	100						41	PLT	PL(A)=1.1MPa		
	5		41.67m: Dark grey siltstone clast, approximately, 5-10mm		FR		M				41.68m: B, 5-10°, IR, CN, RF								
	4	42	42.38m-42.42m: Dark grey siltstone clasts, approximately 5-20mm				H				42.46m: B, 50°, PR, CN, RF				42	PLT	PL(A)=1.1MPa	Gravel	
	3	43						100	100		43.39m: B, 0°, PR, SN Clay, RF				43	PLT	PL(A)=1.4MPa		
	2	44	Borehole discontinued at 44.00m depth. Target depth reached.													PLT	PL(A)=0.96MPa		
	1	45																	
	0	46																	
	-1	47																	
	-2	48																	
	-3	49																	

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.06m, then HQ3 to 44m
CASING: HW to 1.06m
REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 1 of 6

1.06-4.00 m depth

4.00-8.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 2 of 6

8.00-12.00 m depth

12.00-16.00 m depth

Douglas PARTNERS

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 3 of 6

16.00-20.00 m depth

20.00-24.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 4 of 6

24.00-28.00 m depth

28.00-32.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 5 of 6

32.00-36.00 m depth

36.00-40.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 46.3 AHD
COORDINATE: E:325819.8, N:6260775.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH102
PROJECT No: 222462.01
DATE: 11/04/25
SHEET: 6 of 6

40.00-44.00 m depth

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 1 of 6

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
09/04/25 No free groundwater observed whilst augering	47	0.00	FILL / Silty SAND trace gravel: dark brown; fine to medium; coarse to medium, igneous gravel; trace rootlets.		FILL TOP	ND	ND		A		0.10			Flush cover	
									A		0.40 0.50				
		0.85	SAND (SP): pale orange to brown; fine to medium; trace pale grey nodules of clay.		XWM				A		0.90 1.00				
									SPT		1.21	SPT	15,25/60		
	46	1.30	Continued as rock log											Backfill	
	45	2									2				
	44	3									3				
	43	4									4				
	42	5									5				
	41	6									6				
	40	7									7				
	39	8									8				
	38	9									9				

NOTES: [#] Soil origin is "probable" unless otherwise stated. [*] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

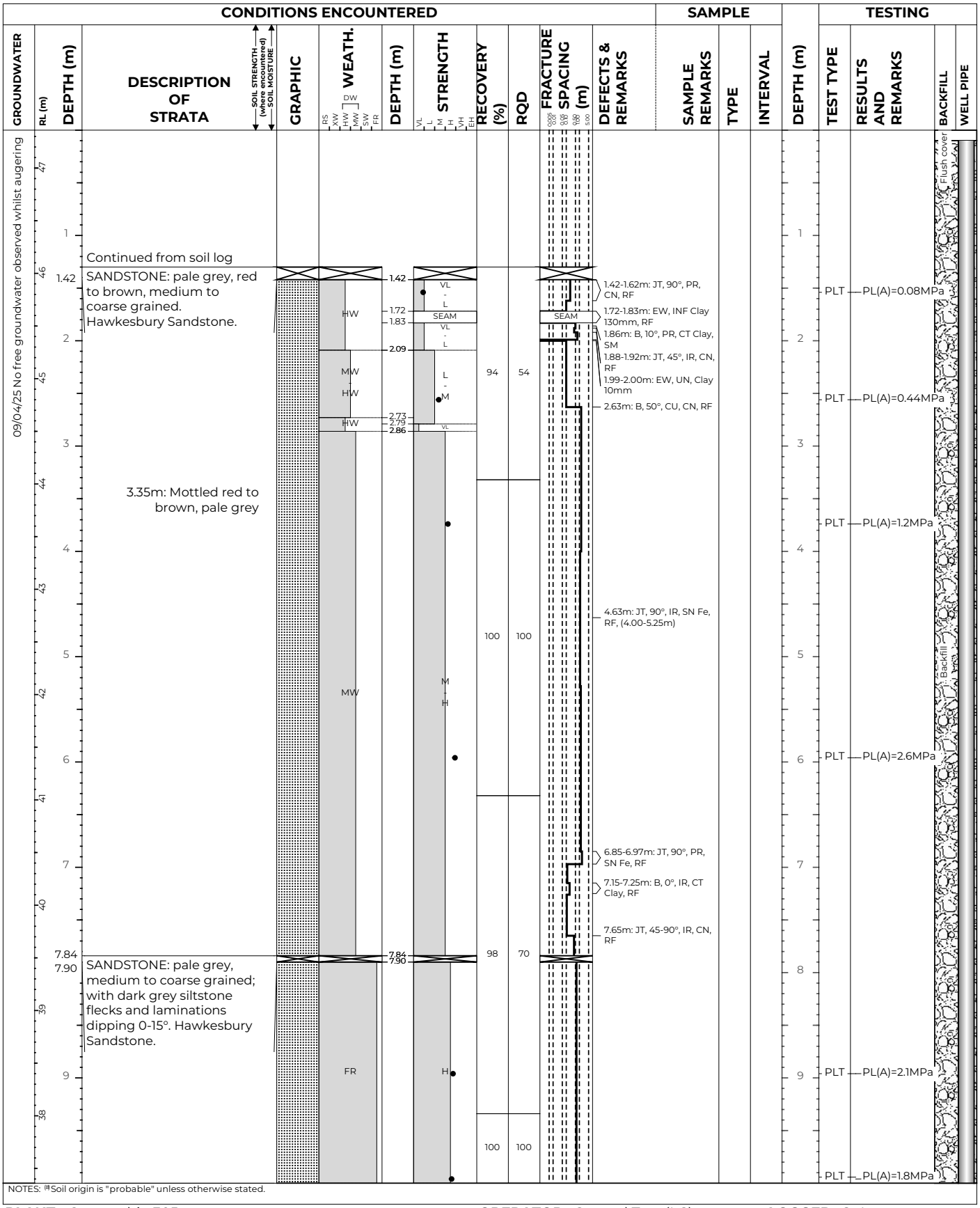
PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.3m, then HQ3 to 45.2m
CASING: HWT to 1.3m
REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Split Soil-Rock Log

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 2 of 6



NOTES: [a] Soil origin is "probable" unless otherwise stated.

Generated with CORE-GS by Geroc - Split Soil-Rock Log

PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.3m, then HQ3 to 45.2m
CASING: HWT to 1.3m
REMARKS:

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 3 of 6

CONDITIONS ENCOUNTERED															SAMPLE				TESTING			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE)	GRAPHIC	WEATH. (RS, XW, DW [HW, MW], SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m) (0.03, 0.06, 0.20, 0.60, 2.00, >2.00)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	37	10				10						10.67m: B, 0-5°, IR, CN, RF				10				
	36	11						100	100							11	PLT	PL(A)=1.7MPa		
	35	12														12	PLT	PL(A)=1.9MPa		
	34	13														13	PLT	PL(A)=1.7MPa		
	33	14						100	100							14	PLT	PL(A)=2.0MPa		
	32	15			FR		H					14.59m: B, 0°, IR, SN CBS, RF				15	PLT	PL(A)=1.7MPa	Backfill	
	31	16														16	PLT PLT	PL(A)=1.7MPa PL(A)=1.9MPa		
	30	17						100	63			16.44-16.45m: B, 25°, PR, VNR Clay, RF 16.94m: JT, 80-90°, IR, CN, RF, (16.5-17.38m)				17	PLT	PL(A)=1.4MPa		
	29	18										17.34m: JT, 45°, IR, CN, RF 17.35m: JT, 60°, PR, CN, RF 17.57m: B, 0°, IR, VNR Clay, RF 17.99m: JT, 60°, IR, CN, RF, (17.77-18.20m)				18	PLT	PL(A)=1.4MPa		
	28	19				19.90		100	75			18.57m: JT, 80-90°, IR, CN, RF, (18.32-18.81m) 18.97m: B, 5°, PR, VNR Clay, RF 19.89m: JT, 80-90°, IR, CN, RF				19	PLT	PL(A)=1.4MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 305
METHOD: AD/T to 1m, then WB to 1.3m, then HQ3 to 45.2m
REMARKS:
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
CASING: HWT to 1.3m

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 4 of 6

CONDITIONS ENCOUNTERED | **SAMPLE** | **TESTING**

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE)	GRAPHIC	WEATH. (DW: PS, XW, HW, MW, SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	27							100	75		20.50m: JT, 80-90°, UN, CN, RF, (19.75-21.18m)									
	26	21						100	100							21				
	25	22	21.62m-22.27m: Very thin, dark grey laminations of carbonaceous material				M				21.90m: JT, 65°, PR, CN, RF, (21.78-22.02m)					22	PLT	PL(A)=0.37MPa		
	24	23	22.81m-22.87m: 30% siltstone and quartz clasts up to 20 mm 23.14m-23.24m: Layer of dark grey siltstone			22.85		100	100		22.13m: B, 0°, IR, VNR CBS, RF 22.50m: JT, 70-80°, UN, CN, RF, (22.35-22.62m) 22.65m: B, 0°, UN, VNR CBS, RF					23	PLT	PL(A)=1.7MPa		
	23	24									23.07m: JT, 70-90°, CU, CN, RF, (22.97-23.15m) 23.40m: B, 10°, PR, VNR Clay, RF					24	PLT PLT	PL(A)=1.7MPa PL(A)=1.9MPa		
	22	25			FR											25	PLT	PL(A)=1.7MPa	Backfill	
	21	26	25.50m-27.68m: Very thin, dark grey laminations of carbonaceous material				H	100	100							26	PLT	PL(A)=2.1MPa		
	20	27									26.92m: B, 5°, PR, CT Clay 1mm, RF,					27	PLT	PL(A)=1.8MPa		
	19	28														28	PLT	PL(A)=1.9MPa		
	18	29	29.18m-29.43m: Carbonaceous flecks in sandstone					100	100		29.80m: JT, 70°, PR, CN, RF, (29.61-30.00m)					29	PLT	PL(A)=1.6MPa		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.3m, then HQ3 to 45.2m
CASING: HWT to 1.3m
REMARKS:

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 5 of 6

CONDITIONS ENCOUNTERED | **SAMPLE** | **TESTING**

GROUNDWATER | RL (m) | DEPTH (m) | DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE) | GRAPHIC | WEATH. (PS, XW, DW [HW, MW], SW, FR) | DEPTH (m) | STRENGTH (VL, L, M, H, VH, EH) | RECOVERY (%) | RQD | FRACTURE SPACING (m) (0.03, 0.06, 0.20, 0.60, 2.00) | DEFECTS & REMARKS | SAMPLE REMARKS | TYPE | INTERVAL | DEPTH (m) | TEST TYPE | RESULTS AND REMARKS | BACKFILL | WELL PIPE

Depth (m)	RL (m)	Description of Strata	Weath.	Strength	Recovery (%)	RQD	Defects & Remarks	Test Type	Results and Remarks
31	16				100	100		PLT	PL(A)=1.6MPa
32	15	32.00m-34.00m: Carbonaceous flecks in sandstone			100	100		PLT	PL(A)=1.9MPa
33	14							PLT	PL(A)=1.7MPa
34	13	34.00m-34.86m: Carbonaceous laminations thinly bedded		H	100	97		PLT	PL(A)=1.5MPa
35	12		FR				34.91m: B, 0-5°, PR, Clay, RF 35.34m: DS, 5°, 10mm 35.40m: EW, Clay 10mm	PLT PLT	PL(A)=1.7MPa PL(A)=2.2MPa
36	11	35.90m-36.03m: Siltstone clasts embedded in sandstone approximately 10-25mm						PLT	PL(A)=1.9MPa
37	10				100	95	37.12m: B, 0-15°, IR, VNR Clay, RF	PLT	PL(A)=1.1MPa
38	9			38.27			38.36-38.40m: B, 5-10°, PR, VNR Clay, RF	PLT	PL(A)=0.95MPa
39	8	38.41m-38.72m: Coarse grained, brecciated, with quartz and siltstone clasts		M H			38.90m: B, 10°, UN, VNR CBS, RF 38.96m: JT, 30°, PR, CT Clay, RF	PLT	PL(A)=1.1MPa
					100	97	39.76m: B, 0°, PR, VNR CBS, RF		
				39.85 H				PLT	PL(A)=1.7MPa

BACKFILL: Backfill; Bentonite; Gravel

NOTES: [a] Soil origin is "probable" unless otherwise stated.

Generated with CORE-GS by Geroc - Split Soil-Rock Log

PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.3m, then HQ3 to 45.2m
CASING: HWT to 1.3m
REMARKS:

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 6 of 6

CONDITIONS ENCOUNTERED														SAMPLE				TESTING			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE)	GRAPHIC	WEATH. (PS, XW, HW, DW, MW, SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	7	41	40.64m-42.40m: Carbonaceous flecks in sandstone 41.18m: Dark grey siltstone clast approximately 10mm		FR		H	100	97		40.41m: B, 0°, PR, VNR Clay, RF 40.48m: B, 25°, UN, CN, RF				41	PLT	PL(A)=1.7MPa	Gravel	
	6	42													42	PLT	PL(A)=1.3MPa		
	5	43									42.60m: B, 0°, PR, VNR Clay, RF 43.18m: B, 0°, PR, VNR CBS, RF 43.31m: B, 30°, PR, VNR Clay, RF				43	PLT	PL(A)=2.0MPa		
	4	44						100	99						44	PLT	PL(A)=1.4MPa		
	3	45													45	PLT	PL(A)=1.5MPa		
	2	46	Borehole discontinued at 45.20m depth. Target depth reached .																
	1	47																	
	0	48																	
	-1	49																	
	-2																		

NOTES: [a] Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 305
OPERATOR: Ground Test (LC)
LOGGED: S. Antoun
METHOD: AD/T to 1m, then WB to 1.3m, then HQ3 to 45.2m
CASING: HWT to 1.3m
REMARKS:

Generated with CORE-GS by Geroc - Split Soil-Rock Log

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 1 of 6

BH103: 1.30-4.00 m depth

BH103: 4.00-8.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25

BH103: 8.00-12.00 m depth

BH103: 12.00-16.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 3 of 6

BH103: 16.00-20.00 m depth

BH103: 20.00-24.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 4 of 6

BH103: 24.00-28.00 m depth

BH103: 28.00-32.00 m depth

CORE PHOTO LOG

CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 5 of 6

BH103: 32.00-36.00 m depth

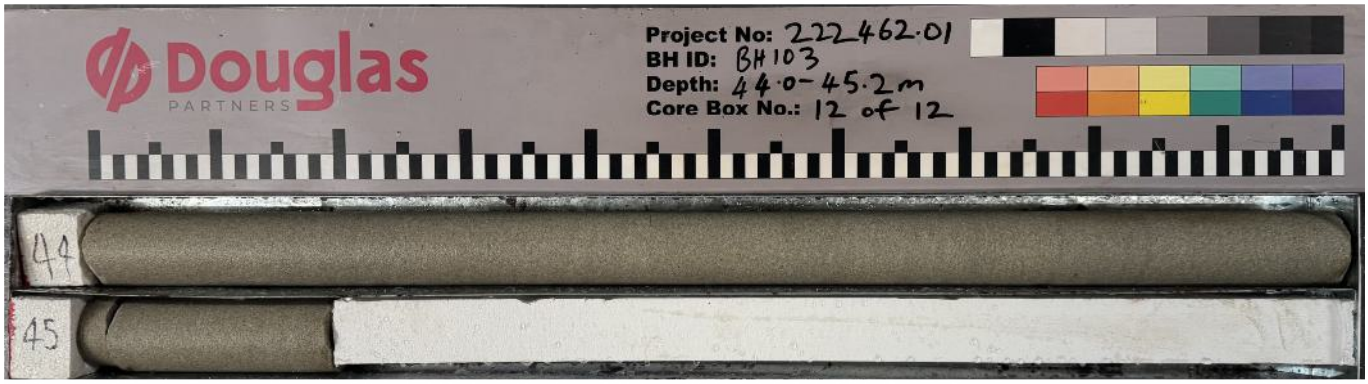
BH103: 36.00-40.00 m depth

Douglas PARTNERS

CORE PHOTO LOG

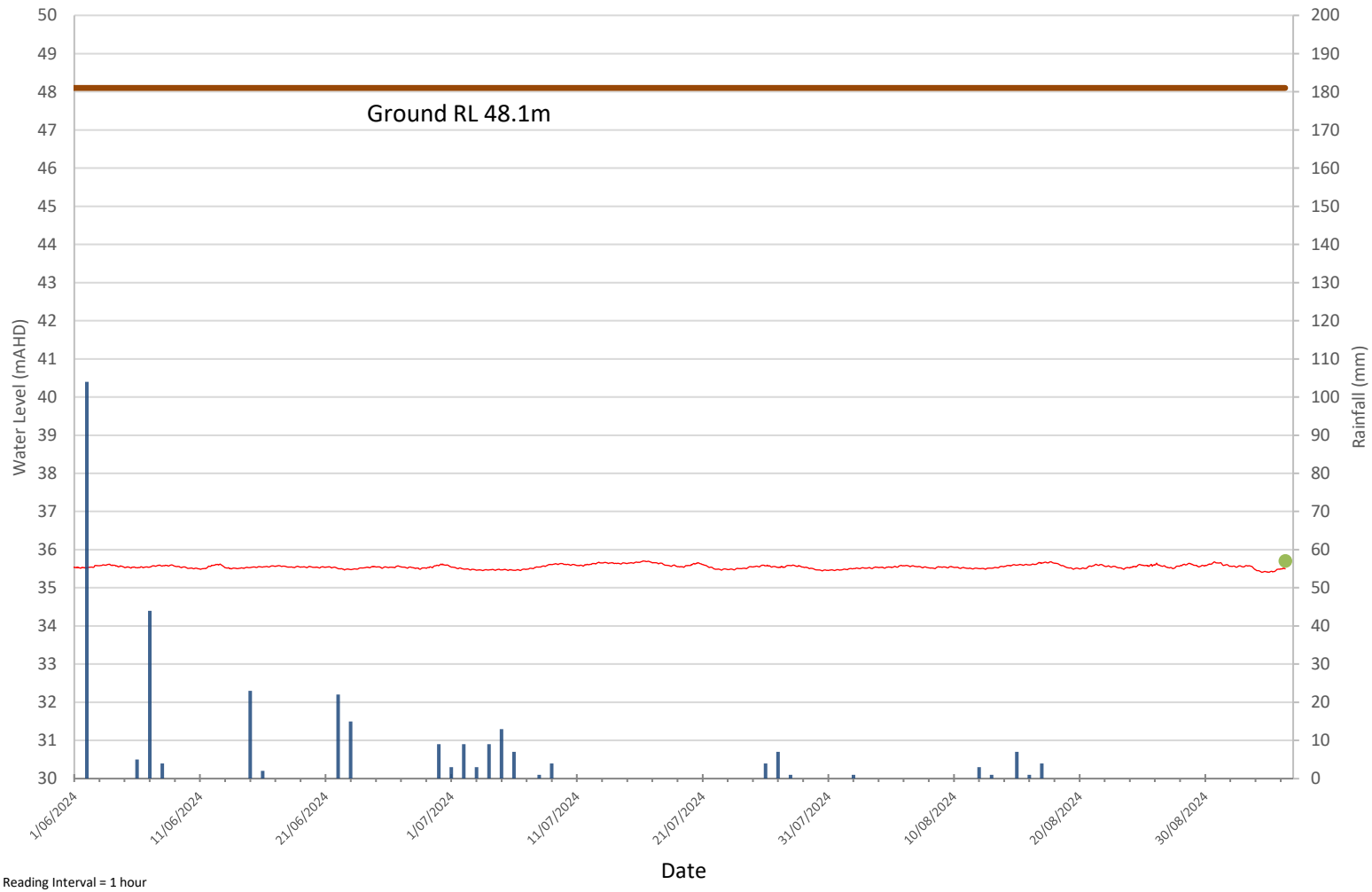
CLIENT: Cottonwood Development Pty Ltd
PROJECT: Proposed Mixed-Use Residential Redevelopment
LOCATION: 15-21 Cottonwood Crescent, Macquarie Park, NSW 2113
SURFACE LEVEL: 47.4 AHD
COORDINATE: E:325808.7, N:6260757.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°
LOCATION ID: BH103
PROJECT No: 222462.01
DATE: 09/04/25
SHEET: 6 of 6

BH103: 40.00-44.00 m depth



BH103: 44.00-45.20 m depth

BH1



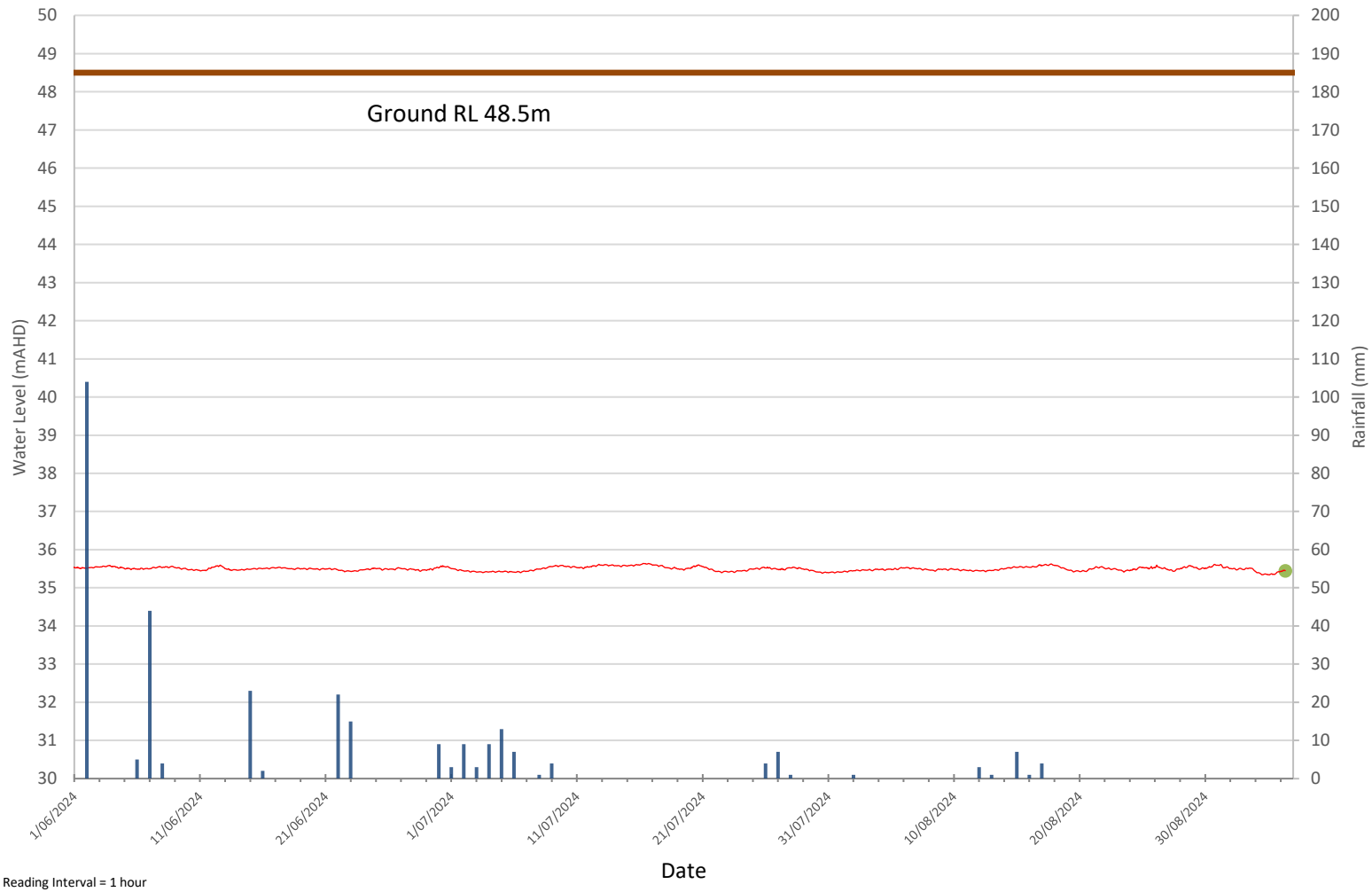
Note: Reading Interval = 1 hour

Douglas PARTNERS

Manual Levels
Water Level
Rainfall data (ST: 66213 North Ryde Golf Club)

Date:	From	Drawn:
12/09/2024	1/06/2024	RMM
Project:	**To**	**Checked:**
212194.01	5/09/2024	STE

BH2



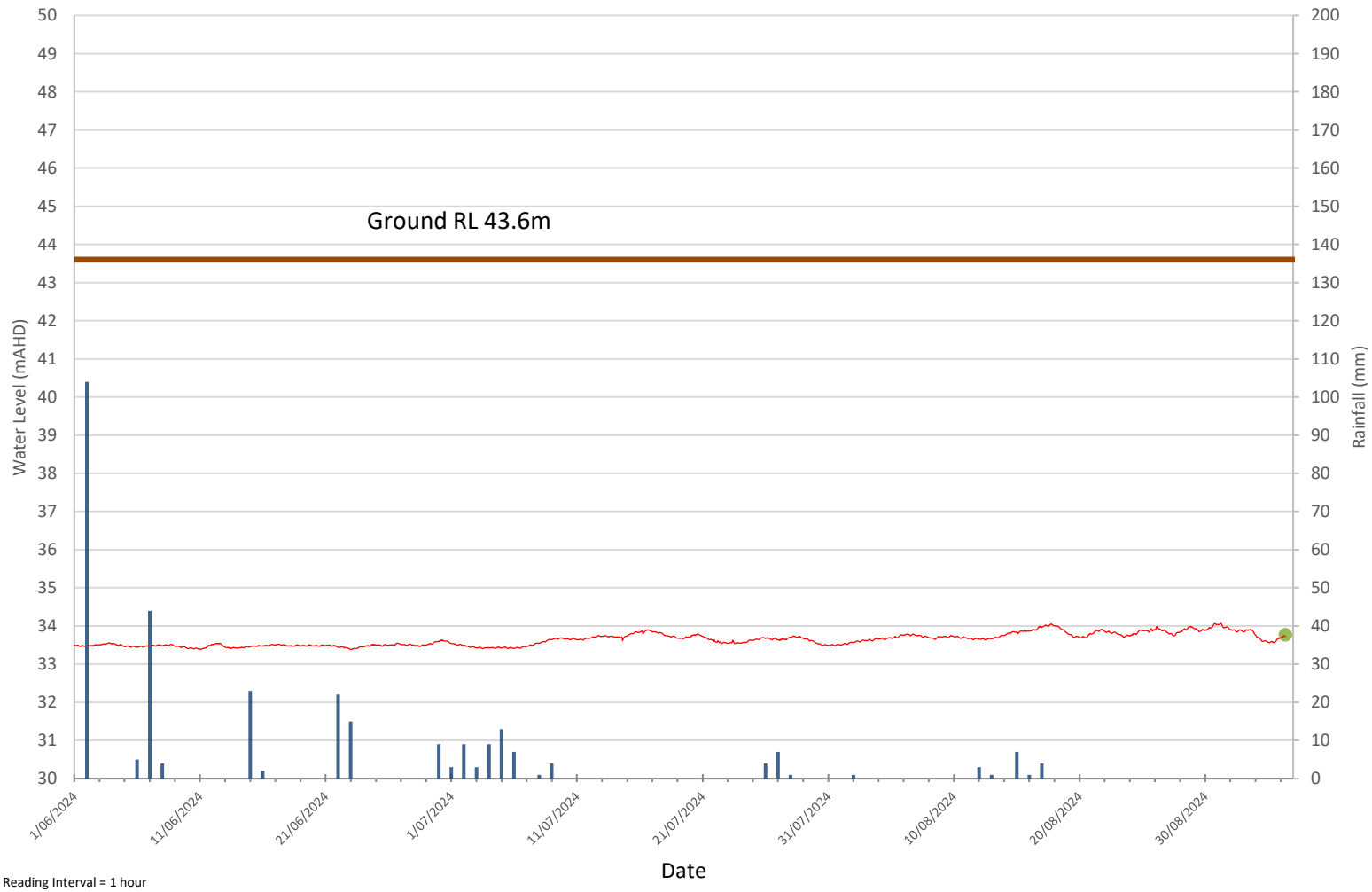
Note: Reading Interval = 1 hour

Douglas PARTNERS

Manual Levels
Water Level
Rainfall data (ST: 66213 North Ryde Golf Club)

Date:	From	Drawn:
12/09/2024	1/06/2024	RMM
Project:	**To**	**Checked:**
212194.01	5/09/2024	STE

BH5



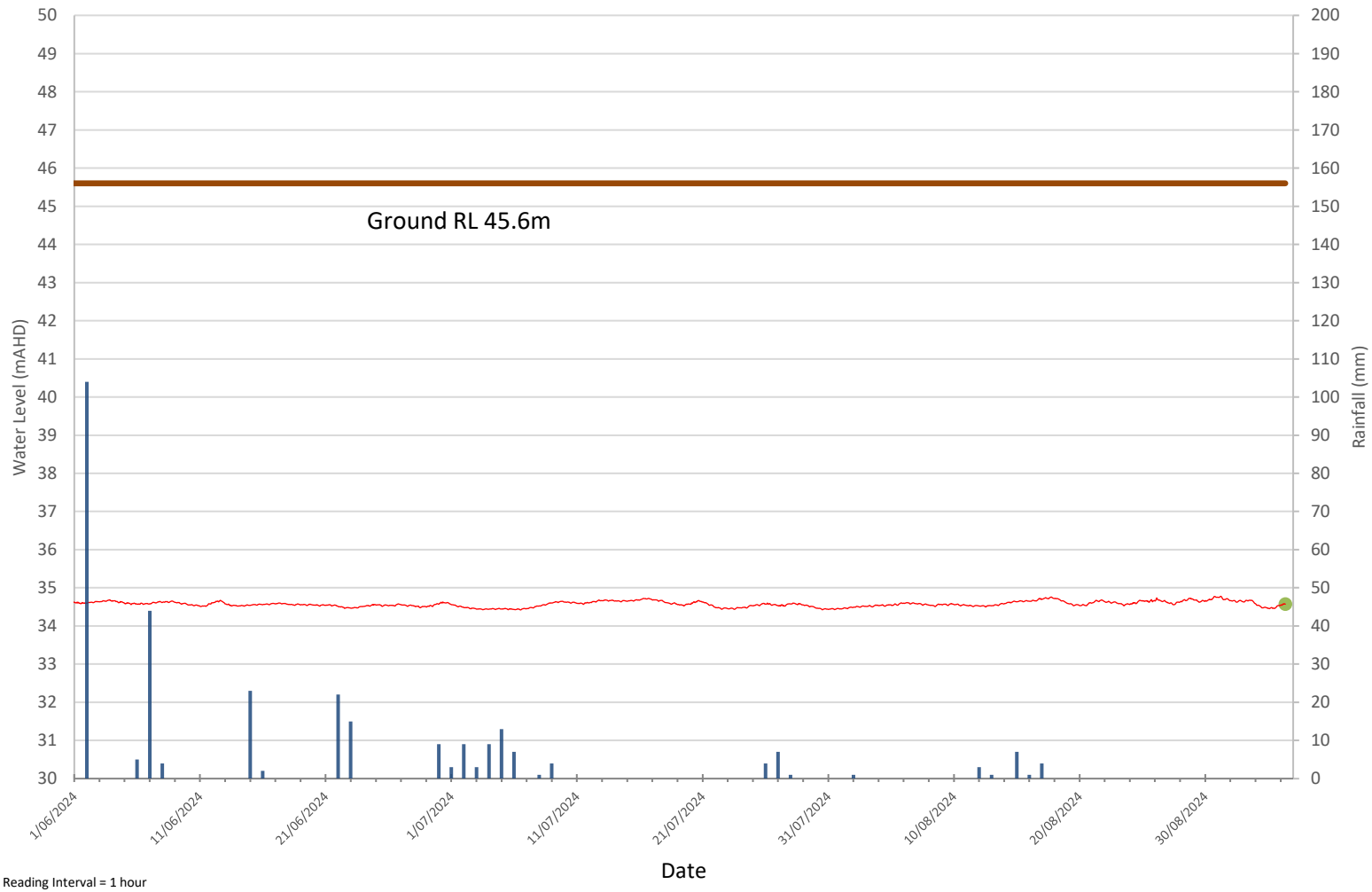
Note: Reading Interval = 1 hour

Douglas PARTNERS

Manual Levels
Water Level
Rainfall data (ST: 66213 North Ryde Golf Club)

Date:	From	Drawn:
12/09/2024	1/06/2024	RMM
Project:	**To**	**Checked:**
212194.01	5/09/2024	STE

BH6



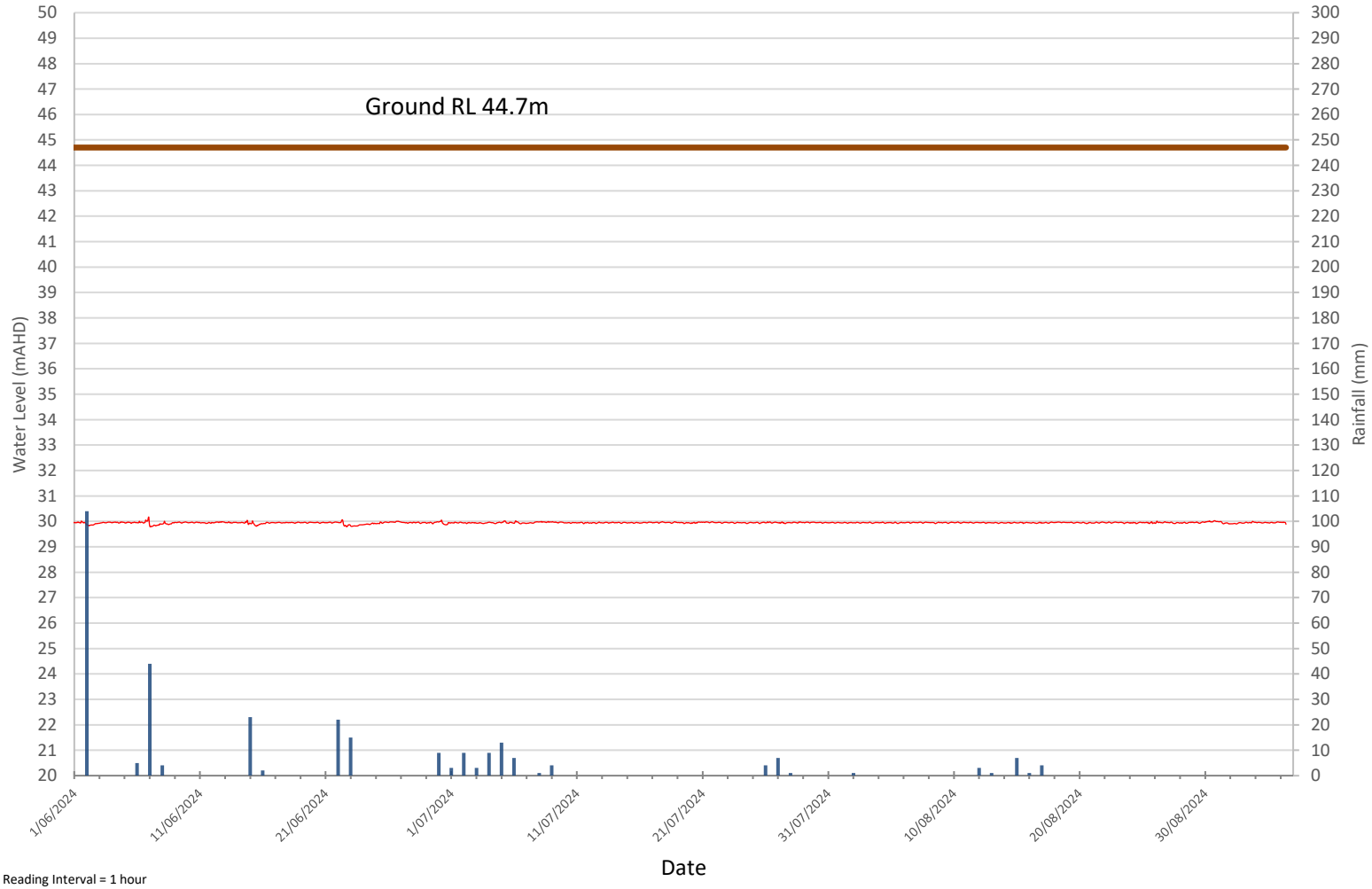
Note: Reading Interval = 1 hour

Douglas PARTNERS

Manual Levels
Water Level
Rainfall data (ST: 66213 North Ryde Golf Club)

Date:	From	Drawn:
12/09/2024	1/06/2024	RMM
Project:	**To**	**Checked:**
212194.01	5/09/2024	STE

BH2-2018

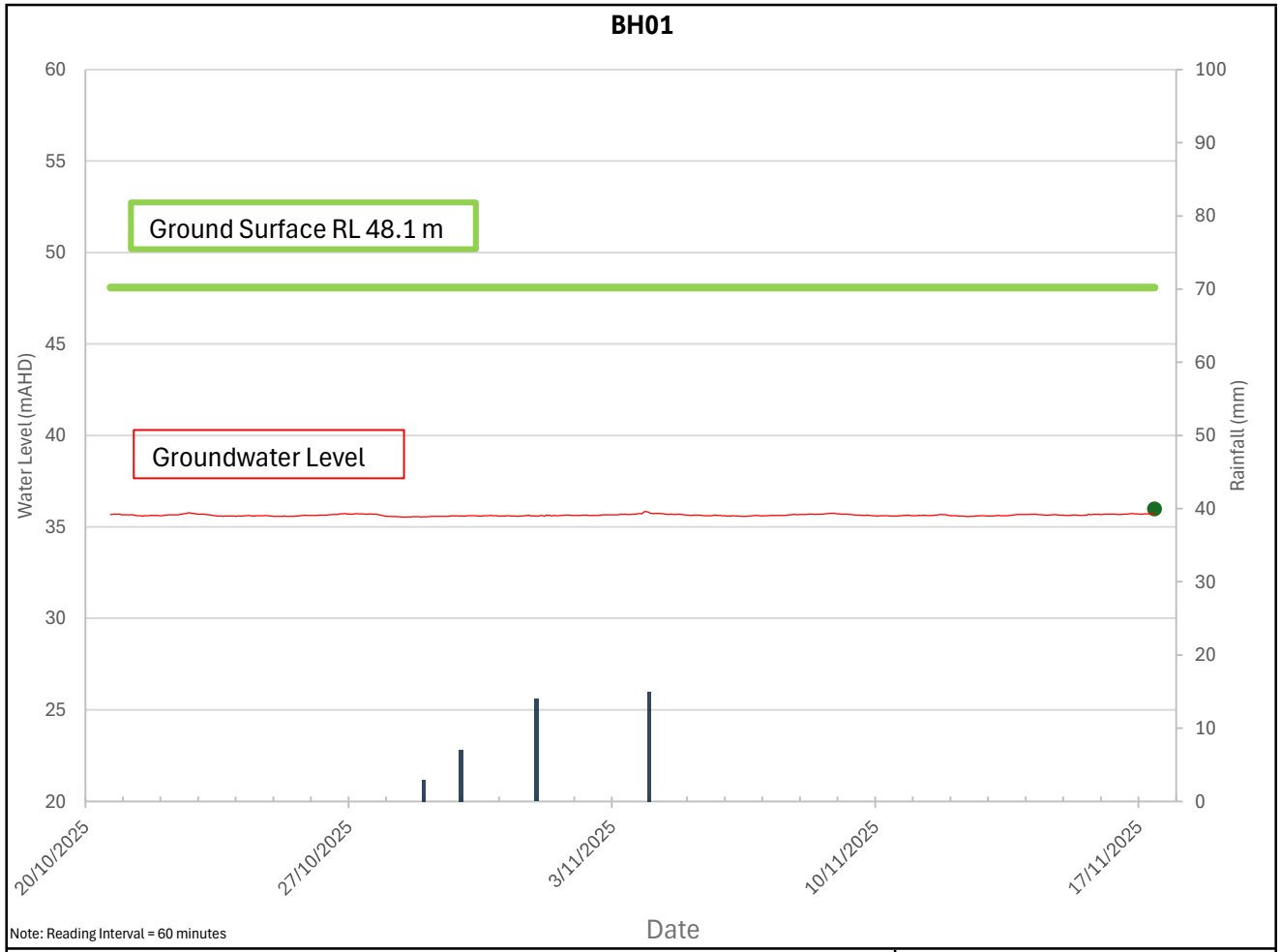


Note: Reading Interval = 1 hour

Douglas PARTNERS

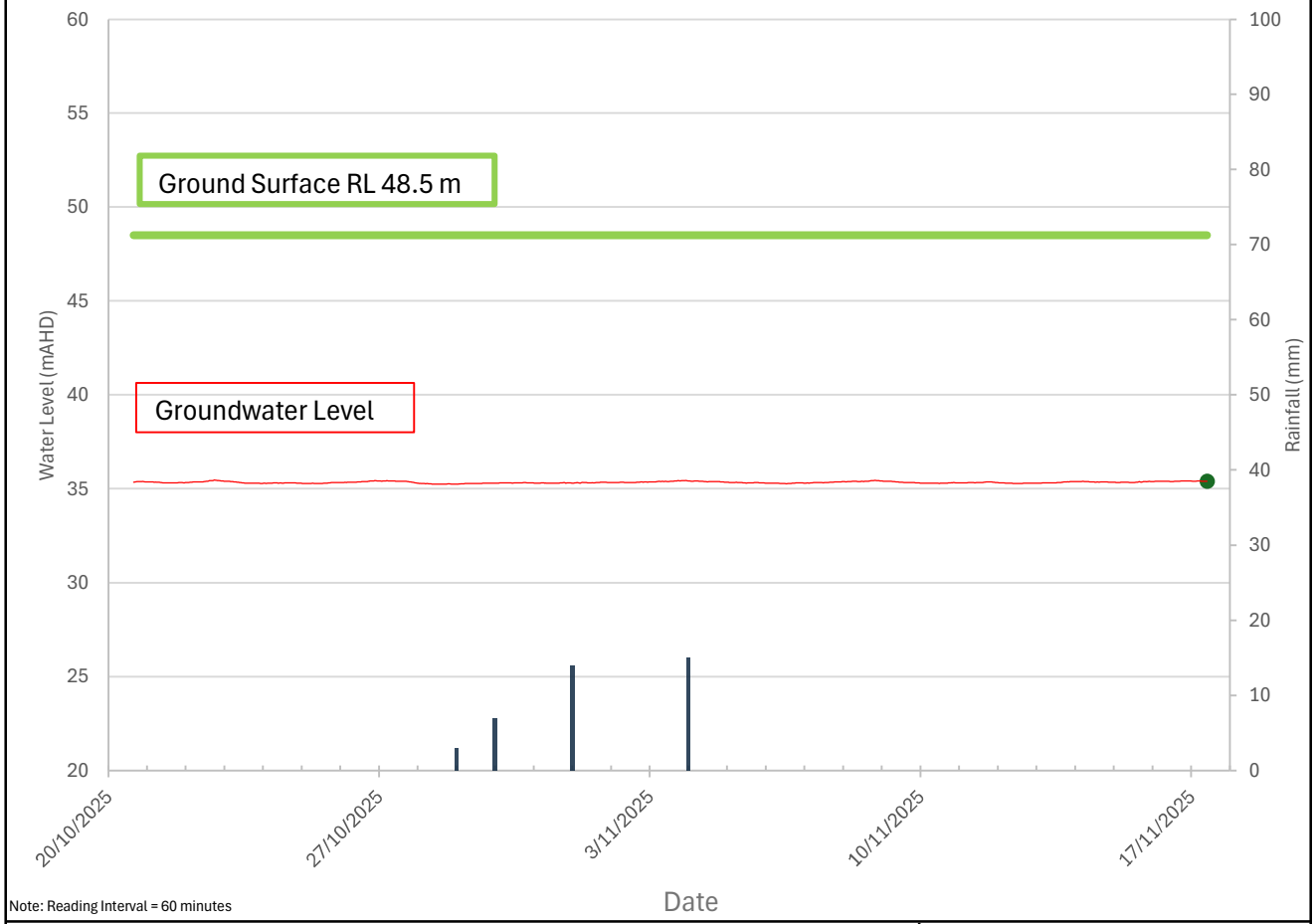
Manual Levels
Water Level
Rainfall data (ST: 66213 North Ryde Golf Club)

Date:	From	Drawn:
12/09/2024	1/06/2024	RMM
Project:	**To**	**Checked:**
212194.01	5/09/2024	STE



Date:	From	Drawn:
17/11/2025	20/10/2025	ZF
Project:	**To**	**Checked:**
222462.01	17/11/2025	

BH02



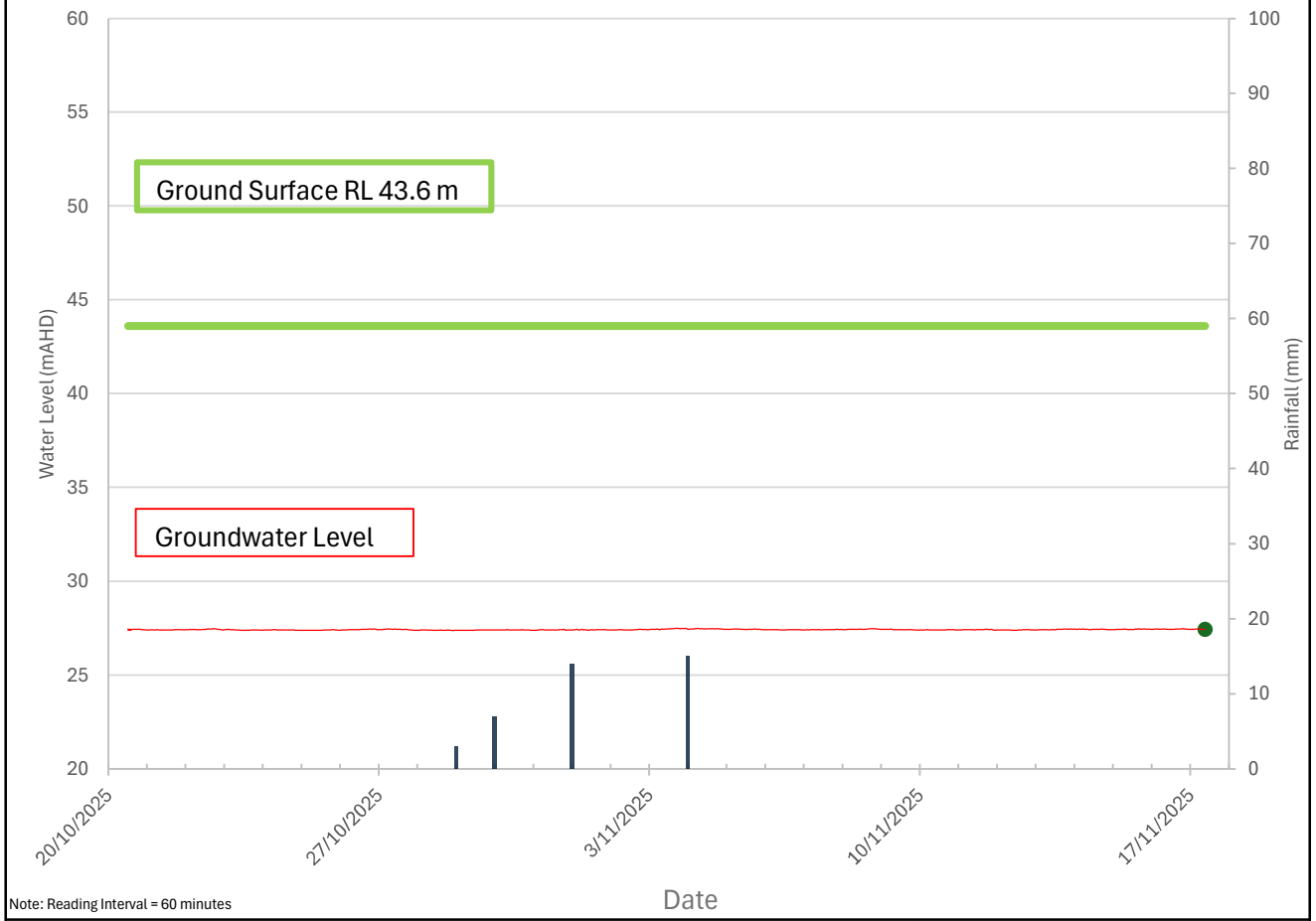
Note: Reading Interval = 60 minutes

Douglas PARTNERS

Manual Levels | Water Level | Ground Surface RL | Rainfall Data

Date:	From	Drawn:
17/11/2025	20/10/2025	ZF
Project:	**To**	**Checked:**
222462.01	17/11/2025	

BH05

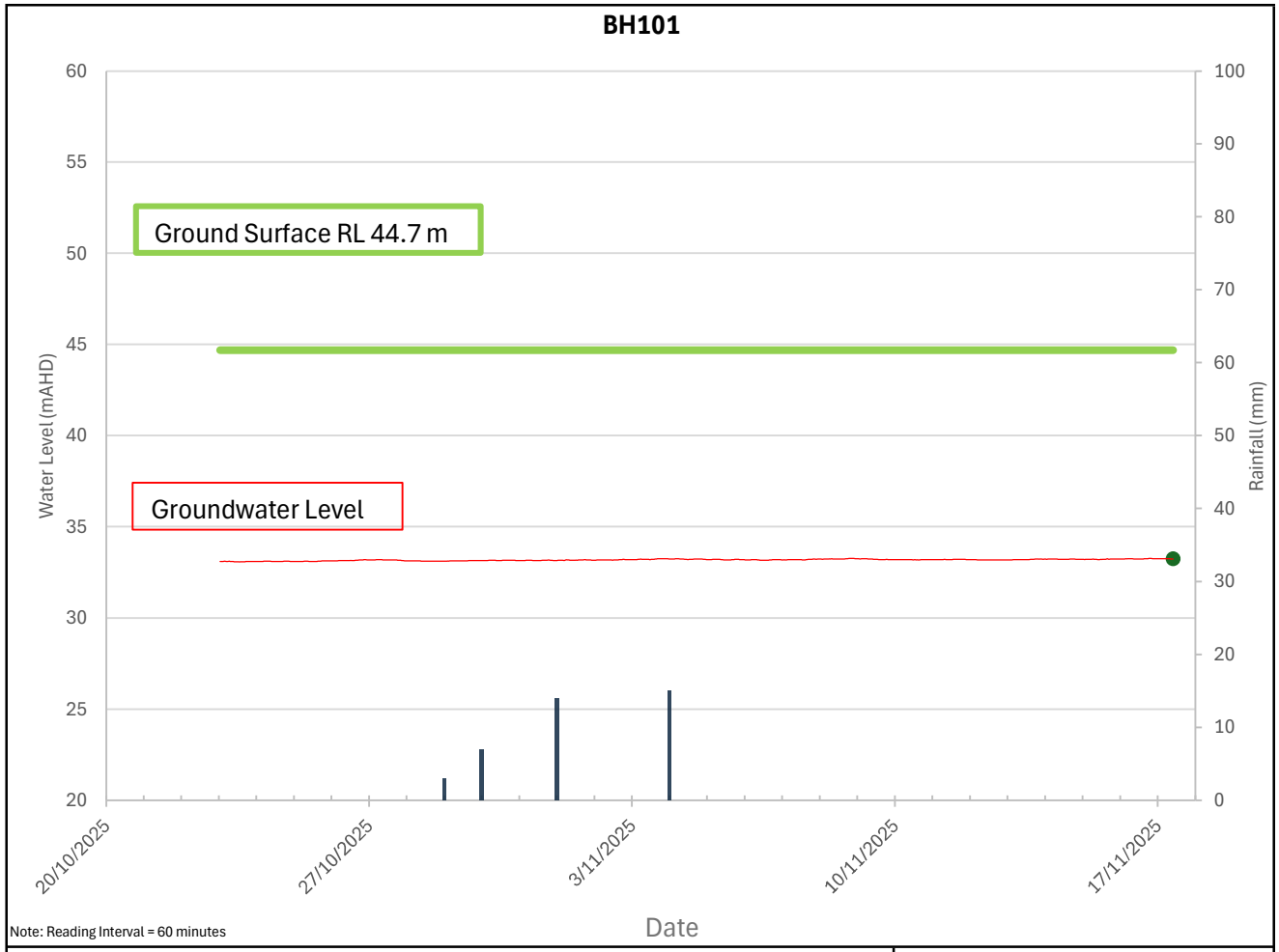


Note: Reading Interval = 60 minutes

Douglas PARTNERS

Manual Levels
Water Level
Ground Surface RL
Rainfall Data

Date:	From	Drawn:
17/11/2025	20/10/2025	ZF
Project:	**To**	**Checked:**
222462.01	17/11/2025	



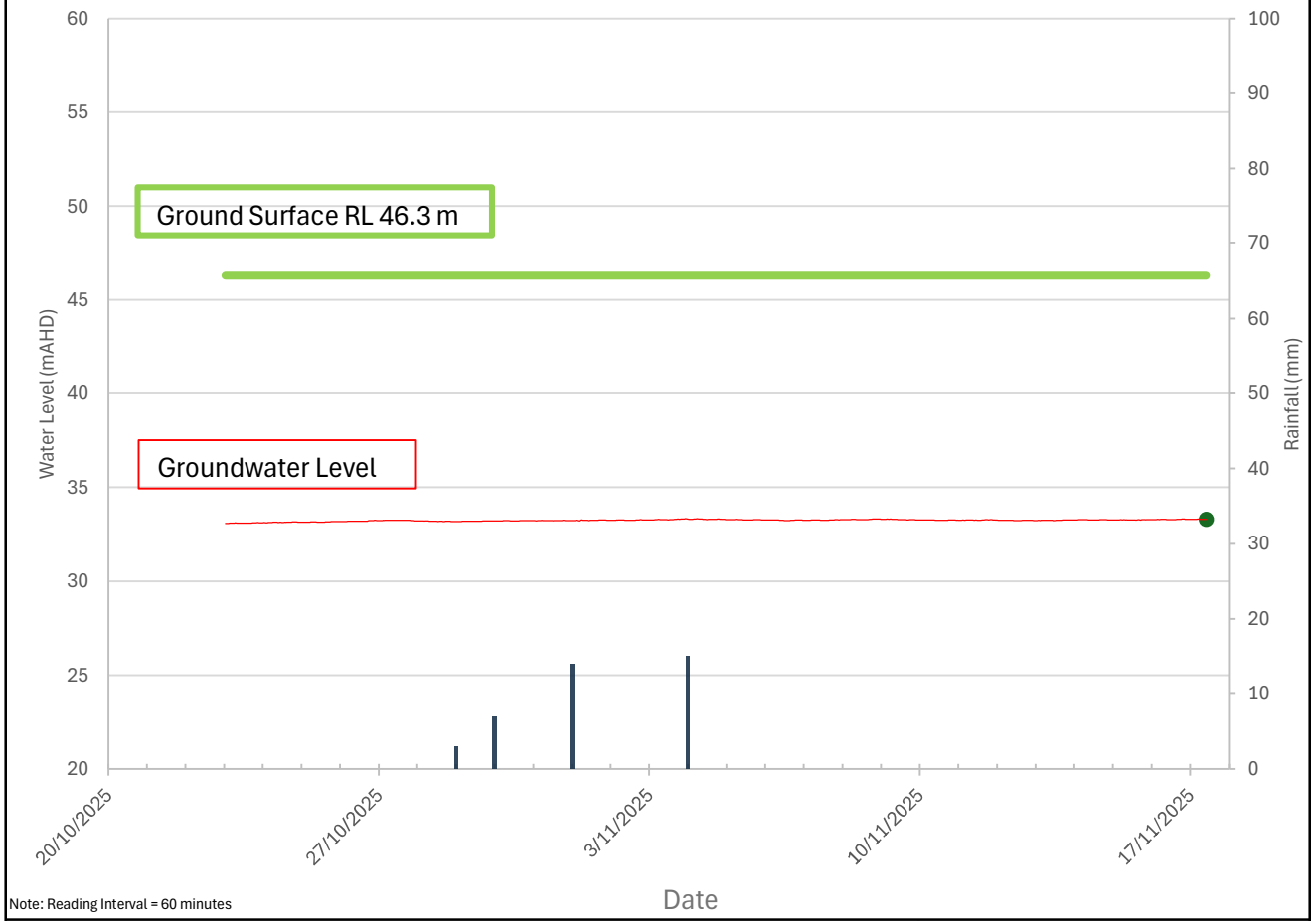
Note: Reading Interval = 60 minutes

Douglas PARTNERS

Manual Levels
Water Level
Ground Surface RL
Rainfall Data

Date:	From	Drawn:
17/11/2025	20/10/2025	ZF
Project:	**To**	**Checked:**
222462.01	17/11/2025	

BH102



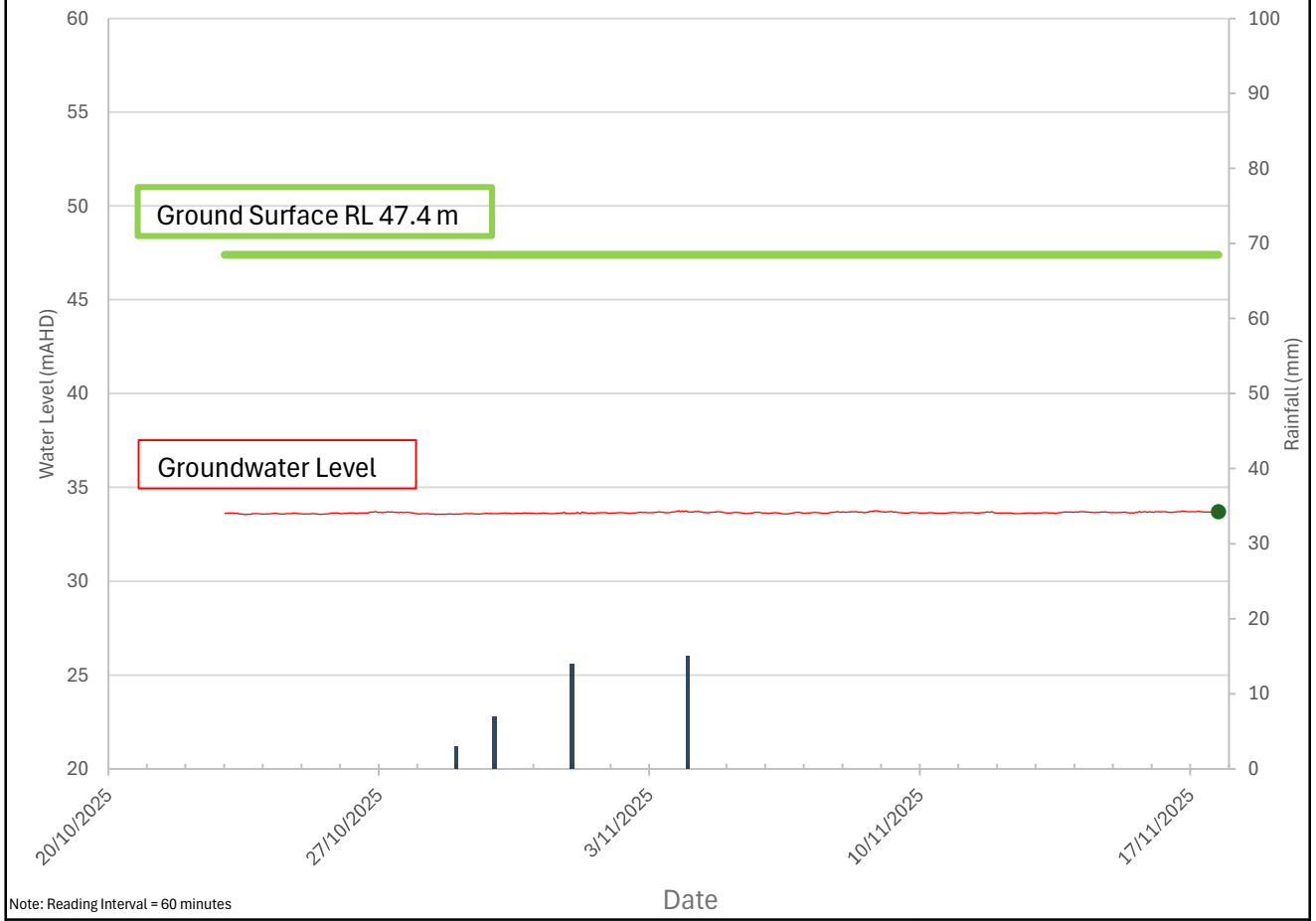
Note: Reading Interval = 60 minutes

Douglas PARTNERS

Manual Levels
Water Level
Ground Surface RL
Rainfall Data

Date:	From	Drawn:
17/11/2025	20/10/2025	ZF
Project:	**To**	**Checked:**
222462.01	17/11/2025	

BH103



Note: Reading Interval = 60 minutes

Douglas PARTNERS

Manual Levels
Water Level
Ground Surface RL
Rainfall Data

Date:	From	Drawn:
17/11/2025	20/10/2025	ZF
Project:	**To**	**Checked:**
222462.01	17/11/2025	

Douglas Partners Pty Ltd
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www.douglaspartners.com.au

Permeability Testing - Rising or Falling Head Test Report

Client:	Legacy Property Ptd Ltd	Project No:	222462.01
Project:	Proposed Mixed-use Development	Test date:	27.05.2024
Location:	17-21 Cottonwood Crescent, Macquarie Park	Tested by:	IH

Test Location

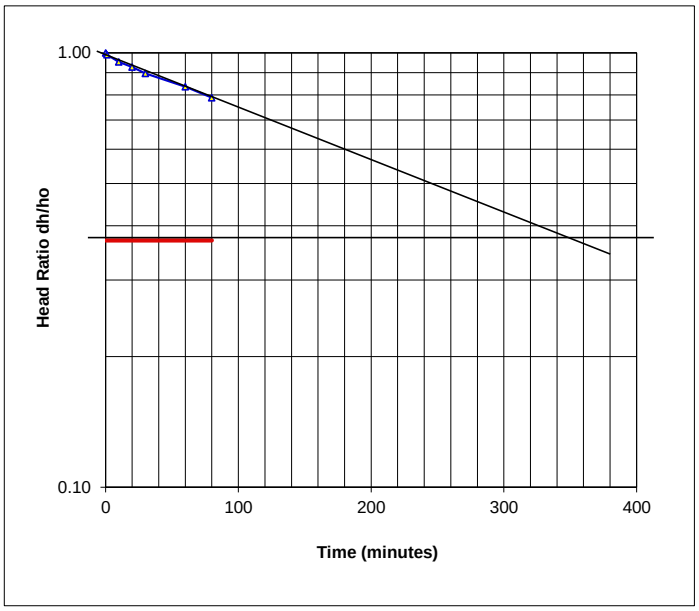
Description:	Standpipe in borehole	**Test No.**	BH1	
Material type:	Sandstone	Easting:	325791.8	m
	Rising head test	Northing	6260745.9	m
		Surface Level:	48.1	m AHD

Details of Well Installation

Effective diameter (2re)	76	mm	Depth to water before test	12.34	m
borehole diameter (2R)	76	mm	Depth to water at start of test	14.28	m
Effective Length of well screen (Le)	4.16	m	Depth of top of gravel pack	1.50	m
			Depth of base of gravel pack	16.50	m

Test Results

Time (min)	Depth (m)	Change in Head dH (m)	dH/Ho
0	14.28	1.94	1.000
1	14.26	1.92	0.990
10	14.19	1.85	0.954
20	14.14	1.80	0.928
30	14.08	1.74	0.897
60	13.96	1.62	0.835
80	13.87	1.53	0.789



To = 350 mins
21000 secs

Theory: Falling Head Permeability calculated using equation by Hvorslev

$k = [r^2 \ln(Le/R)]/2Le\ To$

where r = radius of casing
R = radius of well screen
Le = length of well screen
To = time taken to rise or fall to 37% of initial change

Hydraulic Conductivity **k =** **3.9E-08** m/sec
= **3.4E-03** m/day

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Permeability Testing - Rising or Falling Head Test Report

Client:	Legacy Property Ptd Ltd	Project No:	222462.01
Project:	Proposed Mixed-use Development	Test date:	27.05.2024
Location:	17-21 Cottonwood Crescent, Macquarie Park	Tested by:	IH

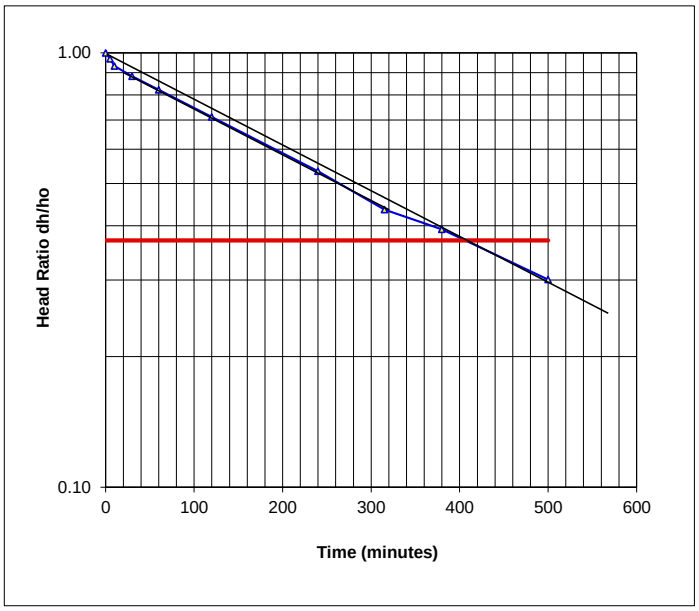
Test Location		**Test No.**	BH2	
Description:	Standpipe in borehole	Easting:	325795.0	m
Material type:	Sandstone	Northing	6260767.6	m
	Rising head test	Surface Level:	48.5	m AHD

Details of Well Installation

Effective diameter (2re)	76	mm	Depth to water before test	12.97	m
borehole diameter (2R)	76	mm	Depth to water at start of test	14.60	m
Effective Length of well screen (Le)	4.03	m	Depth of top of gravel pack	2.00	m
			Depth of base of gravel pack	17.00	m

Test Results

Time (min)	Depth (m)	Change in Head dH (m)	dH/Ho
0	14.60	1.63	1.000
5	14.55	1.58	0.969
10	14.49	1.52	0.933
30	14.41	1.44	0.883
60	14.31	1.34	0.822
120	14.13	1.16	0.712
240	13.84	0.87	0.534
315	13.68	0.71	0.436
380	13.61	0.64	0.393
500	13.46	0.49	0.301



To = 410 mins
24600 secs

Theory: Falling Head Permeability calculated using equation by Hvorslev

$k = [r^2 \ln(Le/R)]/2Le\ To$

where r = radius of casing
R = radius of well screen
Le = length of well screen
To = time taken to rise or fall to 37% of initial change

Hydraulic Conductivity **k =** **3.4E-08** m/sec
= **2.9E-03** m/day

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Permeability Testing - Rising or Falling Head Test Report

Client:	Legacy Property Ptd Ltd	Project No:	222462.01
Project:	Proposed Mixed-use Development	Test date:	27.05.2024
Location:	17-21 Cottonwood Crescent, Macquarie Park	Tested by:	IH

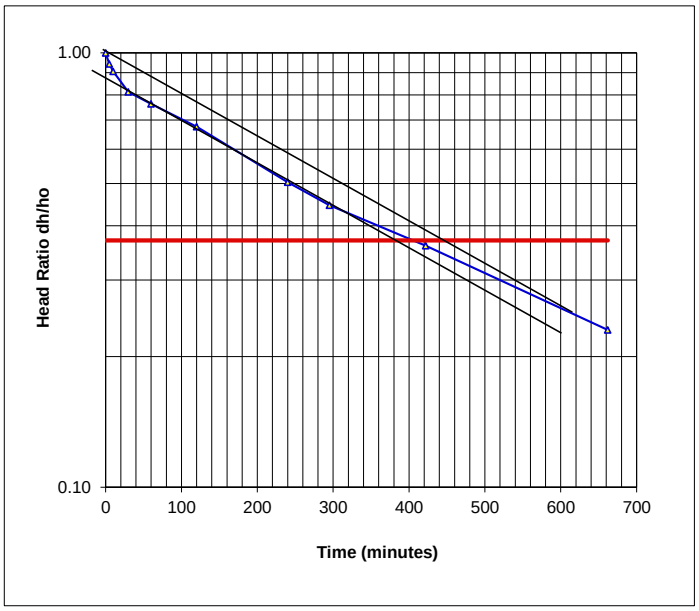
Test Location		**Test No.**	BH5	
Description:	Standpipe in borehole	Easting:	325852.0	m
Material type:	Sandstone	Northing	6260784.5	m
	Rising head test	Surface Level:	43.6	m AHD

Details of Well Installation

Effective diameter (2re)	76	mm	Depth to water before test	10.12	m
borehole diameter (2R)	76	mm	Depth to water at start of test	11.51	m
Effective Length of well screen (Le)	8.38	m	Depth of top of gravel pack	5.00	m
			Depth of base of gravel pack	18.50	m

Test Results

Time (min)	Depth (m)	Change in Head dH (m)	dH/Ho
0	11.51	1.39	1.000
5	11.43	1.31	0.942
10	11.38	1.26	0.906
30	11.25	1.13	0.813
60	11.18	1.06	0.763
120	11.06	0.94	0.676
240	10.82	0.70	0.504
295	10.74	0.62	0.446
422	10.62	0.50	0.360
662	10.44	0.32	0.230



To = 440 mins
26400 secs

Theory: Falling Head Permeability calculated using equation by Hvorslev

$k = [r^2 \ln(Le/R)]/2Le\ To$

where r = radius of casing
R = radius of well screen
Le = length of well screen
To = time taken to rise or fall to 37% of initial change

Hydraulic Conductivity **k =** **1.8E-08** m/sec
= **1.5E-03** m/day

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Permeability Testing - Rising or Falling Head Test Report

Client:	Legacy Property Ptd Ltd	Project No:	222462.01
Project:	Proposed Mixed-use Development	Test date:	27.05.2024
Location:	17-21 Cottonwood Crescent, Macquarie Park	Tested by:	IH

Test Location

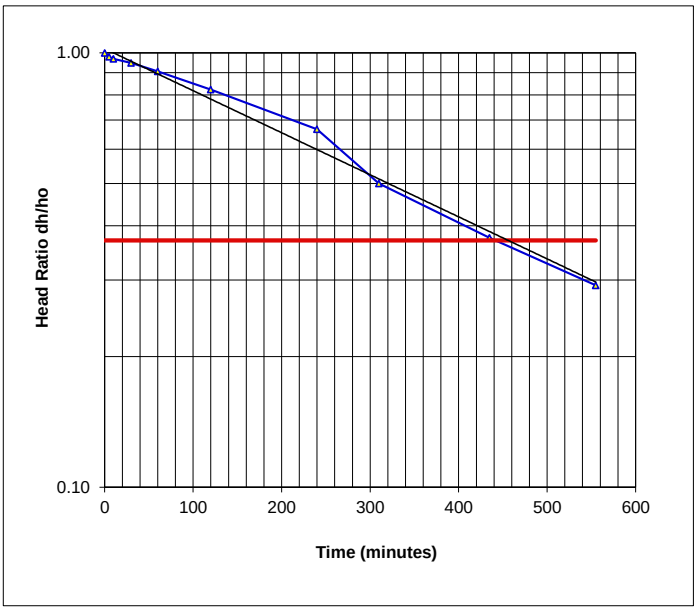
Description:	Standpipe in borehole	**Test No.**	BH6	
Material type:	Sandstone	Easting:	325833.7	m
	Rising head test	Northing	6260762.3	m
		Surface Level:	45.6	m AHD

Details of Well Installation

Effective diameter (2re)	76	mm	Depth to water before test	11.01	m
borehole diameter (2R)	76	mm	Depth to water at start of test	11.97	m
Effective Length of well screen (Le)	3.23	m	Depth of top of gravel pack	2.50	m
			Depth of base of gravel pack	14.24	m

Test Results

Time (min)	Depth (m)	Change in Head dH (m)	dH/Ho
0	11.97	0.96	1.000
5	11.95	0.94	0.979
10	11.94	0.93	0.969
30	11.92	0.91	0.948
60	11.88	0.87	0.906
120	11.80	0.79	0.823
240	11.65	0.64	0.667
310	11.49	0.48	0.500
435	11.37	0.36	0.375
555	11.29	0.28	0.292



To = 460 mins
27600 secs

Theory: Falling Head Permeability calculated using equation by Hvorslev

$k = [r^2 \ln(Le/R)]/2Le\ To$

where r = radius of casing
R = radius of well screen
Le = length of well screen
To = time taken to rise or fall to 37% of initial change

Hydraulic Conductivity **k =** **3.6E-08** m/sec
= **3.1E-03** m/day

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Permeability Testing - Rising Head Test Report

Client:	Cottonwood Development Pty Ltd	Project No:	222462.01
Project:	Proposed Mixed-use Residential Development	Test date:	27.10.2025
Location:	88 Waterloo Road, Macquarie Park	Tested by:	SA

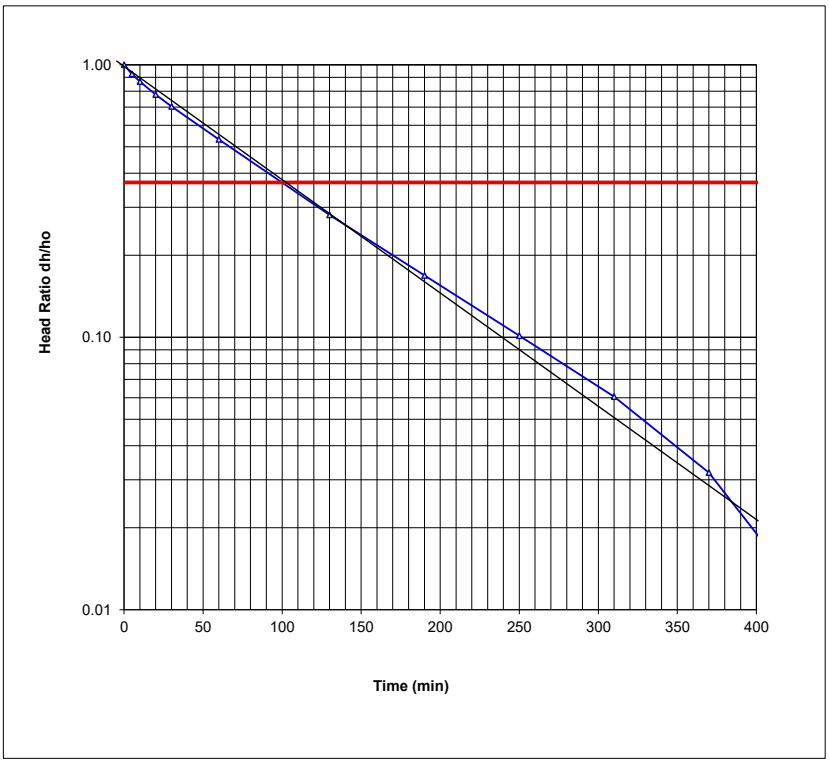
Test Location	BH101	**Test No.**		
Description:	Standpipe/well in borehole	Easting:	325833	m
Material type:	Sandstone	Northing	6260802	m
		Surface Level:	44.7	m AHD

Details of Well Installation

Effective diameter (2re)	50	mm	Depth to water before test	11.27	m
Borehole diameter (2R)	96	mm	Depth to water at start of test	18.23	m
Effective well screen length (Le)	9.52	m	Depth of top of gravel pack	32.60	m
			Depth of base of PVC standpipe	42.12	m

Test Results

Time (min)	Depth (m)	Change in Head dH (m)	dH/Ho
0.0	18.23	6.96	1.000
5.0	17.71	6.44	0.926
10	17.31	6.04	0.868
20	16.68	5.41	0.778
30	16.16	4.89	0.703
60	14.98	3.71	0.532
130	13.23	1.96	0.281
190	12.44	1.17	0.169
250	11.98	0.71	0.101
310	11.69	0.42	0.061
370	11.49	0.22	0.032
430	11.35	0.08	0.011
490	11.27	0.00	0.000



To = 100 minutes
6000 seconds

Theory: Falling Head Permeability calculated using equation by Hvorslev
$k = [r^2 \ln(Le/R)]/2Le\ To$ where r = radius of casing
R = radius of well screen
Le = length of well screen
To = time taken to rise or fall to 37% of initial change

Hydraulic Conductivity	**k =**	**2.9E-08**	m/sec
	=	**0.003**	m/day

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Permeability Testing - Rising Head Test Report

Client:	Cottonwood Development Pty Ltd	Project No:	222462.01
Project:	Proposed Mixed-use Residential Development	Test date:	27.10.2025
Location:	88 Waterloo Road, Macquarie Park	Tested by:	SA

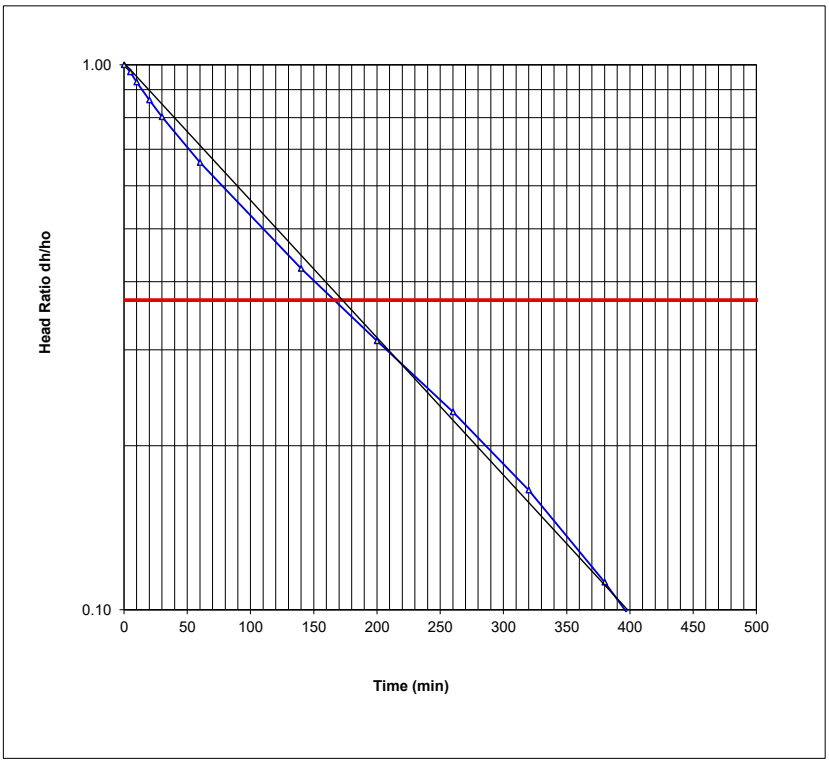
Test Location	BH102	**Test No.**		
Description:	Standpipe/well in borehole	Easting:	325820	m
Material type:	Sandstone	Northing	6260775	m
		Surface Level:	46.3	m AHD

Details of Well Installation

Effective diameter (2re)	50	mm	Depth to water before test	12.87	m
Borehole diameter (2R)	96	mm	Depth to water at start of test	17.18	m
Effective well screen length (Le)	9.50	m	Depth of top of gravel pack	34.50	m
			Depth of base of PVC standpipe	44.00	m

Test Results

Time (min)	Depth (m)	Change in Head dH (m)	dH/Ho
0.0	17.18	4.31	1.000
5	17.05	4.18	0.970
10	16.87	4.00	0.930
20	16.58	3.71	0.862
30	16.33	3.46	0.803
60	15.72	2.85	0.662
140	14.69	1.82	0.423
200	14.21	1.34	0.311
260	13.86	0.99	0.231
320	13.58	0.71	0.166
380	13.35	0.48	0.112
440	13.18	0.31	0.072
500	13.02	0.15	0.034
560	12.87	0.00	0.000
620	12.75	0.12	0.028
680	12.65	0.22	0.050
740	12.55	0.32	0.075
800	12.47	0.40	0.092



To = 180 minutes
10800 seconds

Theory: Falling Head Permeability calculated using equation by Hvorslev

$k = [r^2 \ln(Le/R)]/2Le\ To$

where r = radius of casing
R = radius of well screen
Le = length of well screen
To = time taken to rise or fall to 37% of initial change

Hydraulic Conductivity	**k =**	**1.6E-08**	m/sec
	=	**0.0014**	m/day

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Permeability Testing - Rising Head Test Report

Client:	Cottonwood Development Pty Ltd	Project No:	222462.01
Project:	Proposed Mixed-use Residential Development	Test date:	27.10.2025
Location:	88 Waterloo Road, Macquarie Park	Tested by:	SA

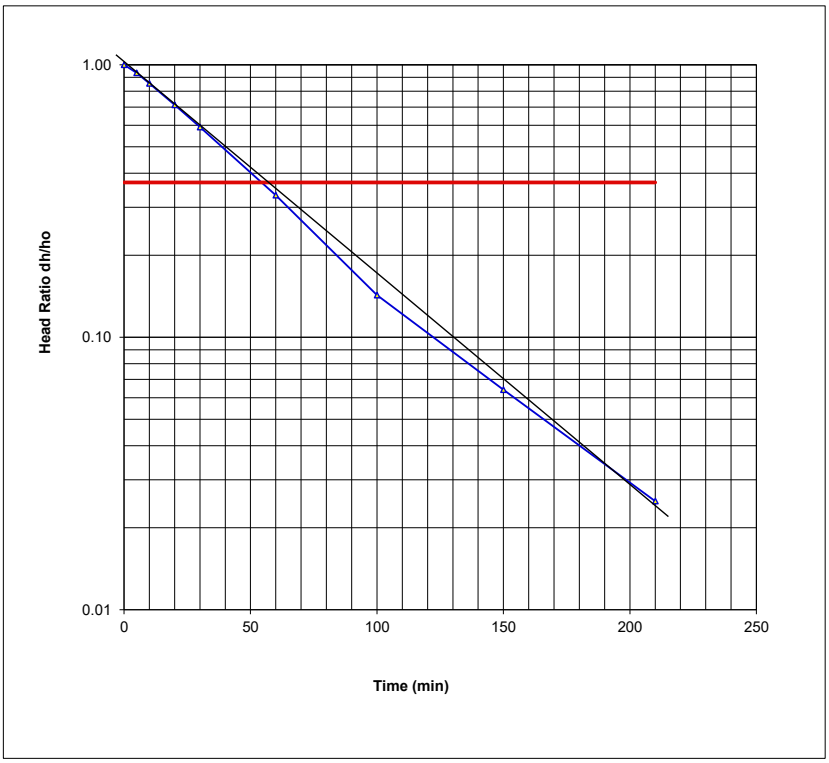
Test Location	BH103	**Test No.**		
Description:	Standpipe/well in borehole	Easting:	325809	m
Material type:	Sandstone	Northing	6260757	m
		Surface Level:	47.4	m AHD

Details of Well Installation

Effective diameter (2re)	50	mm	Depth to water before test	13.71	m
Borehole diameter (2R)	96	mm	Depth to water at start of test	18.02	m
Effective well screen length (Le)	9.52	m	Depth of top of gravel pack	32.60	m
			Depth of base of PVC standpipe	42.12	m

Test Results

Time (min)	Depth (m)	Change in Head dH (m)	dH/Ho
0.0	18.02	4.31	1.000
5.0	17.73	4.02	0.934
10	17.39	3.68	0.855
20	16.78	3.07	0.712
30	16.25	2.54	0.591
60	15.14	1.43	0.332
100	14.32	0.61	0.143
150	13.99	0.28	0.064
210	13.82	0.11	0.025



To = 55 minutes
3300 seconds

Theory: Falling Head Permeability calculated using equation by Hvorslev

$k = [r^2 \ln(Le/R)]/2Le\ To$

where r = radius of casing
R = radius of well screen
Le = length of well screen
To = time taken to rise or fall to 37% of initial change

Hydraulic Conductivity	**k =**	**5.3E-08**	m/sec
	=	**0.005**	m/day

WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH101
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	12.0 - 18.0 m

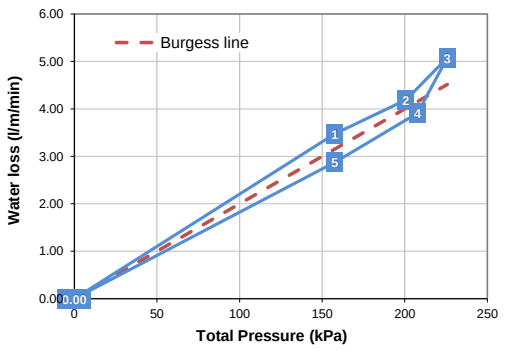
Test Details

Date:	2-Jun-25	Bottom of packer (m):	12.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	18.00	Vertical Depth to groundwater (m):	11.0	0.264
Bore inclination (deg):	90	Section length (m):	6.00	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
40	0	158	5	36924.5	37016.5	92.0	750.0	410.0	89.8	0.0	92.0	3.1	19.4	1.9E-06
40	0	158	5	37072.5	37179.5	107.0	750.0	380.0	97.8	0.0	107.0	3.6	22.6	2.3E-06
40	0	158	5	37223.5	37337.5	114.0	750.0	330.0	111.0	0.0	114.0	3.8	24.1	2.4E-06
90	7	201	5	37414.5	37555.5	141.0	790.0	285.0	133.4	0.0	141.0	4.7	23.4	2.3E-06
90	0	208	5	37651.5	37767.5	116.0	790.0	315.0	125.5	0.0	116.0	3.9	18.6	1.9E-06
90	0	208	5	37849.5	37969.5	120.0	790.0	300.0	129.5	0.0	120.0	4.0	19.3	1.9E-06
130	22	226	5	38100.5	38284.5	184.0	790.0	240.0	145.3	0.0	184.0	6.1	27.2	2.7E-06
130	6	242	5	38357.5	38494.5	137.0	790.0	250.0	142.7	0.0	137.0	4.6	18.9	1.9E-06
130	5	243	5	38627.5	38763.5	136.0	790.0	245.0	144.0	0.0	136.0	4.5	18.7	1.9E-06
90	0	208	5	38859.5	38975.5	116.0	790.0	280.0	134.7	0.0	116.0	3.9	18.6	1.9E-06
90	0	208	5	39060.5	39177.5	117.0	720.0	240.0	126.8	0.0	117.0	3.9	18.8	1.9E-06
90	0	208	5	39263.5	39382.5	119.0	730.0	250.0	126.8	0.0	119.0	4.0	19.1	1.9E-06
40	0	158	5	39442.5	39531.5	89.0	715.0	365.0	92.5	0.0	89.0	3.0	18.8	1.9E-06
40	0	158	5	39582.5	39667.5	85.0	725.0	400.0	85.9	0.0	85.0	2.8	18.0	1.8E-06
40	0	158	5	39694.5	39779.5	85.0	600.0	265.0	88.5	0.0	85.0	2.8	18.0	1.8E-06

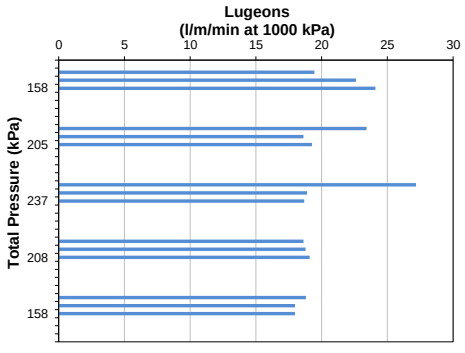
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	158	3.48	22.05
2	201	4.19	20.43
3	226	5.08	21.58
4	208	3.91	18.83
5	158	2.88	18.25

Houlsby Flow Pattern	Laminar Flow
Houlsby Lugeon value	20
Burgess Lugeon value	20

Calculated: SA
Checked: RMM
Date: 8-Jul-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH101
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	24.0-30.0 m

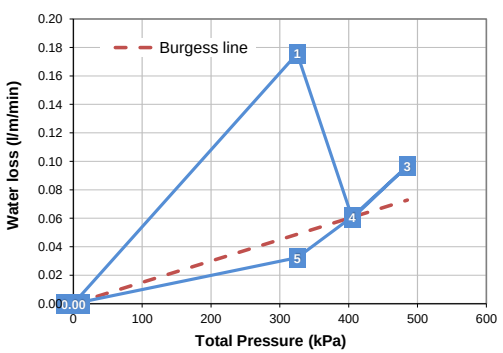
Test Details

Date:	3-Jun-25	Bottom of packer (m):	24.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	30.00	Vertical Depth to groundwater (m):	24.0	0.264
Bore inclination (deg):	90	Section length (m):	6.00	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
80	0	325	5	39850.5	39864.2	13.7	580.0	528.0	13.7	0.0	13.7	0.5	1.4	1.4E-07
80	0	325	5	39864.2	39864.2	0.0	528.0	522.0	1.6	0.0	1.6	0.1	0.2	1.6E-08
80	0	325	5	39864.2	39864.2	0.0	522.0	520.0	0.5	0.0	0.5	0.0	0.1	5.4E-09
160	0	405	5	39865.0	39866.6	1.6	790.0	781.0	2.4	0.0	1.6	0.1	0.1	1.3E-08
160	0	405	5	39866.6	39868.5	1.9	781.0	770.0	2.9	0.0	1.9	0.1	0.2	1.6E-08
160	0	405	5	39868.5	39870.4	1.9	770.0	760.0	2.6	0.0	1.9	0.1	0.2	1.6E-08
240	0	485	5	39871.3	39874.5	3.2	750.0	736.0	3.7	0.0	3.2	0.1	0.2	2.2E-08
240	0	485	5	39874.5	39877.3	2.8	736.0	721.0	4.0	0.0	2.8	0.1	0.2	1.9E-08
240	0	485	5	39877.3	39880.0	2.7	721.0	708.0	3.4	0.0	2.7	0.1	0.2	1.9E-08
160	0	405	5	39881.2	39883.0	1.8	705.0	696.0	2.4	0.0	1.8	0.1	0.1	1.5E-08
160	0	405	5	39883.0	39884.9	1.9	696.0	685.0	2.9	0.0	1.9	0.1	0.2	1.6E-08
160	0	405	5	39884.9	39886.7	1.8	685.0	677.0	2.1	0.0	1.8	0.1	0.1	1.5E-08
80	0	325	5	39886.7	39886.8	0.1	677.0	674.0	0.8	0.0	0.8	0.0	0.1	8.1E-09
80	0	325	5	39886.8	39886.8	0.0	674.0	670.0	1.1	0.0	1.1	0.0	0.1	1.1E-08
80	0	325	5	39886.8	39886.8	0.0	670.0	666.0	1.1	0.0	1.1	0.0	0.1	1.1E-08

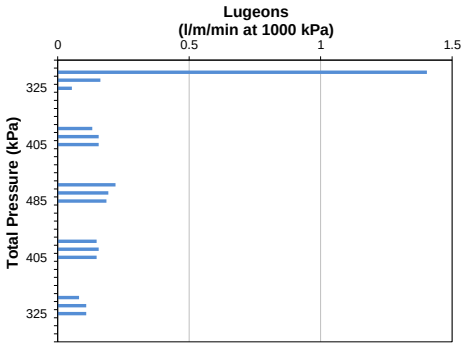
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	325	0.18	0.54
2	405	0.06	0.15
3	485	0.10	0.20
4	405	0.06	0.15
5	325	0.03	0.10

Houlsby Flow Pattern	Void Filling
Houlsby Lugeon value	<0.1
Burgess Lugeon value	0.2

Calculated: SA
Checked: RMM
Date: 8-Jul-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH101
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	30.0 - 36.08 m

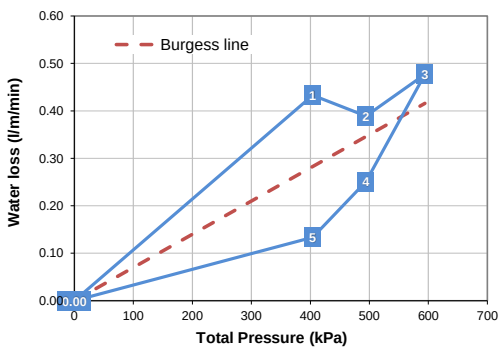
Test Details

Date:	3-Jun-25	Bottom of packer (m):	30.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	36.08	Vertical Depth to groundwater (m):	30.0	0.264
Bore inclination (deg):	90	Section length (m):	6.08	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
100	0	404	5	39946.5	39970.5	24.0	765.0	670.0	25.1	0.0	24.0	0.8	2.0	2.0E-07
100	0	404	5	39970.5	39978.5	8.0	670.0	636.0	9.0	0.0	8.0	0.3	0.7	6.5E-08
100	0	404	5	39978.5	39986.0	7.5	636.0	605.0	8.2	0.0	7.5	0.2	0.6	6.1E-08
190	0	494	5	39991.5	40003.5	12.0	585.0	536.0	12.9	0.0	12.0	0.4	0.8	8.0E-08
190	0	494	5	40003.5	40015.0	11.5	536.0	485.0	13.5	0.0	11.5	0.4	0.8	7.7E-08
190	0	494	5	40015.0	40027.0	12.0	485.0	435.0	13.2	0.0	12.0	0.4	0.8	8.0E-08
290	0	594	5	40036.5	40052.5	16.0	785.0	724.0	16.1	0.0	16.0	0.5	0.9	8.9E-08
290	0	594	5	40052.5	40066.5	14.0	724.0	667.0	15.1	0.0	14.0	0.5	0.8	7.8E-08
290	0	594	5	40066.5	40080.0	13.5	667.0	615.0	13.7	0.0	13.5	0.4	0.7	7.5E-08
190	0	494	5	40082.1	40089.4	7.3	610.0	585.0	6.6	0.0	7.3	0.2	0.5	4.9E-08
190	0	494	5	40089.4	40097.0	7.6	585.0	556.0	7.7	0.0	7.6	0.2	0.5	5.1E-08
190	0	494	5	40097.0	40105.0	8.0	556.0	525.0	8.2	0.0	8.0	0.3	0.5	5.3E-08
100	0	404	5	40105.0	40107.5	2.5	525.0	518.0	1.8	0.0	2.5	0.1	0.2	2.0E-08
100	0	404	5	40107.5	40112.2	4.7	518.0	500.0	4.8	0.0	4.7	0.2	0.4	3.8E-08
100	0	404	5	40112.2	40117.2	5.0	500.0	478.0	5.8	0.0	5.0	0.2	0.4	4.1E-08

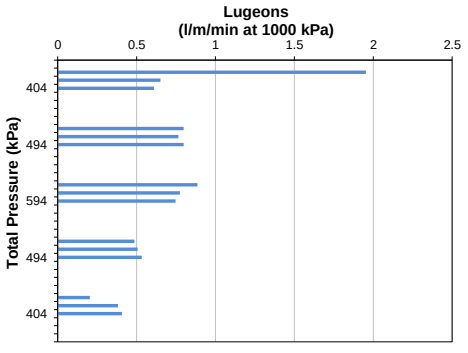
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	404	0.43	1.07
2	494	0.39	0.79
3	594	0.48	0.80
4	494	0.25	0.51
5	404	0.13	0.33

Houlsby Flow Pattern	Laminar Flow
Houlsby Lugeon value	0.7
Burgess Lugeon value	0.7

Calculated: SA
Checked: RMM
Date: 8-Jul-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH101
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	36.0 - 42.12 m

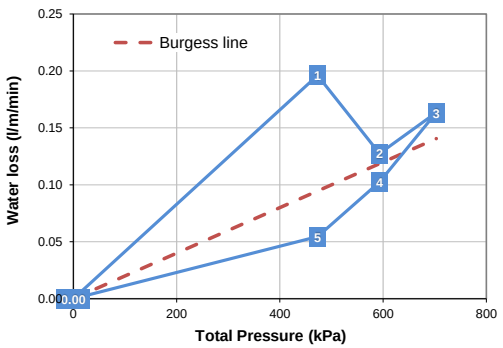
Test Details

Date:	4-Jun-25	Bottom of packer (m):	36.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	42.12	Vertical Depth to groundwater (m):	36.0	0.264
Bore inclination (deg):	90	Section length (m):	6.12	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
110	0	473	5	40146.5	40164.0	17.5	700.0	645.0	14.5	0.0	17.5	0.6	1.2	1.2E-07
110	0	473	5	40164.0	40166.5	2.5	645.0	500.0	38.3	0.0	2.5	0.1	0.2	1.7E-08
110	0	473	5	40166.5	40168.5	2.0	500.0	492.0	2.1	0.0	2.0	0.1	0.1	1.4E-08
110	0	473	5	40168.5	40170.5	2.0	492.0	483.0	2.4	0.0	2.0	0.1	0.1	1.4E-08
230	0	593	5	40171.5	40175.5	4.0	750.0	737.0	3.4	0.0	4.0	0.1	0.2	2.2E-08
230	0	593	5	40175.5	40179.5	4.0	737.0	722.0	4.0	0.0	4.0	0.1	0.2	2.2E-08
230	0	593	5	40179.5	40183.2	3.7	722.0	705.0	4.5	0.0	3.7	0.1	0.2	2.0E-08
340	0	703	5	40185.0	40190.0	5.0	699.0	673.0	6.9	0.0	5.0	0.2	0.2	2.3E-08
340	0	703	5	40190.0	40195.0	5.0	673.0	653.0	5.3	0.0	5.0	0.2	0.2	2.3E-08
340	0	703	5	40195.0	40200.0	5.0	653.0	634.0	5.0	0.0	5.0	0.2	0.2	2.3E-08
230	0	593	5	40201.9	40205.0	3.1	630.0	621.0	2.4	0.0	3.1	0.1	0.2	1.7E-08
230	0	593	5	40205.0	40208.2	3.2	621.0	608.0	3.4	0.0	3.2	0.1	0.2	1.8E-08
230	0	593	5	40208.2	40211.3	3.1	608.0	594.0	3.7	0.0	3.1	0.1	0.2	1.7E-08
110	0	473	5	40213.0	40214.6	1.6	592.0	582.0	2.6	0.0	1.6	0.1	0.1	1.1E-08
110	0	473	5	40214.6	40216.3	1.7	582.0	574.0	2.1	0.0	1.7	0.1	0.1	1.2E-08
110	0	473	5	40216.3	40218.0	1.7	574.0	567.0	1.8	0.0	1.7	0.1	0.1	1.2E-08

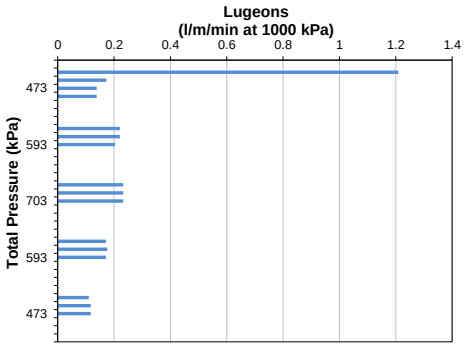
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	473	0.20	0.41
2	593	0.13	0.21
3	703	0.16	0.23
4	593	0.10	0.17
5	473	0.05	0.12

Houlsby Flow Pattern	Void Filling
Houlsby Lugeon value	0.1
Burgess Lugeon value	0.2

Calculated: SA
Checked: RMM
Date: 8-Jul-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH102
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	13.0 - 19.0 m

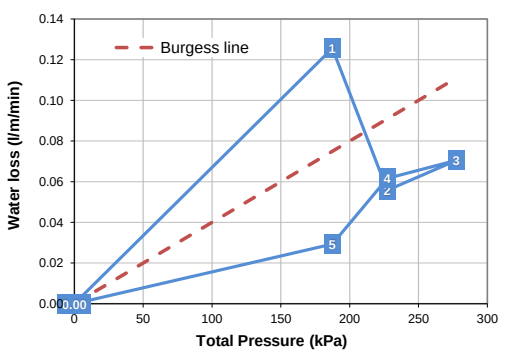
Test Details

Date:	14-Apr-25	Bottom of packer (m):	13.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	19.00	Vertical Depth to groundwater (m):	13.0	0.264
Bore inclination (deg):	90	Section length (m):	6.00	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
50	0	187	5	36573.1	36579.9	6.8	674.0	635.0	10.3	0.0	6.8	0.2	1.2	1.2E-07
50	0	187	5	36579.9	36585.0	5.1	635.0	616.0	5.0	0.0	5.1	0.2	0.9	9.1E-08
50	0	187	5	36585.0	36585.0	0.0	616.0	610.0	1.6	0.0	1.6	0.1	0.3	2.8E-08
50	0	187	5	36585.0	36585.0	0.0	610.0	604.0	1.6	0.0	1.6	0.1	0.3	2.8E-08
90	0	227	5	36585.0	36585.0	0.0	595.0	588.0	1.8	0.0	1.8	0.1	0.3	2.7E-08
90	0	227	5	36585.0	36585.0	0.0	588.0	582.0	1.6	0.0	1.6	0.1	0.2	2.3E-08
90	0	227	5	36585.0	36585.0	0.0	582.0	576.0	1.6	0.0	1.6	0.1	0.2	2.3E-08
140	0	277	5	36585.0	36585.0	0.0	565.0	555.0	2.6	0.0	2.6	0.1	0.3	3.2E-08
140	0	277	5	36585.0	36585.0	0.0	555.0	548.0	1.8	0.0	1.8	0.1	0.2	2.2E-08
140	0	277	5	36585.0	36585.0	0.0	548.0	541.0	1.8	0.0	1.8	0.1	0.2	2.2E-08
90	0	227	5	36585.1	36585.1	0.0	537.0	530.0	1.8	0.0	1.8	0.1	0.3	2.7E-08
90	0	227	5	36585.1	36585.1	0.0	530.0	523.0	1.8	0.0	1.8	0.1	0.3	2.7E-08
90	0	227	5	36585.1	36585.1	0.0	523.0	516.0	1.8	0.0	1.8	0.1	0.3	2.7E-08
50	0	187	5	36585.1	36585.1	0.0	515.0	513.0	0.5	0.0	0.5	0.0	0.1	9.4E-09
50	0	187	5	36585.1	36585.1	0.0	513.0	509.0	1.1	0.0	1.1	0.0	0.2	1.9E-08
50	0	187	5	36585.1	36585.1	0.0	509.0	505.0	1.1	0.0	1.1	0.0	0.2	1.9E-08

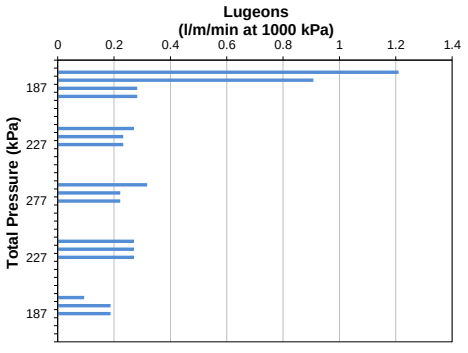
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	187	0.13	0.67
2	227	0.06	0.25
3	277	0.07	0.25
4	227	0.06	0.27
5	187	0.03	0.16

Houlsby Flow Pattern	Void Filling
Houlsby Lugeon value	0.2
Burgess Lugeon value	0.4

Calculated: SA
Checked: RMM
Date: 8-Jul-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH102
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	21.0 - 27.0 m

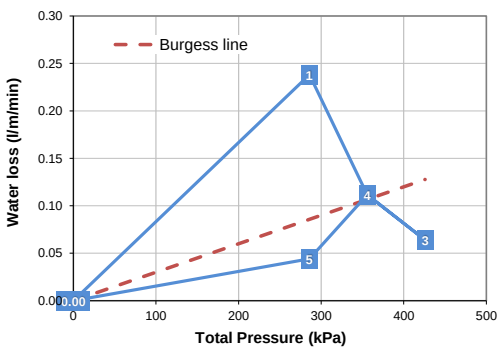
Test Details

Date:	15-Apr-25	Bottom of packer (m):	21.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	27.00	Vertical Depth to groundwater (m):	21.0	0.264
Bore inclination (deg):	90	Section length (m):	6.00	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
70	0	286	5	36634.7	36656.7	22.0	760.0	658.0	26.9	0.0	22.0	0.7	2.6	2.6E-07
70	0	286	5	36656.7	36659.1	2.4	658.0	634.0	6.3	0.0	2.4	0.1	0.3	2.8E-08
70	0	286	5	36659.1	36659.1	0.0	634.0	626.0	2.1	0.0	2.1	0.1	0.2	2.5E-08
70	0	286	5	36659.1	36659.1	0.0	626.0	618.0	2.1	0.0	2.1	0.1	0.2	2.5E-08
140	0	356	5	36659.2	36659.2	0.0	765.0	750.0	4.0	0.0	4.0	0.1	0.4	3.7E-08
140	0	356	5	36659.2	36659.2	0.0	750.0	739.0	2.9	0.0	2.9	0.1	0.3	2.7E-08
140	0	356	5	36659.2	36659.2	0.0	739.0	727.0	3.2	0.0	3.2	0.1	0.3	3.0E-08
210	0	426	5	36660.0	36661.5	1.5	712.0	695.0	4.5	0.0	1.5	0.1	0.1	1.2E-08
210	0	426	5	36661.5	36663.3	1.8	695.0	681.0	3.7	0.0	1.8	0.1	0.1	1.4E-08
210	0	426	5	36663.3	36665.3	2.0	681.0	662.0	5.0	0.0	2.0	0.1	0.2	1.6E-08
210	0	426	5	36665.3	36667.5	2.2	662.0	644.0	4.8	0.0	2.2	0.1	0.2	1.7E-08
210	0	426	5	36667.5	36669.6	2.1	644.0	625.0	5.0	0.0	2.1	0.1	0.2	1.6E-08
140	0	356	5	36669.9	36670.0	0.1	621.0	608.0	3.4	0.0	3.4	0.1	0.3	3.2E-08
140	0	356	5	36670.0	36670.1	0.1	608.0	595.0	3.4	0.0	3.4	0.1	0.3	3.2E-08
140	0	356	5	36670.1	36670.2	0.1	595.0	583.0	3.2	0.0	3.2	0.1	0.3	3.0E-08
70	0	286	5	36670.2	36670.2	0.0	582.0	577.0	1.3	0.0	1.3	0.0	0.2	1.5E-08
70	0	286	5	36670.2	36670.2	0.0	577.0	572.0	1.3	0.0	1.3	0.0	0.2	1.5E-08
70	0	286	5	36670.2	36670.2	0.0	572.0	567.0	1.3	0.0	1.3	0.0	0.2	1.5E-08

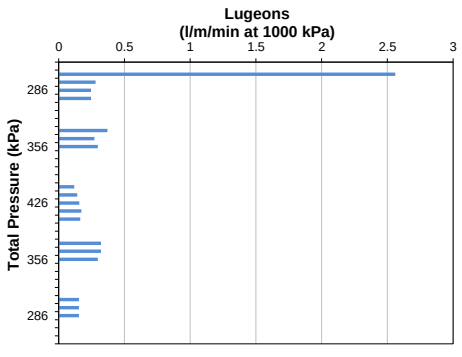
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	286	0.24	0.83
2	356	0.11	0.31
3	426	0.06	0.15
4	356	0.11	0.31
5	286	0.04	0.15

Houlsby Flow Pattern	Void Filling
Houlsby Lugeon value	0.2
Burgess Lugeon value	0.3

Calculated: SA
Checked: RMM
Date: 8-Jul-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH102
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	33.0 - 39.0 m

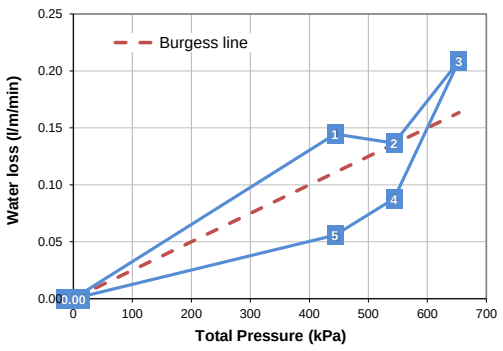
Test Details

Date:	15-Apr-25	Bottom of packer (m):	33.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	39.00	Vertical Depth to groundwater (m):	33.0	0.264
Bore inclination (deg):	90	Section length (m):	6.00	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
110	0	444	5	36712.6	36719.0	6.4	715.0	686.0	7.7	0.0	6.4	0.2	0.5	4.8E-08
110	0	444	5	36719.0	36719.2	0.2	686.0	674.0	3.2	0.0	3.2	0.1	0.2	2.4E-08
110	0	444	5	36719.2	36719.4	0.2	674.0	661.0	3.4	0.0	3.4	0.1	0.3	2.6E-08
210	0	544	5	36722.0	36726.4	4.4	644.0	620.0	6.3	0.0	4.4	0.1	0.3	2.7E-08
210	0	544	5	36726.4	36730.4	4.0	620.0	559.0	16.1	0.0	4.0	0.1	0.2	2.5E-08
210	0	544	5	36730.4	36734.3	3.9	559.0	581.0	5.8	0.0	3.9	0.1	0.2	2.4E-08
320	0	654	5	36738.5	36745.4	6.9	564.0	535.0	7.7	0.0	6.9	0.2	0.4	3.5E-08
320	0	654	5	36745.4	36751.4	6.0	535.0	507.0	7.4	0.0	6.0	0.2	0.3	3.1E-08
320	0	654	5	36751.4	36757.3	5.9	507.0	490.0	4.5	0.0	5.9	0.2	0.3	3.0E-08
210	0	544	5	36756.3	36758.6	2.3	488.0	476.0	3.2	0.0	2.3	0.1	0.1	1.4E-08
210	0	544	5	36758.6	36761.3	2.7	476.0	464.0	3.2	0.0	2.7	0.1	0.2	1.7E-08
210	0	544	5	36761.3	36764.2	2.9	464.0	450.0	3.7	0.0	2.9	0.1	0.2	1.8E-08
110	0	444	5	36763.4	36763.4	0.0	453.0	446.0	1.8	0.0	1.8	0.1	0.1	1.4E-08
110	0	444	5	36763.4	36763.4	0.0	446.0	440.0	1.6	0.0	1.6	0.1	0.1	1.2E-08
110	0	444	5	36763.4	36763.4	0.0	440.0	434.0	1.6	0.0	1.6	0.1	0.1	1.2E-08

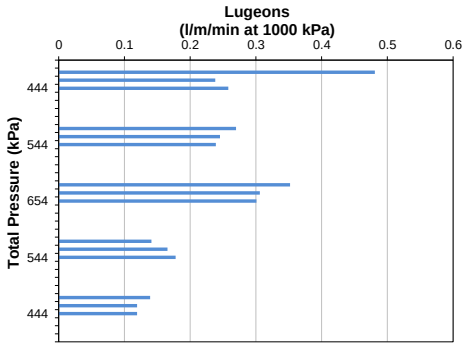
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	444	0.14	0.33
2	544	0.14	0.25
3	654	0.21	0.32
4	544	0.09	0.16
5	444	0.06	0.13

Houlsby Flow Pattern	Laminar Flow
Houlsby Lugeon value	0.2
Burgess Lugeon value	0.3

Calculated: SA
Checked: RMM
Date: 8-Jul-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH102
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	38.0 - 44.0 m

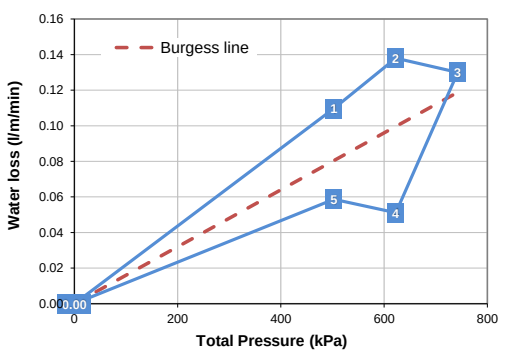
Test Details

Date:	16-Apr-25	Bottom of packer (m):	38.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	44.00	Vertical Depth to groundwater (m):	38.0	0.264
Bore inclination (deg):	90	Section length (m):	6.00	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
120	0	503	5	36783.3	36790.0	6.7	690.0	657.0	8.7	0.0	6.7	0.2	0.4	4.4E-08
120	0	503	5	36790.0	36790.0	0.0	657.0	651.0	1.6	0.0	1.6	0.1	0.1	1.1E-08
120	0	503	5	36790.0	36790.0	0.0	651.0	645.0	1.6	0.0	1.6	0.1	0.1	1.1E-08
240	0	623	5	36790.3	36790.9	0.6	632.0	616.0	4.2	0.0	4.2	0.1	0.2	2.3E-08
240	0	623	5	36790.9	36791.6	0.7	616.0	600.0	4.2	0.0	4.2	0.1	0.2	2.3E-08
240	0	623	5	36791.6	36792.2	0.6	600.0	585.0	4.0	0.0	4.0	0.1	0.2	2.1E-08
360	0	743	5	36793.3	36797.2	3.9	576.0	554.0	5.8	0.0	3.9	0.1	0.2	1.8E-08
360	0	743	5	36797.2	36801.2	4.0	554.0	535.0	5.0	0.0	4.0	0.1	0.2	1.8E-08
360	0	743	5	36801.2	36805.0	3.8	535.0	516.0	5.0	0.0	3.8	0.1	0.2	1.7E-08
240	0	623	5	36806.1	36807.8	1.7	513.0	498.0	4.0	0.0	1.7	0.1	0.1	9.1E-09
240	0	623	5	36807.8	36809.2	1.4	498.0	482.0	4.2	0.0	1.4	0.0	0.1	7.5E-09
240	0	623	5	36809.2	36810.7	1.5	482.0	469.0	3.4	0.0	1.5	0.1	0.1	8.0E-09
120	0	503	5	36811.1	36811.1	0.0	467.0	465.0	0.5	0.0	0.5	0.0	0.0	3.5E-09
120	0	503	5	36811.1	36811.1	0.0	465.0	456.0	2.4	0.0	2.4	0.1	0.2	1.6E-08
120	0	503	5	36811.1	36811.1	0.0	456.0	447.0	2.4	0.0	2.4	0.1	0.2	1.6E-08

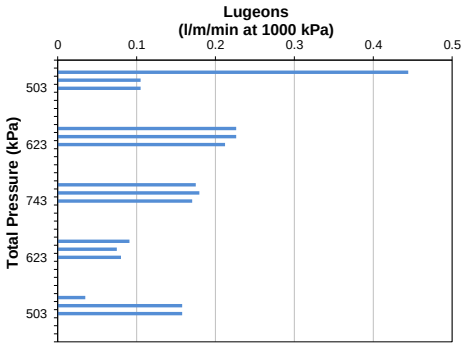
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	503	0.11	0.22
2	623	0.14	0.22
3	743	0.13	0.18
4	623	0.05	0.08
5	503	0.06	0.12

Houlsby Flow Pattern	Laminar Flow
Houlsby Lugeon value	0.2
Burgess Lugeon value	0.2

Calculated: SA
Checked: RMM
Date: 8-Jul-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH103
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	14.00 - 20.17m

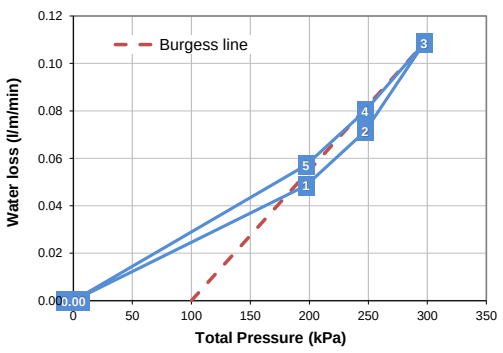
Test Details

Date:	9-Apr-25	Bottom of packer (m):	14.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	20.17	Vertical Depth to groundwater (m):	14.0	0.264
Bore inclination (deg):	90	Section length (m):	6.17	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
50	0	197	5	36070.6	36070.6	0.0	755.0	750.0	1.3	0.0	1.3	0.0	0.2	2.2E-08
50	0	197	5	36070.6	36070.6	0.0	750.0	746.0	1.1	0.0	1.1	0.0	0.2	1.7E-08
50	0	197	5	36070.6	36070.6	0.0	746.0	738.0	2.1	0.0	2.1	0.1	0.3	3.5E-08
100	0	247	5	36070.6	36070.6	0.0	720.0	710.0	2.6	0.0	2.6	0.1	0.3	3.5E-08
100	0	247	5	36070.6	36070.6	0.0	710.0	700.0	2.6	0.0	2.6	0.1	0.3	3.5E-08
100	0	247	5	36070.6	36070.6	0.0	700.0	695.0	1.3	0.0	1.3	0.0	0.2	1.7E-08
150	0	297	5	36070.7	36070.7	0.0	678.0	667.0	2.9	0.0	2.9	0.1	0.3	3.2E-08
150	0	297	5	36070.7	36070.7	0.0	667.0	653.0	3.7	0.0	3.7	0.1	0.4	4.0E-08
150	0	297	5	36070.7	36070.7	0.0	653.0	640.0	3.4	0.0	3.4	0.1	0.4	3.7E-08
100	0	247	5	36070.7	36070.7	0.0	639.0	629.0	2.6	0.0	2.6	0.1	0.3	3.5E-08
100	0	247	5	36070.7	36070.7	0.0	629.0	620.0	2.4	0.0	2.4	0.1	0.3	3.1E-08
100	0	247	5	36070.7	36070.7	0.0	620.0	611.0	2.4	0.0	2.4	0.1	0.3	3.1E-08
50	0	197	5	36070.7	36070.7	0.0	611.0	606.0	1.3	0.0	1.3	0.0	0.2	2.2E-08
50	0	197	5	36070.7	36070.7	0.0	606.0	597.0	2.4	0.0	2.4	0.1	0.4	3.9E-08
50	0	197	5	36070.7	36070.7	0.0	597.0	591.0	1.6	0.0	1.6	0.1	0.3	2.6E-08

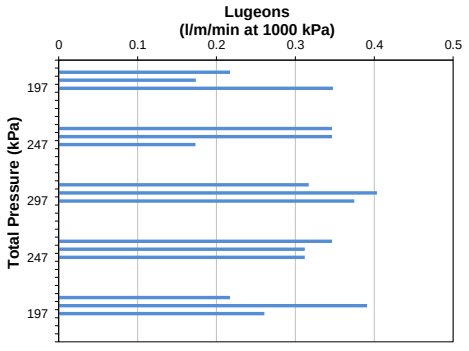
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	197	0.05	0.25
2	247	0.07	0.29
3	297	0.11	0.37
4	247	0.08	0.32
5	197	0.06	0.29

Houlsby Flow Pattern	Laminar Flow
Houlsby Lugeon value	0.3
Burgess Lugeon value	0.6

Calculated: SA
Checked: JDB
Date: 16-Apr-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH103
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	21.20 - 27.20m

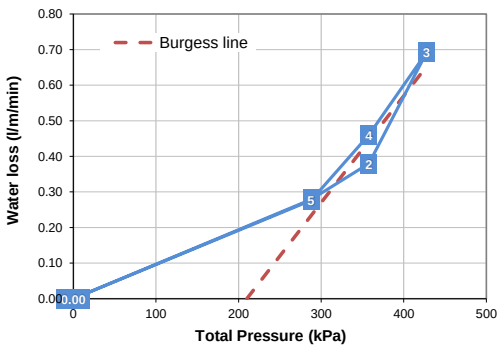
Test Details

Date:	9-Apr-25	Bottom of packer (m):	21.20	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	27.20	Vertical Depth to groundwater (m):	21.2	0.264
Bore inclination (deg):	90	Section length (m):	6.00	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
70	0	288	5	36131.2	36141.2	10.0	685.0	655.0	7.9	0.0	10.0	0.3	1.2	1.2E-07
70	0	288	5	36141.2	36149.8	8.6	655.0	620.0	9.2	0.0	8.6	0.3	1.0	1.0E-07
70	0	288	5	36149.8	36158.2	8.4	620.0	582.0	10.0	0.0	8.4	0.3	1.0	9.7E-08
70	0	288	5	36158.2	36165.6	7.4	582.0	550.0	8.5	0.0	7.4	0.2	0.9	8.6E-08
70	0	288	5	36165.6	36173.1	7.5	550.0	520.0	7.9	0.0	7.5	0.3	0.9	8.7E-08
140	0	358	5	36177.2	36186.4	9.2	-	714.0		0.0	9.2	0.3	0.9	8.5E-08
140	0	358	5	36186.4	36197.9	11.5	714.0	662.0	13.7	0.0	11.5	0.4	1.1	1.1E-07
140	0	358	5	36197.9	36210.8	12.9	662.0	605.0	15.1	0.0	12.9	0.4	1.2	1.2E-07
140	0	358	5	36210.8	36222.8	12.0	605.0	550.0	14.5	0.0	12.0	0.4	1.1	1.1E-07
210	0	428	5	36232.2	36252.6	20.4	-	703.0		0.0	20.4	0.7	1.6	1.6E-07
210	0	428	5	36252.6	36274.4	21.8	703.0	623.0	21.1	0.0	21.8	0.7	1.7	1.7E-07
210	0	428	5	36274.4	36294.6	20.2	623.0	543.0	21.1	0.0	20.2	0.7	1.6	1.6E-07
140	0	358	5	36304.4	36318.3	13.9	520.0	460.0	15.9	0.0	13.9	0.5	1.3	1.3E-07
140	0	358	5	36318.3	36332.9	14.6	775.0	725.0	13.2	0.0	14.6	0.5	1.4	1.4E-07
140	0	358	5	36332.9	36346.9	13.9	725.0	671.0	14.3	0.0	13.9	0.5	1.3	1.3E-07
140	0	358	5	36346.9	36359.7	12.8	671.0	615.0	14.8	0.0	12.8	0.4	1.2	1.2E-07
70	0	288	5	36364.8	36373.8	8.9	595.0	557.0	10.0	0.0	8.9	0.3	1.0	1.0E-07
70	0	288	5	36373.8	36381.7	7.9	557.0	514.0	11.4	0.0	7.9	0.3	0.9	9.2E-08
70	0	288	5	36381.7	36389.7	8.0	514.0	482.0	8.5	0.0	8.0	0.3	0.9	9.3E-08

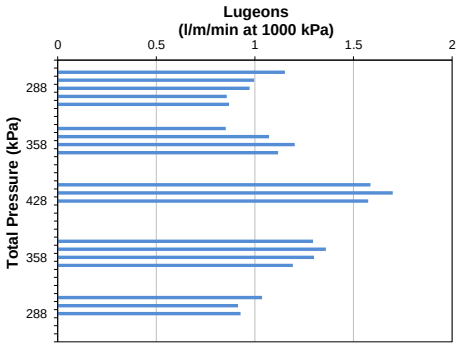
Notes Drum readings not taken for some pressure stages due to drum refilling



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	288	0.28	0.97
2	358	0.38	1.06
3	428	0.69	1.62
4	358	0.46	1.29
5	288	0.28	0.96

Houlsby Flow Pattern	Dilation
Houlsby Lugeon value	1
Burgess Lugeon value	3

Calculated: SA
Checked: JDB
Date: 16-Apr-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH103
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	33.20 - 39.20m

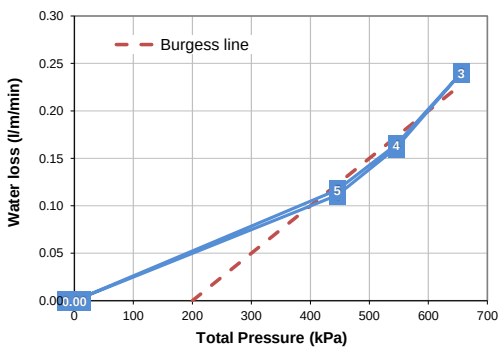
Test Details

Date:	10-Apr-25	Bottom of packer (m):	33.20	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	39.20	Vertical Depth to groundwater (m):	33.2	0.264
Bore inclination (deg):	90	Section length (m):	6.00	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
110	0	446	5	36417.9	36421.1	3.3	780.0	764.0	4.2	0.0	3.3	0.1	0.2	2.4E-08
110	0	446	5	36421.1	36424.5	3.4	764.0	750.0	3.7	0.0	3.4	0.1	0.3	2.5E-08
110	0	446	5	36424.5	36427.9	3.3	750.0	736.0	3.7	0.0	3.3	0.1	0.3	2.5E-08
210	0	546	5	36428.5	36433.2	4.8	715.0	700.0	4.0	0.0	4.8	0.2	0.3	2.9E-08
210	0	546	5	36433.2	36438.2	5.0	700.0	680.0	5.3	0.0	5.0	0.2	0.3	3.1E-08
210	0	546	5	36438.2	36443.0	4.8	680.0	660.0	5.3	0.0	4.8	0.2	0.3	2.9E-08
320	0	656	5	36445.3	36452.7	7.4	632.0	601.0	8.2	0.0	7.4	0.2	0.4	3.8E-08
320	0	656	5	36452.7	36459.7	7.0	601.0	570.0	8.2	0.0	7.0	0.2	0.4	3.6E-08
320	0	656	5	36459.7	36466.9	7.2	570.0	540.0	7.9	0.0	7.2	0.2	0.4	3.7E-08
210	0	546	5	36467.2	36472.0	4.8	534.0	513.0	5.5	0.0	4.8	0.2	0.3	2.9E-08
210	0	546	5	36472.0	36477.1	5.1	513.0	492.0	5.5	0.0	5.1	0.2	0.3	3.1E-08
210	0	546	5	36477.1	36482.0	4.9	492.0	470.0	5.8	0.0	4.9	0.2	0.3	3.0E-08
110	0	446	5	36482.4	36486.0	3.6	462.0	445.0	4.5	0.0	3.6	0.1	0.3	2.7E-08
110	0	446	5	36486.0	36489.5	3.5	445.0	430.0	4.0	0.0	3.5	0.1	0.3	2.6E-08
110	0	446	5	36489.5	36492.9	3.4	430.0	420.0	2.6	0.0	3.4	0.1	0.3	2.5E-08

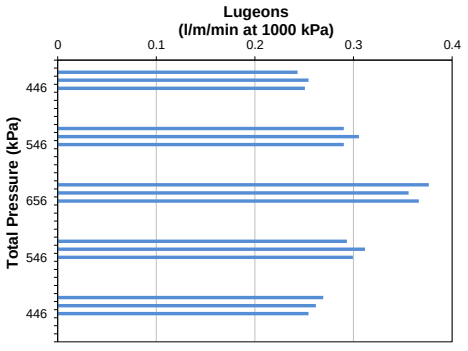
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	446	0.11	0.25
2	546	0.16	0.30
3	656	0.24	0.37
4	546	0.16	0.30
5	446	0.12	0.26

Houlsby Flow Pattern	Laminar Flow
Houlsby Lugeon value	0.3
Burgess Lugeon value	0.5

Calculated: SA
Checked: JDB
Date: 12-Apr-25



WATER PRESSURE TEST RESULTS

Client :	Cottonwood Development Pty Ltd	**Project No. :**	222462
Project :	Proposed Mixed-Use Residential Redevelopment	**Bore :**	BH103
Location :	88 Waterloo Road, Macquarie Park	**Test section :**	39.2 - 45.2 m

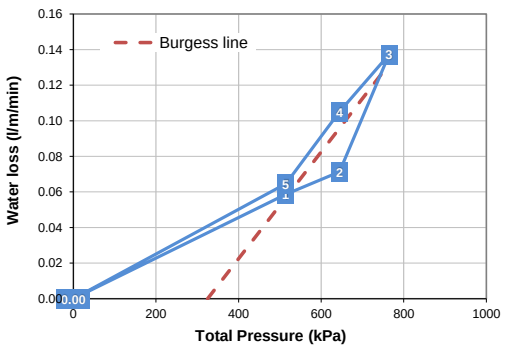
Test Details

Date:	10-Apr-25	Bottom of packer (m):	39.20	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	61	Bore depth (m):	45.20	Vertical Depth to groundwater (m):	39.2	0.264
Bore inclination (deg):	90	Section length (m):	6.00	(or depth to base of packer)		

Hg = gauge pressure, Hl = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-Hl

PRESSURE			Test	FLOW RATES								Water	Lugeons	Approx
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
120	0	514	5	36517.0	36517.0	0.0	645.0	639.0	1.6	0.0	1.6	0.1	0.1	1.0E-08
120	0	514	5	36517.0	36517.0	0.0	639.0	632.0	1.8	0.0	1.8	0.1	0.1	1.2E-08
120	0	514	5	36517.0	36517.0	0.0	632.0	625.0	1.8	0.0	1.8	0.1	0.1	1.2E-08
250	0	644	5	36517.2	36518.2	1.0	616.0	603.0	3.4	0.0	1.0	0.0	0.1	5.2E-09
250	0	644	5	36518.2	36520.0	1.8	603.0	587.0	4.2	0.0	1.8	0.1	0.1	9.3E-09
250	0	644	5	36520.0	36522.3	2.3	587.0	572.0	4.0	0.0	2.3	0.1	0.1	1.2E-08
250	0	644	5	36522.3	36525.2	2.9	572.0	555.0	4.5	0.0	2.9	0.1	0.2	1.5E-08
250	0	644	5	36525.2	36527.9	2.7	555.0	536.0	5.0	0.0	2.7	0.1	0.1	1.4E-08
370	0	764	5	36532.5	36536.6	4.1	738.0	716.0	5.8	0.0	4.1	0.1	0.2	1.8E-08
370	0	764	5	36536.6	36540.8	4.2	716.0	697.0	5.0	0.0	4.2	0.1	0.2	1.8E-08
370	0	764	5	36540.8	36544.9	4.1	697.0	678.0	5.0	0.0	4.1	0.1	0.2	1.8E-08
250	0	644	5	36546.3	36549.5	3.2	672.0	657.0	4.0	0.0	3.2	0.1	0.2	1.7E-08
250	0	644	5	36549.5	36552.3	2.8	657.0	642.0	4.0	0.0	2.8	0.1	0.1	1.4E-08
250	0	644	5	36552.3	36555.5	3.2	642.0	625.0	4.5	0.0	3.2	0.1	0.2	1.7E-08
250	0	644	5	36555.5	36558.9	3.4	625.0	608.0	4.5	0.0	3.4	0.1	0.2	1.8E-08
120	0	514	5	36559.8	36559.9	0.1	607.0	601.0	1.6	0.0	1.6	0.1	0.1	1.0E-08
120	0	514	5	36559.9	36559.9	0.0	601.0	594.0	1.8	0.0	1.8	0.1	0.1	1.2E-08
120	0	514	5	36559.9	36559.9	0.0	594.0	585.0	2.4	0.0	2.4	0.1	0.2	1.5E-08

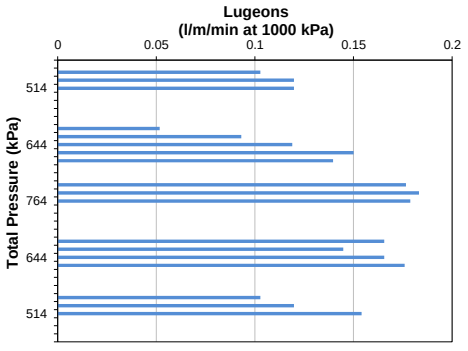
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	514	0.06	0.11
2	644	0.07	0.11
3	764	0.14	0.18
4	644	0.10	0.16
5	514	0.06	0.13

Houlsby Flow Pattern	Laminar Flow
Houlsby Lugeon value	0.1
Burgess Lugeon value	0.3

Calculated: SA
Checked: JDB
Date: 12-Apr-25



Appendix D

Laboratory Results

Material Test Report

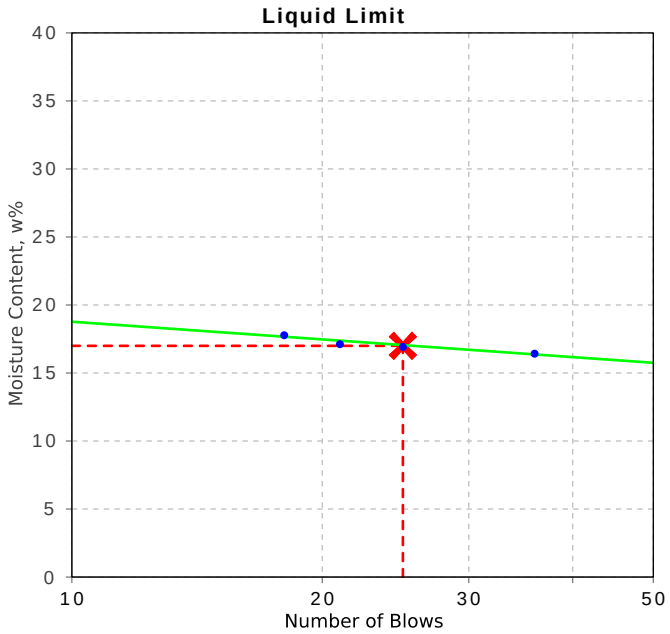
Douglas Partners Pty Ltd
Sydney Laboratory
96 Hermitage Road West Ryde NSW 2114
Phone: (02) 9809 0666
Email: mick.gref@douglaspartners.com.au

Report Number:	**222462.01-1**
Issue Number:	1
Date Issued:	20/02/2024
Client:	The Trustee for LegPro 48 Unit Trust c/o Legacy Property, Sydney NSW 2000
Contact:	Adam Peacock
Project Number:	222462.01
Project Name:	Proposed Mixed-Use Residential Redevelopment
Project Location:	15-21 Cottonwood Crescent, Macquarie Park NSW
Work Request:	11197
Sample Number:	SY-11197A
Date Sampled:	31/01/2024
Dates Tested:	13/02/2024 - 19/02/2024
Sampling Method:	Sampled by Engineering Department *The results apply to the sample as received*
Sample Location:	**BH7 (0.15 - 0.55m)**
Material:	FILL / Sandy CLAY: pale brown, fine to medium sand, with fine to medium, sub-rounded sandstone gravel

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Mick Gref
Assistant Laboratory Manager
Laboratory Accreditation Number: 828

Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	17		
Plastic Limit (%)	14		
Plasticity Index (%)	**3**		



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CERTIFICATE OF ANALYSIS 343588

Client Details

Client	Douglas Partners Pty Ltd
Attention	Rhys McMillan
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**222462.01, Macquarie Park**
Number of Samples	2 Soil
Date samples received	09/02/2024
Date completed instructions received	09/02/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	16/02/2024
Date of Issue	15/02/2024

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Clara Fong, Chemist (FAS)

Authorised By
Nancy Zhang, Laboratory Manager

Misc Inorg - Soil			
Our Reference		343588-1	343588-2
Your Reference	UNITS	BH3	BH7
Depth		0.5-0.6	0.9-1
Date Sampled		30/01/2024	30/01/2024
Type of sample		Soil	Soil
Date prepared	-	13/02/2024	13/02/2024
Date analysed	-	13/02/2024	13/02/2024
pH 1:5 soil:water	pH Units	4.8	7.9
Electrical Conductivity 1:5 soil:water	µS/cm	190	92
Chloride, Cl 1:5 soil:water	mg/kg	150	20
Sulphate, SO4 1:5 soil:water	mg/kg	83	41

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			13/02/2024	[NT]	[NT]	[NT]	[NT]	13/02/2024	[NT]
Date analysed	-			13/02/2024	[NT]	[NT]	[NT]	[NT]	13/02/2024	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	98	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	102	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Samples were out of the recommended holding time for pH / Conductivity analysis.

Appendix E

Historical Borehole Logs

BOREHOLE LOG

CLIENT: MP No 2 Holdings Pty Ltd atf MP No 2 Unit Trust
PROJECT: Waterloo-Cottonwood Garden Precinct
LOCATION: Cottonwood Crescent, Macquarie Park
SURFACE LEVEL: 44.7 AHD
EASTING: 325835
NORTHING: 6260805
DIP/AZIMUTH: 90°/--
BORE No: BH2
PROJECT No: 86572.00
DATE: 5-10-2018
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
44	0.13	CONCRETE SLAB										
	0.2	FILLING: brown, silty sand filling with trace of clay, humid										
	0.6	SANDSTONE: low strength, pale brown to brown medium grained sandstone with some medium strength ironstone bands						0.6-1.0m: (B)x6, 0-10°, pl, ro, cln				PL(A) = 1.1 PL(D) = 1.4
	0.88	SANDSTONE: medium to high strength, moderately weathered, fractured, pale brown medium grained sandstone						1.0-3.0m: (B)x3, 0-10°, pl, ro, cln				
43	1											
		SANDSTONE: high strength, moderately to slightly weathered, slightly fractured, red-brown, medium grained sandstone							C	100	85	PL(A) = 1.9 PL(D) = 1.4
42	2											
	3											PL(A) = 1.8 PL(D) = 1.6
41								3.3m: J, 80°, un, partially healed				
	4							3.5-3.75m: (B)x4, 0-10°, pl, ro, cln				PL(A) = 1.9 PL(D) = 1.8
40								4.38m: B, 0°, pl, ro, cly co	C	100	100	
	5											PL(A) = 2.3 PL(D) = 2.1
	5.6	SANDSTONE: high strength, fresh, slightly fractured to unbroken, pale grey and pale brown, medium grained sandstone with <5% interlaminated siltstone						5.45m: B, 5°, pl, ro, cly co				PL(A) = 2.9 PL(D) = 2.5
39	6											
								6.5m: B, 5°, pl, ro, cly co				PL(A) = 1.6 PL(D) = 1.5
38	7							7.1m: B, 5°, pl, ro, cly co				
								7.1-8.94m: (B)x7, 5°, pl, ro, cly co	C	100	100	
37	8											PL(A) = 1.5 PL(D) = 1.6
36	9											PL(A) = 1.8 PL(D) = 1.9
35									C	100	100	PL(A) = 2.5

RIG: Scout 2 **DRILLER:** SS **LOGGED:** AT **CASING:** HW to 0.60 m

TYPE OF BORING: Diatube (150 mm) to 0.12 m, Solid Flight Auger (TC-bit) to 0.6 m, NMLC to 15.0 m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Groundwater well installed upon completion.

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_x	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)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: MP No 2 Holdings Pty Ltd atf MP No 2 Unit Trust
PROJECT: Waterloo-Cottonwood Garden Precinct
LOCATION: Cottonwood Crescent, Macquarie Park
SURFACE LEVEL: 44.7 AHD
EASTING: 325835
NORTHING: 6260805
DIP/AZIMUTH: 90°/--
BORE No: BH2
PROJECT No: 86572.00
DATE: 5-10-2018
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
34	11	SANDSTONE: high strength, fresh, slightly fractured to unbroken, pale grey and pale brown, medium grained sandstone with <5% interlaminated siltstone *(continued)* 10.23 - 10.28m: high strength, fresh, dark grey siltstone band						10.3m: B, 0°, pl, ro, cly co	C	100	100	PL(D) = 2.2 PL(A) = 2.3 PL(D) = 1.8
33	12											PL(A) = 2.3 PL(D) = 1.6
32	12.1	SANDSTONE: high strength, fresh, slightly fractured to unbroken, pale grey, medium grained sandstone with <5% siltstone and carbonaceous laminations						12.12m: B, 0-10°, pl, ro, cln 12.12-15.0m: (B)x7, 0-10°, pl, ro, cln	C	100	100	PL(A) = 2.1 PL(D) = 2.1
31	13											PL(A) = 1.9 PL(D) = 1.2
30	14											
29	15	15.0 Bore discontinued at 15.0m										PL(A) = 2 PL(D) = 1.6
28	16											
27	17											
26	18											
25	19											

RIG: Scout 2 **DRILLER:** SS **LOGGED:** AT **CASING:** HW to 0.60 m

TYPE OF BORING: Diatube (150 mm) to 0.12 m, Solid Flight Auger (TC-bit) to 0.6 m, NMLC to 15.0 m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Groundwater well installed upon completion.

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_x	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)

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0.6 – 5.0 m

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5.0 – 10.0 m

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10.0 -15.0 m