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Report on Geotechnical Investigation

Proposed Residential Development

271-273 Alfred Street, North Sydney NSW

Prepared for Tara Shore Pty Ltd ATF John Taylor Family Trust

Project 239528.00

2 July 2026

Document History

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

Signature	Date
Author	2 July 2026
Reviewer pp	2 July 2026

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1. Introduction

This geotechnical investigation report has been prepared by Douglas Partners Pty Ltd (Douglas) on behalf of Tara Shore Pty Ltd ATF John Taylor Family Trust (the Applicant) in support of a State Significant Development Application (SSDA) identified as SSD-103541730 which seeks approval for a 37-storey mixed-use housing development, located at 271-273 Alfred Street, North Sydney (the site).

The site is located within the North Sydney Local Government Area (LGA). The site comprises two allotments which are legally identified as Lot 1 DP 532504 (271 Alfred Street) and SP6830 (273 Alfred Street). It is rectangular in shape and has street frontages to Alfred Street to the west and Little Alfred Street to the east (both measuring approximately 23m). The existing building on the site is a three-storey commercial building. A site aerial is provided in Figure 1 below.

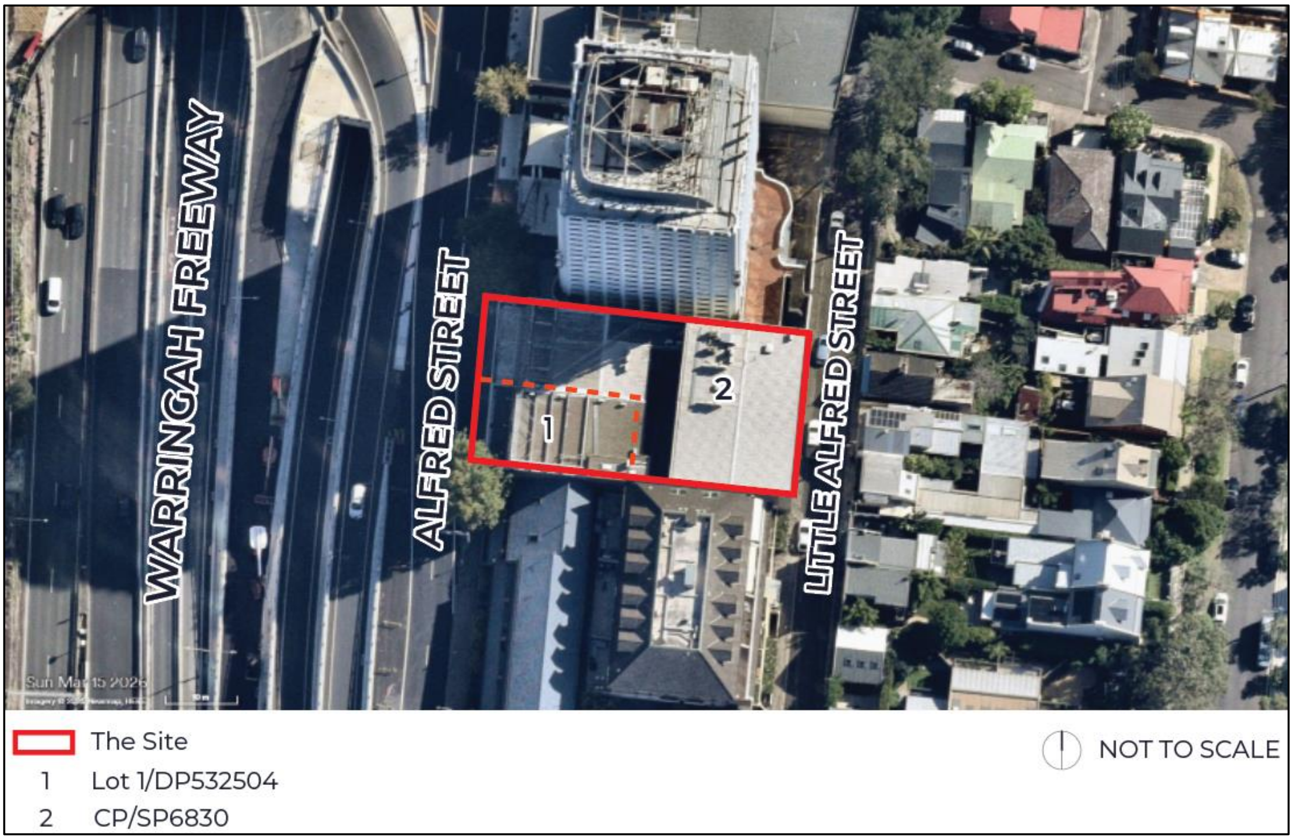

Figure 1: Site aerial map showing site location in red (source: Nearmap/edited by Colliers Urban Planning)

The proposal was declared State Significant Development (SSD) in State Significant Declaration Order (No.15) 2025 (the Order), which specified that the development detailed in EOI No.279422, including a mixed-use development located at the site be declared as SSD. The Order enables SSD-103541730 to be undertaken via the Housing Delivery Authority (HDA) pathway, including a concurrent rezoning proposal to the North Sydney Local Environmental Plan 2013 (North Sydney LEP).

The proposal involves two components: the SSDA and the concurrent rezoning of the site. The SSDA component seeks consent for:

- Demolition of the existing building on the site;
- Construction of a 38-storey mixed use development, comprising:
    - 9 levels of basement car parking, comprising plant and bicycle storage area;
    - Commercial tenancies on Level 2;
    - Residential uses on levels 3 and above, comprising 95 apartments.
- Landscaping and public domain works;
- Extension and augmentation of services and infrastructure as required; and
- Lot amalgamation and stratum subdivision of the site.

The rezoning component seeks consent to amend the North Sydney LEP, comprising:

- Rezone the land use zone of the site from E2 Commercial Centre to MU1 Mixed Use;
- Amend the maximum building height from 13m to RL 166m;
- Amend the maximum floor space ratio from 3.5:1 to 13.9:1; and
- Introduce a site-specific clause requiring 15% of residential Gross Floor Area (GFA) to be used as affordable housing and managed by a CHP for a period of at least 15 years.

For a detailed project description refer to the Environmental Impact Statement and Rezoning Report prepared by Colliers Urban Planning.

This geotechnical investigation was undertaken alongside a Detailed Site (contamination) Investigation (DSI). Some information from the Douglas environmental works has been included within this geotechnical investigation report, notably six (6) shallow hand augered boreholes. Refer to the DSI report for further information on site contamination (ref: 239528.01.R.001).

Refer to Table 1 for details relating to the Secretary's Environmental Assessment Requirements (SEARs) for the project.

Table 1: SEARs table

Item	SEARs Requirement	Relevant Section of Report
12	Assess potential impacts on soil resources and related infrastructure and riparian lands on and near the site and including soil erosion	Section 7
	Groundwater Impact Assessment in accordance with relevant Groundwater Guidelines. If the proposed development is on land identified as having high salinity or acid sulfate soil potential in an EPI provide a Salinity Management Plan or Acid Sulfate Soil Management Plan that includes appropriate management measures and strategies.	Groundwater Impact Assessment reported separately (ref: 239528.00.R.002)
		Section 2.4. Salinity Management Plan and Acid Sulfate Soil Management Plan not required

This report must be read in conjunction with all appendices including the notes provided in Appendix A.

2. Site description and published data

2.1 Site description

As outlined in Section 1 the site is bounded by Alfred Street to the west and Little Alfred Street to the east. The site is bounded by low rise residential apartments to the south and the SBS Building (previously the Bayer Building) to the north.

Two multi-level commercial buildings are present at the site, which extend to the site boundaries, except for the Little Alfred Street side, where Little Alfred Street overlaps an approximately 1.8 m wide strip of the site. Surface levels adjacent to the site range from around RL40.0 to RL40.2 on the Alfred Street side and around RL43.0 to 43.7 on the Little Alfred Street side. There is around a 3 m ground level difference between Little Alfred Street and Alfred Street.

No. 271 and No.273 have separate single level basements with an approximate floor level of around RL38.5 m. A visual inspection of the basements indicated that the concrete floor slabs and basement walls were in sound condition. Both are drained basements with subfloor drainage leading to a below ground sump. At the time of inspection water was not observed to be actively flowing into the sumps.

An inspection through existing penetrations through the No.273 basement brick wall indicated fresh medium strength sandstone below Little Alfred Street (as shown on Drawing 2 in Appendix B). From limited information observed at the site, it appears that the basement walls are cut vertically within the sandstone (i.e. shoring is not present).

To the west of Alfred Street, extensive road upgrade works to the Warringah Freeway has been undertaken in recent years, resulting in the modification and construction of additional lanes. A large sandstone cutting has now been fully excavated to make space for a new Warringah Freeway Lane and the new Mount Street ramp (as shown in Figure 2).

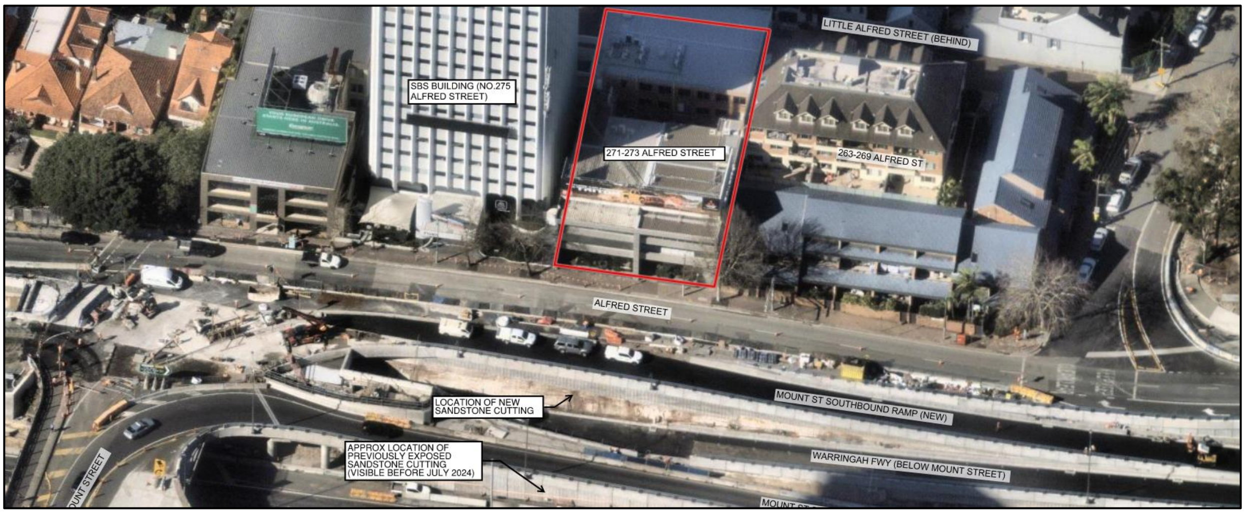

Figure 2: Ortho view of site (looking east) showing nearby site features (Nearmap, dated 11 July 2025).

The sandstone cutting is now covered by a concrete wall (as of April 2025). Photos of the previous condition of the rock cutting show that it was excavated near vertical, with closely spaced ‘presplit’ drilling holes present across the face. Several subvertical joints (dipping between 60°-90°) are visible across the face (Figure 3). One of the joints has a stepped face showing that it is striking at around 020°, which is generally consistent with the prevailing joint sets in Sydney (i.e. striking NNE and EW). No water seepage is visible on the exposed rock face.

Figure 3: Ortho photo dated 5 May 2018 (above) and Google Maps Street View dated June 2021 (below) showing rock face prior to Waringah Freeway works, and marked up joints (red). Both photos looking east.

2.2 **Geology**

Reference to the Sydney 1:100,000 Geological Series Sheet indicates that the site is underlain by Hawkesbury Sandstone of the Triassic Period which typically consists of medium to coarse grained quartz sandstone with minor siltstone and laminite lenses.

The primary joint sets in Hawkesbury sandstone are typically near vertical (but typically ranging between 75° to 90°) and striking NNE and ESE. The NNE joints are generally spaced between 1 m to 10 m but can be spaced closer in the joint swarms. The NNE joints are very prominent and are persistent over many metres, both horizontally and vertically. Low angle (25° to 30°) thrust faults, typically dipping to the north and south, are also relatively common, affecting north-south striking faces.

2.3 **Hydrogeology**

A groundwater bore search of the WaterNSW database indicates no registered water bores within 250 m of the site.

2.4 **Acid sulfate soils and Salinity**

The 1:25,000 Acid Sulfate Soil Risk Map (1994-1998, NSW Department of Environment and Climate Change) indicates that the site is not located within an area with known potential for acid sulfate soils (ASS). The surface level of the site is located above RL40 m (AHD), meaning that ASS is not considered a risk for this site and further assessment is not warranted.

The site is not located within an area with a mapped risk of saline soil and further assessment is not warranted.

3. **Review of No.275 Alfred Street geotechnical information**

As part of a geotechnical investigation for an SSDA associated with a proposed residential development at 275 Alfred Street (to the north of the site) JK Geotechnics drilled three cored boreholes to depths of between 26 m and 40 m (report ref: 37877Lrpt1, dated 26 November 2025).

The boreholes were drilled from the floor of the existing two (2) level basement at RL31.3 m (AHD throughout this report). Below the concrete floor slab, medium and medium to high sandstone was encountered to the borehole termination depths. Some thin ‘laminite’ and siltstone bands were encountered between RL15.4 m to RL16.4 m. Defects were assessed as being widely spaced with some occasional joints dipping at between 20° to 80°.

Groundwater wells were installed in each of the cored boreholes. Levels were continuously monitored using water level loggers from 3 October 2025 to 5 November 2025 with groundwater levels ranging from a minimum of RL13.3 m to a maximum of RL19.2 m.

Five stage packer testing was undertaken progressively in all three boreholes to assess the permeability of the bedrock. Nine (9) individual packer tests were undertaken with permeability values ranging between 6.2×10^{-7} and 2.2×10^{-8}, with an average permeability of 3.4×10^{-7} (converted using a 1 lugeon = 1×10^{-7} empirical conversion factor).

Rising head testing was undertaken in each well with values ranging between 2.6 x 10^{-8} and 6.9 x 10^{-8}. The permeability values from the packer testing and rising head testing are consistent with published values from Pells et al. (2018) which indicates hydraulic conductivity values in the range of 1 x 10^{-8} m/s and 5 x 10^{-7} m/s for Class II to III Sandstone respectively.

The results of this previous investigation at No.275 have been used as part of this geotechnical investigation report. The borehole locations are shown on Figure 4 below and details are shown on the Drawing 2 Cross Section in Appendix B.

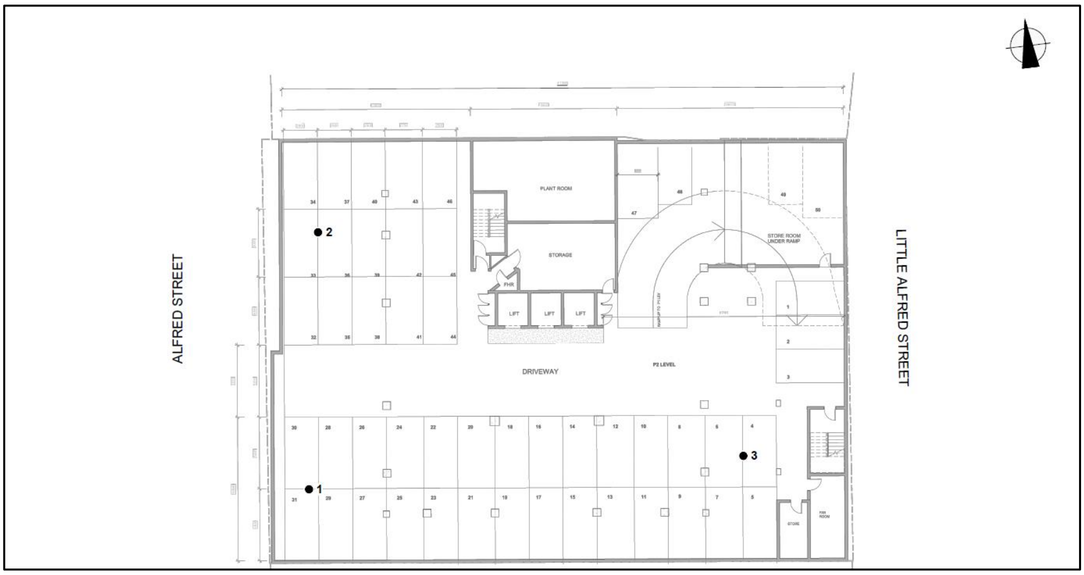

Figure 4: Test location drawing from previous No.275 investigation. No.271-273 located to the south of the image

4. Field work

4.1 Field work methods

Field work for the geotechnical investigation was carried out between 16 and 20 March 2026, and included the following scope of works:

- Concrete cutting at BH201 and BH202 using a concrete saw to allow for drilling in a low headroom setting within the No.273 basement;
- Drilling of two boreholes (BH201 and BH202) using a tracked mounted tight access drill rig. Both boreholes were drilled by NMLC sized diamond coring methods to 35.08 m (BH201) and 34.0 m (BH202) depth;
- Concrete coring at shallow boreholes (BH203 to BH208) using a diatube, followed by manual drilling using hand augering. The shallow boreholes were taken down to refusal at depths of between 0.16 m and 0.26 m;
- Undertake point load strength testing at regular intervals on collected rock core samples;
- Logging of encountered sub-surface conditions by an experienced geotechnical engineer from Douglas in accordance with AS1726:2017;

- Packer testing was conducted at two depth intervals within the boreholes to assess the permeability of the rock mass. Packer testing consists of inflating a rubber bladder to seal off a section of the borehole and pumping water through at set pressures whilst monitoring the volume of water that has been pumped, to assess the rock mass permeability of that section of rock;
- Installation of groundwater monitoring wells in boreholes BH201 and BH202 upon completion. The wells were developed by either removing at least three well volumes or by purging the wells dry following installation;
- In-situ hydraulic conductivity testing using either the falling head or rising head method within the installed wells; and,
- Install data loggers in the two wells to allow for long-term groundwater level monitoring.

The indoor setting of the field work impeded the use of GPS to survey the position of the drilled boreholes. The locations of the boreholes were measured in relation to existing basement walls. The surface level at the borehole locations was confirmed by the project surveyor by email dated 17 March 2026. Coordinates are in GDA2020/MGA Zone 56 format (Geocentric Datum of Australia 2020 base with Map Grid of Australia projection) and levels are relative to AHD.

The approximate locations of the boreholes are shown on the Test Location Plan (Drawing 1) in Appendix B.

4.2 Field work results

4.2.1 Lithology

Detailed descriptions of the subsurface conditions encountered are given in the borehole logs included in Appendix C, along with photographs of the rock core. Notes defining classification methods and descriptive terms used in the preparation of the borehole logs are included within Appendix A.

In summary, the boreholes encountered predominantly gravel fill (sub floor drainage layer) below the existing basement floor slabs, which was overlying sandstone bedrock. Refer to Section 6.1 for a detailed description of the interpreted geotechnical units.

4.2.2 Groundwater Monitoring and Permeability Testing

The results of groundwater level measurements taken during drilling are shown on the borehole logs in Appendix C.

Dataloggers were installed in each of the wells in March 2026 and were set up to record measurements of groundwater pressure at hourly intervals. Groundwater level monitoring is being undertaken at the time of reporting.

Table 2 summarises water level measurements taken for the groundwater wells at the site.

Table 2: Groundwater level measurements in wells

Borehole	Surface Level (m AHD)	Date Measured	Water Depth (m)	Water Level (m AHD)
BH201	38.5	23 March 2026	20.28	18.22
		27 March 2026	20.93	17.57
		2 April 2026	20.88	17.62
		8 April 2026	19.86	18.64
BH202	38.5	23 March 2026	20.45	18.05
		27 March 2026	21.05	17.45
		2 April 2026	21.43	17.07
		8 April 2026	21.39	17.11

Hydraulic conductivity tests were analysed using Hvorslev (1951) solution for slug testing interpretation. Results are presented in Table 3.

Table 3: Summary of interpreted hydraulic conductivity results

Borehole	Screen Depth (m bgl)	Test Type	Material Type over Screen	Hydraulic Conductivity, k (m/sec)
BH201	21 - 31	Rising Head	Fresh sandstone with bands of siltstone (10%)	3.5×10^{-8}
BH202	24 - 31	Falling Head	Fresh sandstone, with bands of siltstone (5%) including a shear zone at 25.5m depth	3.3×10^{-6}

The results of the packer tests have been summarised in Table 4 and the detailed results sheets are provided in Appendix D. At the completion of Test 3, the test was repeated by lowering the packer down several metres (refer to Test 4) to identify the zone of higher water loss, which was inferred to be the sheared zone at approximately 25.5 m depth.

Table 4: Summary of Packer Test Results

Test No.	Borehole	Test Depth Interval (m)	Houlsby Lugeon Value	Estimated Hydraulic Conductivity (m/s)
1	BH201	20.00 – 26.85	0.6	6×10^{-8}
2	BH201	27.00 – 35.08	0.1	1×10^{-8}
3	BH202	24.00 – 30.90	6.9	6.9×10^{-7}
4	BH202	27.00 – 30.90[1]	0.8	8×10^{-8}

Notes: 1. Test No. 4 undertaken to identify source of higher water loss from test No.3. Due to time constraints, only a single pressure stage was undertaken at 75% of the calculated effective overburden stress.

5. Proposed development

Refer to Section 1 for a full description of the proposed development. Relevant to this geotechnical report, the proposed development includes a 38 storey mixed use tower and a 9 level basement for car parking, with a proposed FFL of RL10.06m.

At this stage, anticipated columns loads have not been provided to Douglas, however based on the small footprint of the site and the height of the building, they are expected to be relatively high.

It is understood that the proposed basement extent will widen out into Little Alfred Street, to extend to the full extent of the site boundary. Due to the presence of several existing buried services within the road (that are technically within or adjacent to the site boundary), it is anticipated that these will need to be realigned to make space for bulk excavation. Reference to Before You Dig Australia (BYDA) plans indicates that this may be required for the existing 100 mm CICL water main pipe.

It is understood that the project team are considering constructing a suspended deck or slab at the road level, to allow for bulk excavation below Little Alfred Street and usage by vehicles in the long term. The design of this structure will require detailed geotechnical information for the shallow soils and rock below Little Alfred Street, which will need to be captured as part of additional geotechnical investigations during detailed design.

Although unclear of timing at this stage, it is anticipated that excavation and construction may overlap with the excavation of the adjacent development at No.275 Alfred Street. Specific geotechnical advice (e.g. stress relief) would need to consider which development is built first or if both basements are excavated simultaneously.

6. Comments

6.1 Geotechnical Model

One geotechnical cross-section (Section A-A'), showing the interpreted subsurface profile between selected boreholes, is presented as Drawing 2 in Appendix B. The section shows interpreted geotechnical units of the underlying rock together with the proposed 9 level basement floor level.

The geotechnical units assessed for the site (all being part of the Hawkesbury Sandstone formation) are:

- **Unit 1 – Fill**: variable depth and composition, mainly underlying the existing basement floor slabs and also below the footpath and road on Alfred and Little Alfred Street.
- **Unit 2 – Residual Soil**: not encountered as part of this geotechnical investigation from the basement level, but likely to include a thin veneer of stiff to very stiff sandy clay, grading to extremely weathered sandstone below street level.
- **Unit 3 – VL & L Sandstone**: not encountered as part of this geotechnical investigation, but a thin layer of highly to moderately weathered sandstone could be present at shallow depths (i.e. below Alfred and Little Alfred Street).

- **Unit 4 – L-M Sandstone**: slightly weathered to fresh sandstone (as encountered in BH202) with strength slightly below Unit 5, but otherwise generally considered to be competent rock.
- **Unit 5 – M Siltstone/Sandstone**: slightly weathered to fresh interbedded and interlaminated siltstone and sandstone bands, with bands of massive sandstone (within Unit 6).
- **Unit 6 – M & H Sandstone**: slightly weathered and fresh, medium and high strength.

Within the No.271 and No.273 basements, the boreholes were drilled through the reinforced concrete floor slab which ranged between 100 mm and 170 mm thick, and was generally overlying a layer of subfloor drainage gravel to depths of around 0.15 m to 0.3 m. In some locations (e.g. BH201) a thin layer of sand fill was encountered below this layer to a maximum depth of 0.5 m.

Sandstone bedrock was encountered below the fill in all boreholes, which was generally medium and high strength and slightly weathered to fresh (i.e. consistent with the sandstone bedrock behind the brick wall below Little Alfred Street). The exception to this were some shallow low to medium strength bands in otherwise fresh rock encountered in BH202.

Defects within the Unit 6 sandstone included bedding planes generally spaced between 0.5 m to 2 m and several vertical joints. An example of two vertical joints is shown in BH201 between 9.42 m and 11.03 m depth. It is likely these joints are part of the NNE-SSW trending joint sets (as shown in Warringah Freeway cutting in Figure 3). Both joints appear to terminate on a bedding plane on one side suggesting their persistence is limited, however these joints can persist over significant heights.

A zone of relatively higher water loss was encountered during packer test no.3 within BH202 from 24.00 m to 30.90 m. A repeat of this test by lowering the packer down to 27 m depth (test no.4) indicated the zone of water loss is somewhere between 24 m to 27 m. This was also seen in the falling head test within BH202 from 24 m to 31 m depth which indicated a permeability of 3.3 x 10^{6} m/s which is considered quite high for fresh sandstone. The cause of this water loss is thought to be from several bedding planes and parallel joints from 24.7 m to 25.65 m depth (Figure 5) which has been assessed as a shear zone. A zone of several bedding planes and joints was also seen in JK1 and JK2 at a similar depth, but is not visible within BH201 or JK3, suggesting that the shear zone does not extend across the entire site.

Figure 5: Zone of inferred high water loss (red)

Groundwater levels within BH201 and BH202 (Table 2) ranged between around 19.9 m and 21.4 m depth (or between RL18.6 and RL17.1 m) as part of manual dip measurements from 23 March and 8 April 2026. These levels are generally consistent with the previous measurements from JK1 to JK3. It is likely that the groundwater levels encountered within the wells at the site are part of an unconfined and unproductive Hawkesbury Sandstone aquifer (with low storativity), with water within the joints/fractures.

It is noted that groundwater levels will fluctuate with weather and climatic conditions and may temporarily rise following periods of prolonged rainfall. Previous experience suggests that groundwater levels may rise by at least 1 m to 2 m following prolonged, heavy rainfall. Groundwater levels may also be impacted by human activities such as dewatering, irrigation and from leaking water mains.

6.2 Earthworks

6.2.1 Dilapidation Survey

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 demolition and excavation works in order to document any existing defects so that claims for damage due to construction related activities can be accurately assessed.

6.2.1 Excavation Conditions

Excavation across the site is likely to encounter medium and high strength sandstone with some bands of medium strength siltstone/sandstone. Excavation below Little Alfred Street may encounter fill, and residual soil overlying sandstone.

Excavation of fill and residual soil may be undertaken using an excavator fitted with a toothed bucket. Excavation of medium and high strength rock will require excavators fitted with hydraulic rock hammers and/or rock saws.

Detailed excavation for footings and service trenches/pits should be achievable using rock hammers, hydraulic rotary rock saws, or milling heads. Rock saws may also be required around the boundaries to reduce the risk of vibration causing damage to neighbouring structures and also to reduce the risk of overbreak and loose rock.

When using a hydraulic hammer, excavation in the unbroken high strength rock (and in particular the massive sandstone beds) may exhibit very low productivity and may require the use of a more powerful unit and additional rock sawing. 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. The rock core can be inspected at the Douglas West Ryde office, and these will be held for up to 6 months (unless informed otherwise).

6.2.1 Vibration

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

Ground vibration can be strongly perceptible to humans at levels above 2.5 mm/s peak particle velocity (PPV). This is generally much lower than the vibration levels required to cause structural damage to most buildings. The Standard AS/ISO 2631.2 – 2014 "Mechanical vibration and shock – Evaluation of human exposure to whole-body vibration – Vibration in buildings (1 Hz to 80 Hz)" suggests an acceptable daytime limit of 8 mm/s PPV for human comfort. Based on Douglas' experience and with reference to AS/ISO 2631.2, it is suggested that a maximum PPV of 8 mm/s (measured at the first occupied level of neighbouring buildings) be adopted at this site for both architectural and human comfort considerations for 'modern building'.

As the magnitude of vibration transmission is site specific, it is recommended that a vibration trial be carried out at the commencement of rock excavation. These trials may indicate that different types of excavation equipment are required to reduce vibration to acceptable levels.

The vibration limits should be reviewed following review of dilapidation reports and input from a structural engineer and may also need to be adjusted to comply with requirements of other authorities such as Sydney Water.

6.3 **Excavation Support**

Excavations in fill, residual soil and weathered rock (Units 1, 2, and 3), will require both temporary and permanent lateral support during and after excavation. Based on the borehole information, the low to medium strength rock (Unit 4) may not require temporary or permanent lateral support, however this will need to be confirmed during construction, and may require rock bolts and shotcrete.

6.3.1 **Rock Faces**

Excavation should be carried out in a controlled manner, with inspections by a suitably experienced engineering geologist/geotechnical professional every 1.5 m drop in excavation to determine if adverse joints/wedges are present or if additional support is required. The requirement for regular geotechnical inspections every 1.5 m drop should be explicitly stated on the drawings and the earthworks contractor should be made fully aware of this requirement.

Unsupported vertical excavations are possible within Unit 4 to Unit 6, subject to detailed rock face inspection and localised stabilisation where required. Allowance should be made for some ground anchors, rock bolts and shotcrete support. In particular it is possible that the prominent NNE striking joints may intercept the east and west faces forming thin wedges of rock that may require rock bolt/anchor support.

6.3.1 **Shoring Walls**

As outlined in Section 2.1, sandstone rock is visible behind the existing basement wall, suggesting that the existing basement was not shored at the time of construction. It is possible that a retaining wall is present at a high level, either along the boundary with 263-269 Alfred Street or below Little Alfred Street, although this needs to be further investigated during detailed design. In either case, it is expected that the existing rigid basement floor slabs are providing permanent support.

Depending on the results of further investigation along the site boundaries, the excavation may need to be progressively internally braced as the existing basement is demolished if Units 1 to 3 are to be supported.

Shallow retaining/shoring walls will be necessary for the proposed excavation below Little Alfred Street, to retain the soils and weathered rock below the road, down to at least medium strength sandstone. It is likely that fill soil may be up to 1 m deep (or deeper) associated with the buried services, which are possibly trenched into the sandstone bedrock. Options for this retaining wall could include internally braced or anchored contiguous piles or possibly closely spaced soldier piles with shotcrete infill. Further geotechnical advice on this retaining wall can be provided at a later date, following further investigation.

6.3.2 Earth Pressures for Shoring Design

It is suggested that the preliminary design of cantilevered shoring systems (or shoring systems with one row of anchors) be based on a triangular earth pressure distribution using the earth pressure coefficients provided in Table 5. 'Active' earth pressure coefficient (K_a) values may be used where some wall movement is acceptable. 'At Rest' earth pressure coefficient (K_o) values should be used where the wall movement needs to be limited. A suitable factor of safety (e.g. 2.5 – 3) should be adopted when using the ultimate passive pressure values, to limit wall movements.

Table 5: Recommended Design Parameters for Shoring Systems

Unit	Unit Weight (kN/m3)	Earth Pressure Coefficient		Ultimate Passive Earth Pressure (kPa)[3]
		Active (K_a)	At Rest (K_o)	
Unit 1: Fill	20	0.4	0.6	-
Unit 2: Residual Soil	20	0.3	0.45	-
Unit 3: VL & L Sandstone	22	0.25	0.4	-
Unit 4: L-M Sandstone	22	0[1]	0[1]	4,000
Unit 5 and 6: M & H Rock	24	0	0	6,000

Notes: 1: To be confirmed during construction. May require localised rock bolts and shotcrete.
2. The values above assume a level surface behind the wall.
3. It is assumed that the rock mass is free of adverse dipping joints and seams.
4. It should also be noted that the K_a and the K_o designs will not prevent stress relief movement.

For braced walls or where two or more rows of anchors are used, the shoring can be designed using a rectangular or trapezoidal earth pressure distribution.

An alternative approach, where the support pressure is related to the height of soil/rock retained, could also be used. Where there are no movement-sensitive structures within the influence zone behind retaining walls, an earth pressure distribution equal to 4H kPa (where H, in metres, equals the depth of material to be retained) can be used. Where the wall movement is to be minimised (i.e., close to adjacent buildings or services) the lateral earth pressure can be calculated using 6H kPa. For movement-sensitive structures, where it is critical that deformation is controlled, it may be necessary to calculate the pressure using 8H kPa. These pressures can be applied as trapezoidal earth pressure distributions. Note these earth pressure distributions are "pressure envelopes", selected to ensure that no row of anchors is overloaded during the temporary support phase. The actual magnitude and distribution of lateral earth pressures for the building in its final (long term) condition may differ from the uniform distributions given above. The final condition earth pressures can be assessed using numerical methods.

The design of the shoring should allow for all surcharge loads, including footings for neighbouring buildings, inclined slopes behind the wall, traffic, site sheds, and construction related activities applied as a rectangular earth pressure distribution over the depth of influence. Detailed design of shoring should be carried out using WALLAP, PLAXIS, FLAC or other accepted computer analysis programs, which are capable of modelling progressive excavation and anchoring, and predicting potential lateral movements, stresses and bending moments.

It is possible that the influence zone of the proposed bulk excavation (if in Units 1 to 3) will intercept high level footings of the neighbouring buildings to the north and to the south of the site. It is recommended that footing investigations be carried out to confirm the type and location of the nearby footings and incorporate this information into the shoring design. This would also apply to the Alfred Street and Little Alfred Street to the west and east.

Although not likely to be required for this project, passive resistance for piles founded below the base of the bulk excavation (including allowance for trenches and/or footings) may be based on the ultimate passive restraint values provided in Table 5. A factor of safety must be applied to these ultimate values, while considering the displacement that is required to mobilise the passive resistance. Additional support will be required if allowable displacements are exceeded or if the rock is adversely affected by faults, bedding or jointing.

The first 0.5 m of rock socket should be ignored due to possible disturbance and over-excavation. The minimum socket depth should be equal to the greater of one pile diameter or 1.0 m below the lowest level of any nearby excavation (including any detailed excavations), but subject to analysis. This is also relevant where anchors are installed. Staged excavation and inspection by a suitably qualified geotechnical engineer will therefore be required to confirm that the rock in front of the piles is not adversely affected by discontinuities, especially where passive resistance is relied upon.

6.3.3 Ground Movement and Stress Relief

Horizontal movements due to stress relief of the rock will occur during the excavation works. Based on published literature and Douglas' experience, the lateral deflections associated with stress relief in rock may be in the order of around 0.05% to 0.15% of the excavation height or possibly as high as 0.20%, depending on the various factors such as rock strength, orientation of the face and degree of fracturing. The predicted deflections would generally be greatest at the centre of the excavated faces and would reduce with distance from the excavation face/boundary. For a 30 m high excavation, 15 mm to 45 mm of lateral movement due to stress relief could be expected for planning purposes. Detailed investigation using insitu stress measurements could be used to inform 3D numerical modelling to obtain a more accurate and site specific assessment.

Back from the crest of the excavation, movement can occur over a distance of up to three times the excavated rock depth with an initial reduction of approximately 1 to 1.5 mm per metre, reducing with distance from the face. This differential movement will give rise to strain in both the rock mass and the soil beyond the excavation. Most of the movement would be expected to occur progressively during the excavation.

It is likely that higher stress relief will occur if both the 271-273 and the 275 basements are excavated simultaneously. If the buildings are excavated separately, further assessment of stress relief will be necessary, and the use of void formers behind basement walls/slabs may be required to limit potential cracking of structures.

It is unlikely to be practicable to provide restraint (i.e., anchoring) for the relatively high in-situ horizontal stresses associated with stress relief movements. Stress relief movements have the potential to crack adjacent buildings close to the excavation and may also increase loads on any ground support anchors installed. The effects of this movement on the various buildings or infrastructure (i.e. buried services) should therefore be assessed by a structural engineer. Appropriate allowance should be made for the potential repair of these structures, should it be required.

Douglas can undertake numerical modelling of the predicted stress relief during detailed design and refine the preliminary stress relief movements. It is important that the analysis considers both the shape of the excavation (e.g. 3D analysis) and staging between the 271-273 and 275 basement excavations.

Precise survey monitoring of excavation faces and adjacent buildings and infrastructure should be carried out to assess vertical and horizontal movements during 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 movements increase rapidly or exceed the predicted movements, then the structural engineer and geotechnical engineer should be contacted for immediate review. Trigger levels should be established as part of a geotechnical monitoring plan.

6.3.4 Anchor Design

Ground anchors, rock bolts and dowels (support elements) can be used to laterally support existing walls, new shoring, underpinning works or unstable rock blocks and wedges. Anchors could also be used vertically as hold down anchors. Support elements used for lateral support should be bonded in the stronger rock, inclined as required, but preferably not steeper than 30° below the horizontal. Table 6 provides bond stresses for preliminary anchor design and estimating purposes.

Table 6: Preliminary Bond Stresses for Ground Anchor and Rock Bolt Design

Unit	Material Description	Allowable Bond Stress (1) (kPa)	Ultimate Bond Stress(2) (kPa)
4 - 6	Medium and High Strength Rock	500	1000

Notes: 1. Using FoS of 2, for temporary anchors Higher FoS up to 3 is recommended for permanent anchors
2. Higher values possible pending further geotechnical review and site-specific stress testing.

These values should be confirmed by pull-out tests prior to installation of support elements. Ultimately, it is the contractor's responsibility to ensure that the correct design values (specific to the support system and method of installation) are used and that the support element holes are carefully cleaned prior to grouting.

For vertical ‘hold-down’ anchors a cone pull-out failure assessment (in accordance with AS4678) should be undertaken. A 90° cone could be assumed for Units 4 to 6

After temporary support elements have been installed, it is recommended that they are tested to 125% of their nominal working load. Where stress relief or further unavoidable movement of the shoring is expected, it is recommended that the support elements are locked-off between 60% and 80% of their working loads to accommodate the additional movement and subsequent increase in stress in the support elements. Consideration should, however, be given to the immediate design requirements. The capacity of the anchor may have to be increased if a lower initial lock-off is not feasible. Checks should be carried out to confirm that the load in the support elements has been maintained and that losses due to creep effects or other causes have not occurred.

Shorter support elements (i.e., rock bolts, dowels and pins) may be required to support any unstable rock wedges, slivers or blocks progressively during excavation.

The use of permanent rock bolts and ground anchors (e.g. vertical anchors), if required, will need careful attention to corrosion protection. It should be noted that permission will be required from authorities and adjacent property owners prior to installing rock bolts/ground anchors below their land.

6.4 Groundwater and Dewatering

As outlined in Section 6.1, groundwater was encountered in the wells at between 19.9 m and 21.4 m depth (or between RL18.6 and RL17.1 m). These levels are generally consistent with the previous measurements from JK1 to JK3 from next door. It is likely that the groundwater levels encountered within the wells at the site are part of an unconfined and unproductive Hawkesbury Sandstone aquifer (with low storativity), with groundwater stored within the joints/fractures.

Further long-term monitoring should be conducted to assess the fluctuations in groundwater levels, and to determine a suitable design water level. Dataloggers have been left on site to continue monitoring fluctuations in groundwater levels.

The packer and falling/rising head testing indicated that the hydraulic conductivity of the fresh intact sandstone is low (consistent with published data), with the main groundwater pathway being along joints/fractures. One of these pathways was identified around 25 m depth in BH202 where several parallel joints (shear zone) resulted in higher permeability results in the testing. For this reason the bulk permeability of the excavation will depend on the quantity of ‘open’ and interconnected defects encountered, and it is therefore not possible to accurately estimate inflows prior to excavation. A standard approach is to provide an estimate based on assumed or presumptive values and to refine the estimate during construction. Methods to reduce groundwater ingress (e.g. grouting fractured zones) can be undertaken if inflows are significant. Considering the low storativity of the sandstone rock, groundwater inflows are anticipated to drastically reduce over time.

As is the case with most large excavations, grouting of open joints and partings may be undertaken if excessive water ingress is found to be an issue during excavation.

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. Initial seepage inflows could be moderate until the water that is within the rock joints/defects is drained.

On this basis, it is considered feasible to construct a drained basement for this site without any significant adverse impacts to surrounding groundwater systems. Similar deep basements within North Sydney have been designed and are operating as drained basements.

Drawdown of water levels outside the basement will reduce with distance from the excavation and should be entirely in rock. Therefore, it is expected that there would be no significant impact to adjacent groundwater systems or property due to the basement excavation and associated drawdown.

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

Previous experience in Sydney is that seepage will likely contain relatively high levels of soluble iron that will form a precipitate in the form of a gelatinous ‘sludge’ when exposed to oxygen. This ‘sludge’ has the potential to block-up subsoil (gravel) drains and ‘seize-up’ pumps. Therefore, detailing of subfloor drains, sumps and pumps should incorporate provision for regular maintenance such as flushing and ‘rodding’ of drains and/or “baffle” pits.

6.5 Foundations

Pad footings founded below bulk excavation level are considered appropriate to support the expected column loads. All structures should be uniformly founded on a consistent material being Unit 6 rock. Zones of Unit 5 have been indicated close to bulk excavation (see Drawing 2 in Appendix B) and this may require over excavation of pad footings in some cases to reach Unit 6, although this will depend on the final proposed FFL of the basement floor slab.

Foundations may be designed using the values given in Table 7. For bored piles, if required, shaft adhesion values for uplift (tension) may be taken as being equal to 70% of the shaft adhesion values for compression in Table 7.

Table 7: Suggested Footing Design Parameters

Unit	Material	Modulus, E (MPa)	End Bearing (kPa)		Shaft Adhesion(1) (kPa)	
			Allowable	Ultimate	Allowable	Ultimate
3	Sandstone (VL-L)	100	1,000	3,000	150	300
4 and 5	Sandstone (L-M) & STT/SST (M)	500	3,500	30,000	300	600
6	Sandstone (M and H)	1,500	6,000(2)	60,000	600	1,500

Notes: (1) Shaft adhesion values only apply to piled foundations socketed into the respective material.

(2) Spoon testing in at least 1/3 of footings required

Values listed in Table 7 are subject to confirmation during construction.

Strength: VL = Very Low L = Low M = Medium H = High

All footings should be inspected by a geotechnical engineer to confirm that foundation conditions are in accordance with the design requirements, including spoon testing to check for weak seams (where required).

Higher bearing capacities for footings are possible (e.g. 8,000 kPa allowable for Unit 6, or 6,000 kPa allowable for Unit 5) but will require additional review and will necessitate spoon testing/proof coring during construction as required. Footings designed on the basis of the allowable bearing pressures provided could expect settlements of up to 1% of the footing width.

Shallow footings founding near excavations (service trenches or similar) must have all loads transferred to below an influence line inclined upwards at 45 degrees commencing from the lowest and closest side of the excavation or trench base. Where they are founded on competent rock at high level with no adverse defects a maximum allowable bearing pressure of 1500 kPa is suggested.

6.6 Seismic Design and Site Classification

A Hazard Factor (*Z*) of 0.08 would be appropriate for the development site in accordance with Australian Standard AS 1170.4 – 2007 *Structural design actions – Part 4: Earthquake actions in Australia*. The site sub-soil class is generally considered to be Class B_e due to the relatively shallow depth to sandstone bedrock.

It is recommended that the structure is not designed to rely on any passive resistance from the excavated rock faces surrounding the site where there is the potential for the removal of this rock by future neighbouring developments (e.g. to the north and south).

6.7 Soil Aggressivity

Due to the scope of this geotechnical investigation (i.e. drilling from basement) soil samples were not available for testing. Given the potential transient chemical properties of groundwater, it is recommended to adopt at least a ‘mild’ exposure classification for design. Further investigation/review could be undertaken to justify a less conservative value.

6.8 Acid Sulfate Soil and Salinity

Based on the review of the published mapping on site, the risks associated with acid sulfate and saline soils are considered to be negligible and as such, acid sulfate and salinity management plans are not required.

6.9 Impacts on Nearby Structures

The construction activities associated with the proposed development have the potential to impact nearby structures. It is anticipated that the following additional work may be required:

- Footing investigation for adjacent buildings (to the north and south) to determine the type and depth of potential high-level footings;
- Additional cored boreholes from the Little Alfred Street for the design of the proposed suspended deck/slab and potential retaining wall for bulk earthworks;

- Additional cored boreholes across the site when access is available to inform excavations and footing design;
- Analysis and modelling of stress relief as a result of the proposed excavation. If this is a critical issue insitu stress testing could be carried out to refine the parameters;
- Review of nearby basement locations and depths (by others) to establish feasibility of ground anchors, or other ground support options; and,
- Specialist Engineering Assessment (SEA) for Sydney Water assets below the footpath/road on Alfred Street and Little Alfred Street (if requested);
- Possible impact assessment for the Warringah Freeway rock cuttings, to be determined by relevant authorities.

7. Mitigation Measures

Directly relevant to the SEARs requirements (Table 1), mitigation measures are not required.

8. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at 271-273 Alfred Street, North Sydney NSW in line with Douglas' proposal dated 27/02/2026. The work was carried out under Douglas' Engagement Terms. This report is provided for the exclusive use of Tara Shore Pty Ltd ATF John Taylor Family Trust 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 / environmental / groundwater) 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

Notes About This Report

About this Report

Introduction

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

Douglas' 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 Engagement Terms 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, Douglas 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, Douglas 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, Douglas will be pleased to assist with investigations or advice to resolve the matter.

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, Douglas 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. Douglas 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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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

Terminology
Symbols
Abbreviations

March 2024

Introduction

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".

Soil Descriptions

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.

Soil Descriptions

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
Fluvial	Deposited by channel fill and overbank (natural levee, crevasse splay or flood basin)	FLV
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 Descriptions

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).

Rock Descriptions

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:

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

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

Stratification Spacing

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

Rock Descriptions

Defect Descriptions

Defect Type

Term	Abbreviation Code
Bedding plane	B
Cleavage	CL
Crushed seam	CS
Crushed zone	CZ
Drilling break	DB
Decomposed seam	DS
Drill lift	DL
Extremely Weathered seam	EW
Fault	F
Fracture	FC
Fragmented	FG
Handling break	HB
Infilled seam	IS
Joint	JT
Lamination	LAM
Shear seam	SS
Shear zone	SZ
Vein	VN
Mechanical break	MB
Parting	P
Sheared Surface	S

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
Pyrite	Py
Secondary material	MS
Silt	M
Quartz	Qz
Unidentified material	MU

Rock Defect Shape/Planarity

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

Rock Defect Roughness

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

Defect Orientation

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

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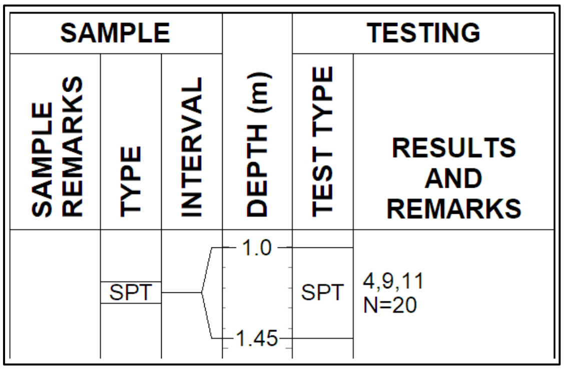
Sampling, Testing and Excavation Methodology

Terminology
Symbols
Abbreviations

October 2024

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
Acid Sulfate sample	ASS
Bulk sample	B
Core sample	C
Disturbed sample	D
Environmental sample	ES
Driven Tube sample	DT
Gas sample	G
Piston sample	P
Sample from SPT test	SPT
Undisturbed tube sample	U[1]
Water sample	W
Material Sample	MT
Core sample for unconfined compressive strength testing	UCS

[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)	DCP9/150
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
Direct Push	DP
Solid flight auger. Suffixes: /T = tungsten carbide tip, /V = v-shaped tip	AD[1]
Air Track	AT
Diatube	DT[1]
Hand auger	HA[1]
Hand tools (unspecified)	HAND
Existing exposure	X
Hollow flight auger	HSA[1]
HQ coring	HQ3
HMLC series coring	HMLC
NMLC series coring	NMLC
NQ coring	NQ3
PQ coring	PQ3
Predrilled	PD
Push tube	PT[1]
Ripping tyne/ripper	R
Rock roller	RR[1]
Rock breaker/hydraulic hammer	EH
Sonic drilling	SON[1]
Mud/blade bucket	MB[1]
Toothed bucket	TB[1]
Vibrocore	VC[1]
Vacuum excavation	VE
Wash bore (unspecified bit type)	WB[1]

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

Appendix B

Drawings

NOTE:

1. Drawing projection in GDA2020 / MGA zone 56, adapted from aerial imagery from Metromap dated Nov 2025

Douglas PARTNERS

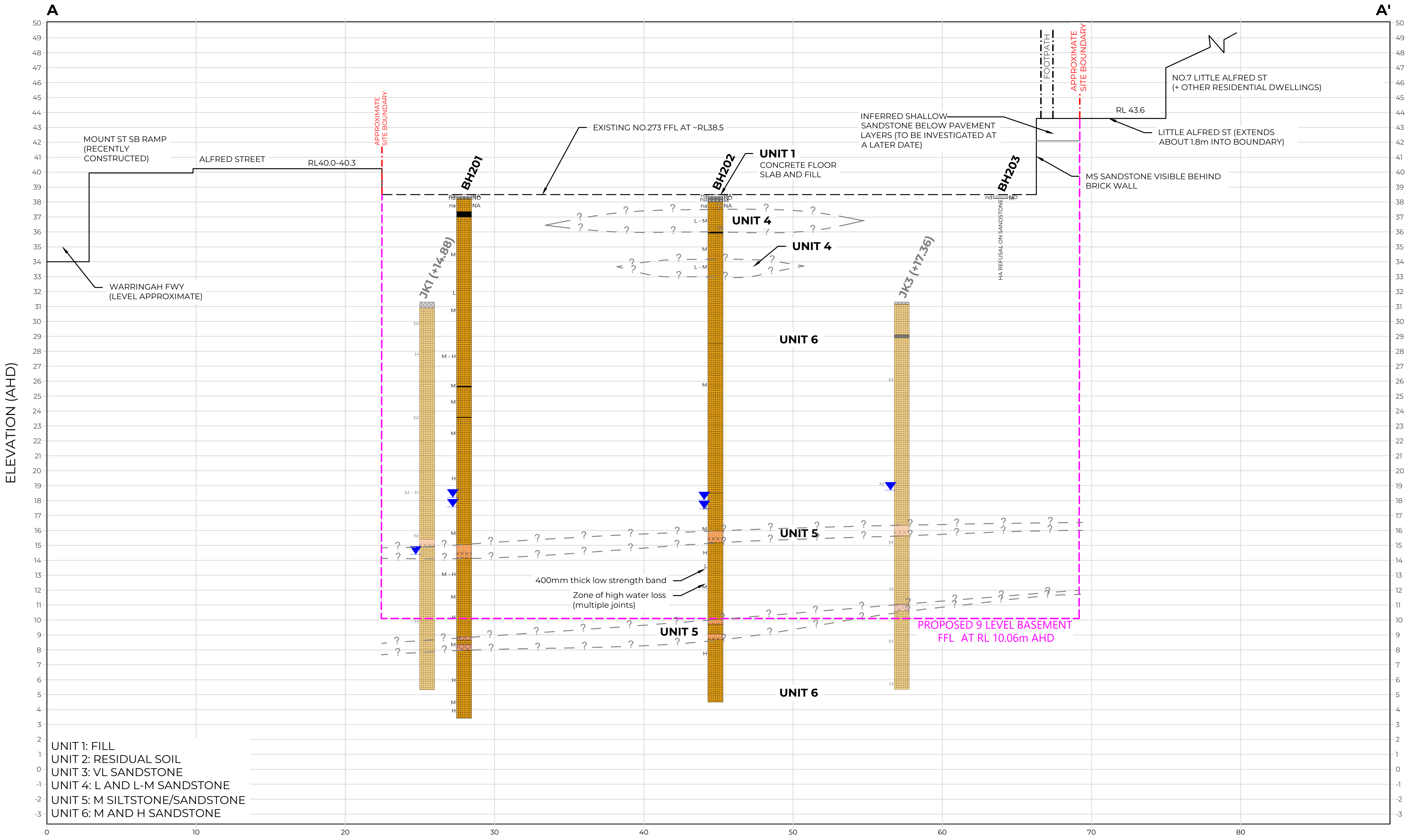
TITLE: **Test Location Plan**
Proposed Residential Development
271-273 Alfred Street, North Sydney, NSW

0 1 2 3 m

N

OFFICE: Sydney
DRAWN BY: JV
DATE: 10.April.2026

CLIENT: Tara Shore Pty Ltd ATF John Taylor Family Trust
PROJECT No: 239528.00
DRAWING No: 1
REVISION: 0
SCALE: 1:250 @A3



LEGEND

▨ CONCRETE	▨ SANDSTONE
■ NO CORE	▨ SILTSTONE
▨ FILL	▨ SILTSTONE & SANDSTONE

TESTS / OTHER

- ? - - Interpreted geotechnical boundary
▼ - Groundwater Level
(+14.00) - Horizontal offset distance from cross section line

ROCK STRENGTH

VL - Very Low
L - Low
M - Medium
H - High
VH - Very High
EH - Extremely High

COMPACTION (anthropogenically modified soil)

na - Not applicable
nd - No data
pc - Poorly compacted
mc - Moderately compacted
wc - Well compacted
vc - Variably compacted

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	Initial Issue	31.03.2026	MN

SCALE: 0 5
Horizontal Scale 1:250
Vertical Exaggeration = 1.0

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

CLIENT:
Tara Shore Pty Ltd ATF
John Taylor Family Trust

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.

PROJECT NAME:
Proposed Residential Development

PROJECT ADDRESS:
271-273 Alfred Street,
North Sydney, NSW

DRAWING TITLE:
Geological Cross Section A-A'

PROJECT No:
239528.00

DRAWING No:
2

REVISION:
0

\\dpsydnas02\Projects\239528.00 - NORTH SYDNEY, 271-273 Alfred Street\7.0 Drawings\7.2 Out\239528.00.D.002.Rev0_Cross Section A.dwg

Appendix C

Borehole Logs

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334503.7, N:6254142.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH201
PROJECT No: 239528.00
DATE: 16/03/26
SHEET: 1 of 5

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**
		0.15	CONCRETE.		NA	NA	NA				0.15			Flush cover	
		0.30	FILL / GRAVEL: dark grey; fine to medium, angular, igneous; (subfloor drainage).		FILL	ND	ND	*	D		0.30	PID	<1ppm		
	38	1.15	SANDSTONE: pale grey, medium to coarse grained; medium strength.			NA	NA		D		0.40 0.50	PID	<1ppm		
			Continued as rock log											Sand	

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 205
OPERATOR: Ground Test (JJ)
LOGGED: J. Sullivan
METHOD: Concrete Saw to 0.15m, HT to 0.3m, AD to 1.15m, HQ wireline to 35.08m
CASING: HWT to 1.1m
REMARKS: Replicate Sample *BD1-20260316 taken from 0.15-0.3m

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

Refer to explanatory notes for symbol and abbreviation definitions

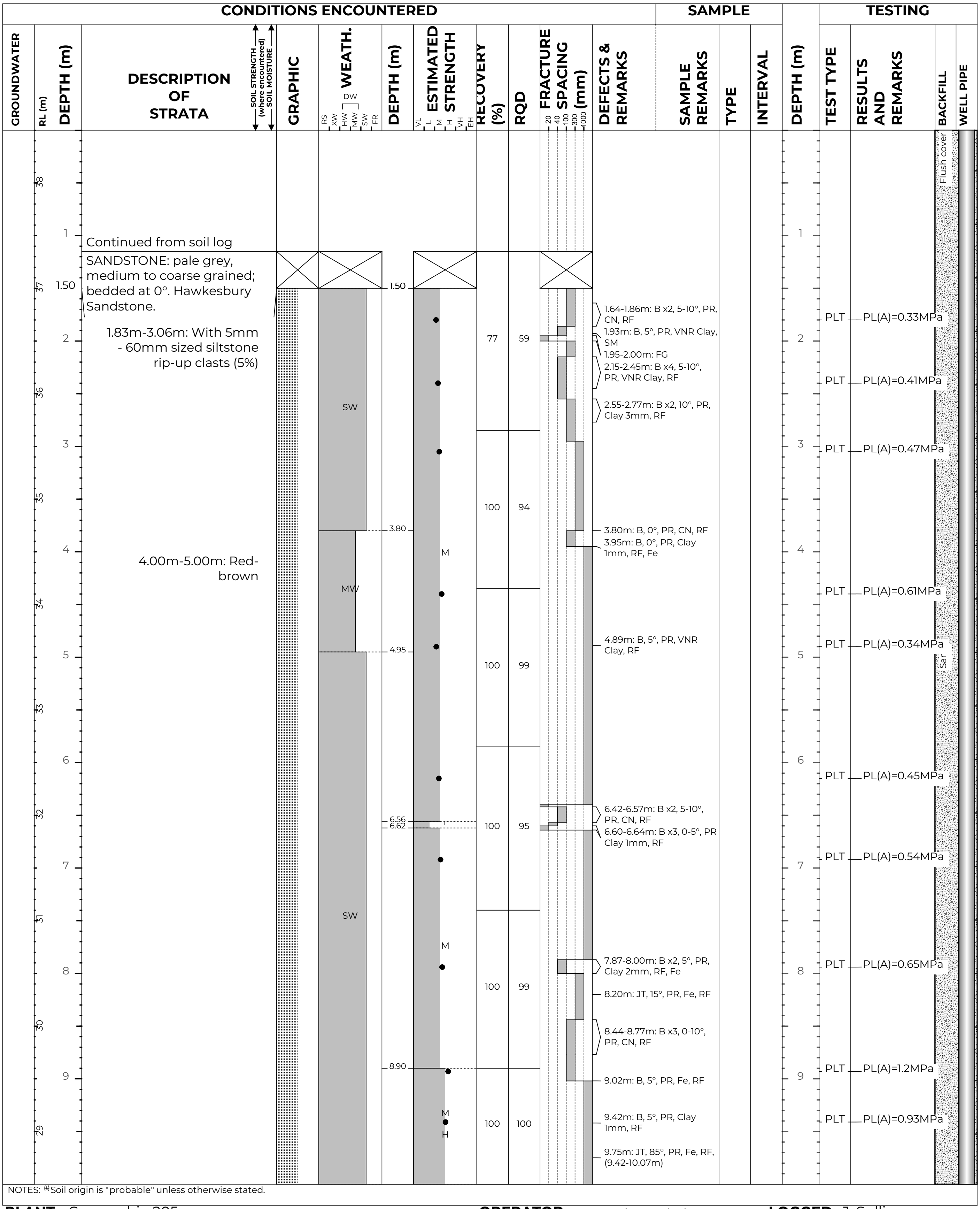
Douglas PARTNERS

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334503.7, N:6254142.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH201
PROJECT No: 239528.00
DATE: 16/03/26
SHEET: 2 of 5



Continued from soil log

SANDSTONE: pale grey, medium to coarse grained; bedded at 0°. Hawkesbury Sandstone.

1.83m-3.06m: With 5mm - 60mm sized siltstone rip-up clasts (5%)

4.00m-5.00m: Red-brown

1.64-1.86m: B x2, 5-10°, PR, CN, RF
1.93m: B, 5°, PR, VNR Clay, SM
1.95-2.00m: FG
2.15-2.45m: B x4, 5-10°, PR, VNR Clay, RF
2.55-2.77m: B x2, 10°, PR, Clay 3mm, RF
3.80m: B, 0°, PR, CN, RF
3.95m: B, 0°, PR, Clay 1mm, RF, Fe
4.89m: B, 5°, PR, VNR Clay, RF
6.42-6.57m: B x2, 5-10°, PR, CN, RF
6.60-6.64m: B x3, 0-5°, PR Clay 1mm, RF
7.87-8.00m: B x2, 5°, PR, Clay 2mm, RF, Fe
8.20m: JT, 15°, PR, Fe, RF
8.44-8.77m: B x3, 0-10°, PR, CN, RF
9.02m: B, 5°, PR, Fe, RF
9.42m: B, 5°, PR, Clay 1mm, RF
9.75m: JT, 85°, PR, Fe, RF, (9.42-10.07m)

TEST TYPE	RESULTS AND REMARKS
PLT	PL(A)=0.33MPa
PLT	PL(A)=0.41MPa
PLT	PL(A)=0.47MPa
PLT	PL(A)=0.61MPa
PLT	PL(A)=0.34MPa
PLT	PL(A)=0.45MPa
PLT	PL(A)=0.54MPa
PLT	PL(A)=0.65MPa
PLT	PL(A)=1.2MPa
PLT	PL(A)=0.93MPa

NOTES: ⁽ᵃ⁾Soil origin is "probable" unless otherwise stated.

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

PLANT: Comacchio 205
OPERATOR: Ground Test (JJ)
LOGGED: J. Sullivan
METHOD: Concrete Saw to 0.15m, HT to 0.3m, AD to 1.15m, HQ wireline to 35.08m
CASING: HWT to 1.1m
REMARKS: Replicate Sample *BD1-20260316 taken from 0.15-0.3m

Refer to explanatory notes for symbol and abbreviation definitions

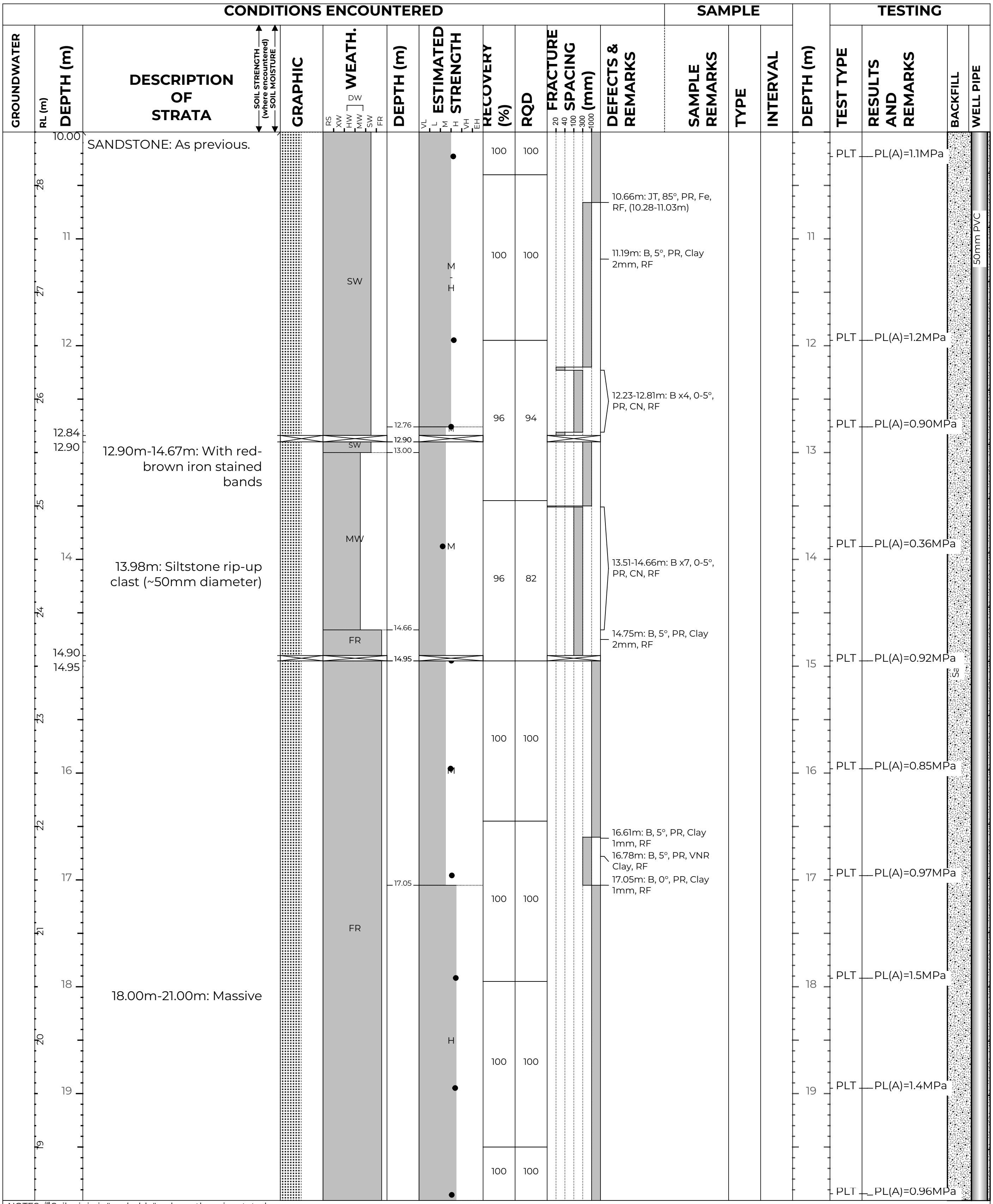
Douglas PARTNERS

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334503.7, N:6254142.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH201
PROJECT No: 239528.00
DATE: 16/03/26
SHEET: 3 of 5



DEPTH (m)	DESCRIPTION OF STRATA
10.00	SANDSTONE: As previous.
12.90	12.90m-14.67m: With red-brown iron stained bands
	13.98m: Siltstone rip-up clast (~50mm diameter)
	18.00m-21.00m: Massive

DEFECTS & REMARKS

10.66m: JT, 85°, PR, Fe, RF, (10.28-11.03m)
11.19m: B, 5°, PR, Clay 2mm, RF
12.23-12.81m: B x4, 0-5°, PR, CN, RF
13.51-14.66m: B x7, 0-5°, PR, CN, RF
14.75m: B, 5°, PR, Clay 2mm, RF
16.61m: B, 5°, PR, Clay 1mm, RF
16.78m: B, 5°, PR, VNR Clay, RF
17.05m: B, 0°, PR, Clay 1mm, RF

TESTING

TEST TYPE	RESULTS AND REMARKS
PLT	PL(A)=1.1MPa
PLT	PL(A)=1.2MPa
PLT	PL(A)=0.90MPa
PLT	PL(A)=0.36MPa
PLT	PL(A)=0.92MPa
PLT	PL(A)=0.85MPa
PLT	PL(A)=0.97MPa
PLT	PL(A)=1.5MPa
PLT	PL(A)=1.4MPa
PLT	PL(A)=0.96MPa

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

PLANT: Comacchio 205
OPERATOR: Ground Test (JJ)
LOGGED: J. Sullivan
METHOD: Concrete Saw to 0.15m, HT to 0.3m, AD to 1.15m, HQ wireline to 35.08m
CASING: HWT to 1.1m
REMARKS: Replicate Sample *BD1-20260316 taken from 0.15-0.3m

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

Refer to explanatory notes for symbol and abbreviation definitions

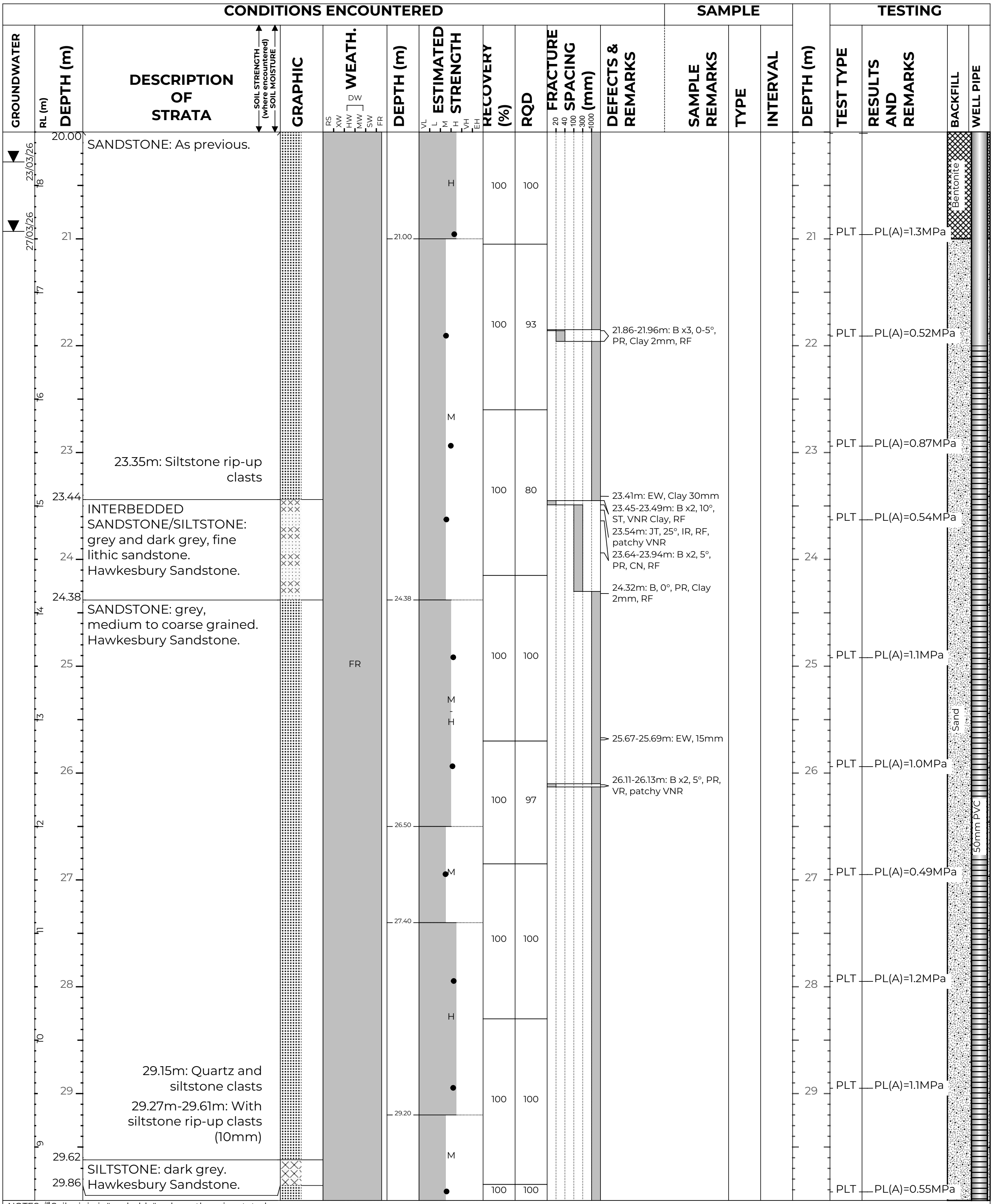
Douglas PARTNERS

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334503.7, N:6254142.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH201
PROJECT No: 239528.00
DATE: 16/03/26
SHEET: 4 of 5



DEPTH (m)	DESCRIPTION OF STRATA
20.00	SANDSTONE: As previous. 23.35m: Siltstone rip-up clasts
23.44	INTERBEDDED SANDSTONE/SILTSTONE: grey and dark grey, fine lithic sandstone. Hawkesbury Sandstone.
24.38	SANDSTONE: grey, medium to coarse grained. Hawkesbury Sandstone. 29.15m: Quartz and siltstone clasts 29.27m-29.61m: With siltstone rip-up clasts (10mm)
29.62	SILTSTONE: dark grey. Hawkesbury Sandstone.
29.86	

DEPTH (m)	ESTIMATED STRENGTH
	H
21.00	M
24.38	M-H
26.50	M
27.40	H
29.20	M

RECOVERY (%)	RQD
100	100
100	93
100	80
100	100
100	97
100	100
100	100
100	100

DEFECTS & REMARKS

21.86-21.96m: B x3, 0-5°, PR, Clay 2mm, RF
23.41m: EW, Clay 30mm
23.45-23.49m: B x2, 10°, ST, VNR Clay, RF
23.54m: JT, 25°, IR, RF, patchy VNR
23.64-23.94m: B x2, 5°, PR, CN, RF
24.32m: B, 0°, PR, Clay 2mm, RF
25.67-25.69m: EW, 15mm
26.11-26.13m: B x2, 5°, PR, VR, patchy VNR

TEST TYPE	RESULTS AND REMARKS
PLT	PL(A)=1.3MPa
PLT	PL(A)=0.52MPa
PLT	PL(A)=0.87MPa
PLT	PL(A)=0.54MPa
PLT	PL(A)=1.1MPa
PLT	PL(A)=1.0MPa
PLT	PL(A)=0.49MPa
PLT	PL(A)=1.2MPa
PLT	PL(A)=1.1MPa
PLT	PL(A)=0.55MPa

NOTES: ⁽ᵃ⁾Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 205
OPERATOR: Ground Test (JJ)
LOGGED: J. Sullivan
METHOD: Concrete Saw to 0.15m, HT to 0.3m, AD to 1.15m, HQ wireline to 35.08m
CASING: HWT to 1.1m
REMARKS: Replicate Sample *BD1-20260316 taken from 0.15-0.3m

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

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334503.7, N:6254142.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH201
PROJECT No: 239528.00
DATE: 16/03/26
SHEET: 5 of 5

CONDITIONS ENCOUNTERED											SAMPLE				TESTING			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	WEATH. (RS XW HW MW SW FR; DW)	DEPTH (m)	ESTIMATED STRENGTH (VL L M H VH EH)	RECOVERY (%)	RQD	FRACTURE SPACING (mm) (20 40 100 300 1000)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
		30.12	SANDSTONE: grey. Hawkesbury Sandstone.	FR		M	100	100									Sand	
	8	30.53	SILTSTONE: dark grey. Hawkesbury Sandstone.															
			SANDSTONE: grey, medium to coarse grained. Hawkesbury Sandstone.															
		31			31.10									31			Bentonite	
	7		30.53m-30.72m: With siltstone rip-up clasts (10%)				100	100										
		32												32	PLT	PL(A)=1.1MPa		
	6		31.67m: Siltstone rip-up clast			H												
		33												33	PLT	PL(A)=1.3MPa	Sand	
	5						100	100										
		34			33.95	M				34.07m: B, 5°, PR, Clay 1mm, RF				34	PLT	PL(A)=0.85MPa		
					34.08													
	4					H	100	100										
		35												35	PLT	PL(A)=1.1MPa		
	3		Borehole discontinued at 35.08m depth. Target Depth Reached.															
		36																
	2																	
		37																
	1																	
		38																
	0																	
		39																
	-1																	

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

PLANT: Comacchio 205
OPERATOR: Ground Test (JJ)
LOGGED: J. Sullivan
METHOD: Concrete Saw to 0.15m, HT to 0.3m, AD to 1.15m, HQ wireline to 35.08m
CASING: HWT to 1.1m
REMARKS: Replicate Sample *BD1-20260316 taken from 0.15-0.3m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas
PARTNERS

CORE PHOTO LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334503.7, N:6254142.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH201
PROJECT No: 239528.00
DATE: 16/03/26
SHEET: 1 of 5

1.15-5.00 m depth

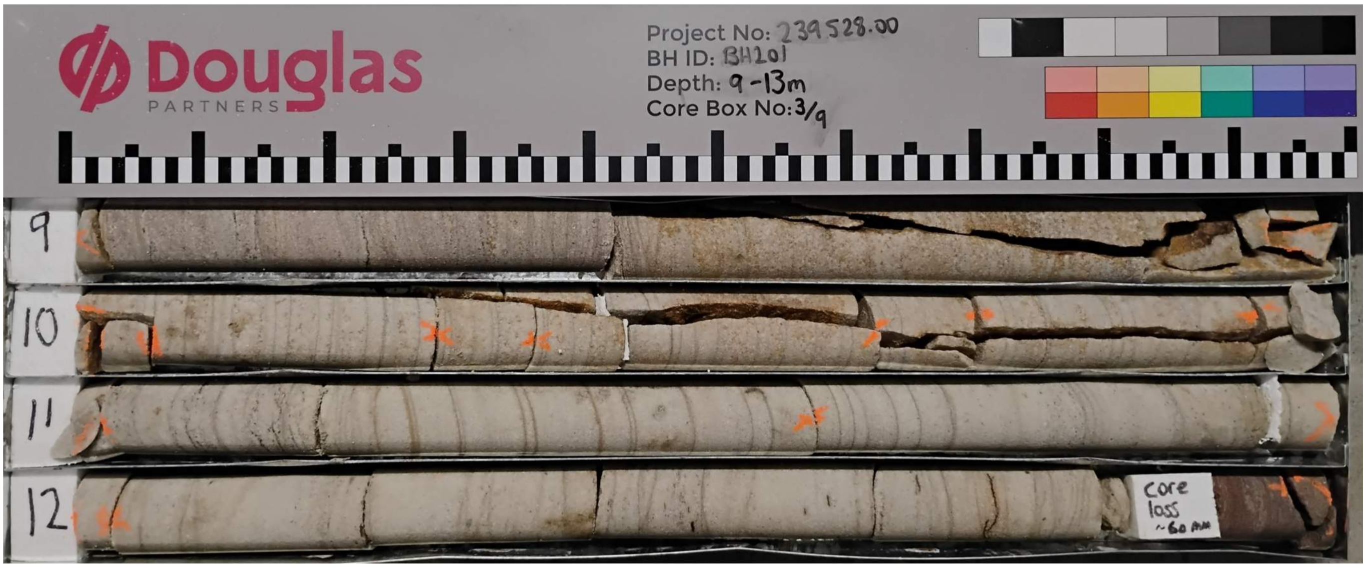
5.00-9.00 m depth

CORE PHOTO LOG

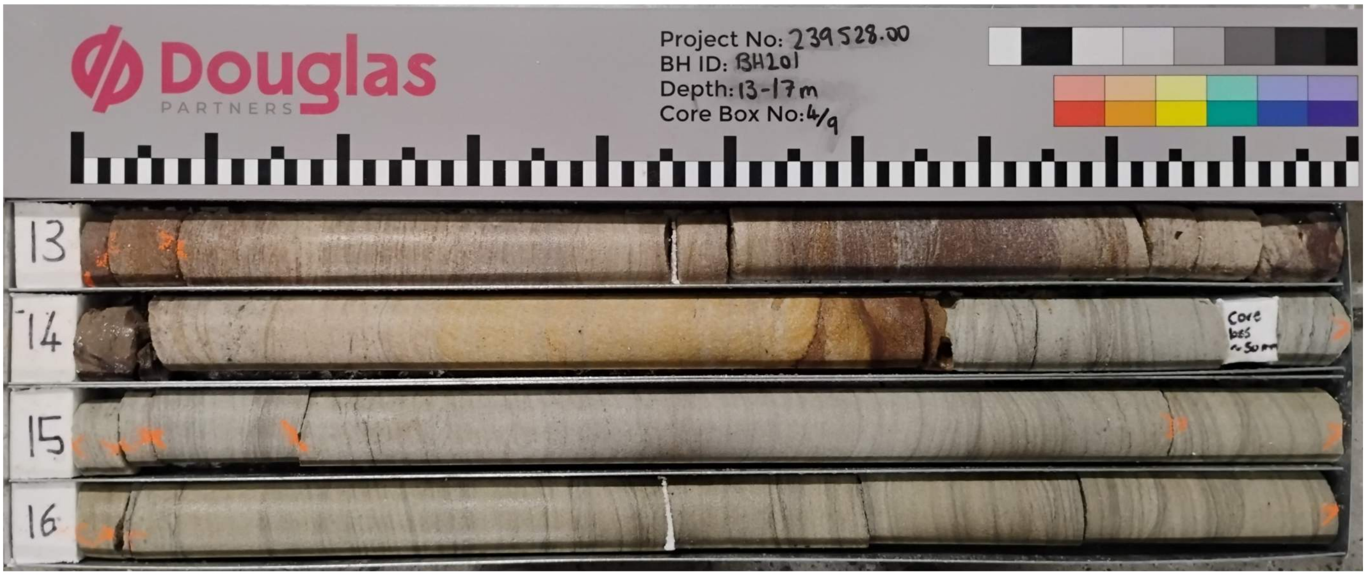
CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334503.7, N:6254142.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH201
PROJECT No: 239528.00
DATE: 16/03/26
SHEET: 2 of 5



9.00-13.00 m depth



13.00-17.00 m depth

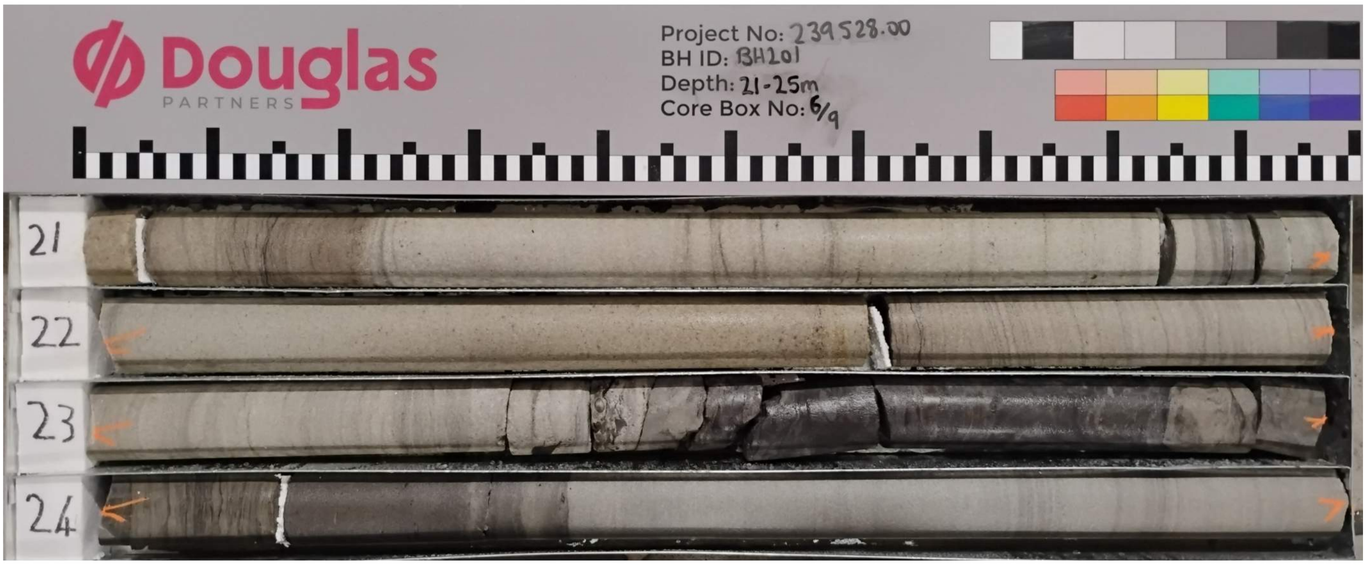
CORE PHOTO LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334503.7, N:6254142.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH201
PROJECT No: 239528.00
DATE: 16/03/26
SHEET: 3 of 5

17.00-21.00 m depth



21.00-25.00 m depth

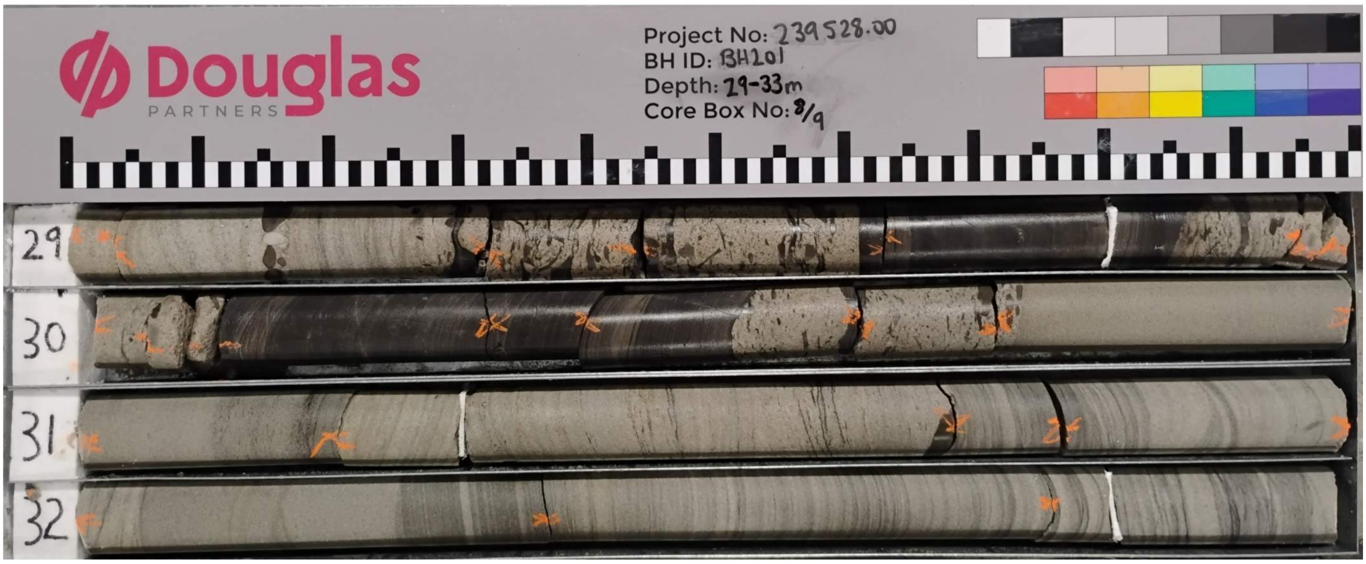
CORE PHOTO LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334503.7, N:6254142.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH201
PROJECT No: 239528.00
DATE: 16/03/26
SHEET: 4 of 5

25.00-29.00 m depth



29.00-33.00 m depth

CORE PHOTO LOG

CLIENT:	Tara Shore Pty Ltd ATF The John Taylor Family Trust	**SURFACE LEVEL:**	38.5 AHD	**LOCATION ID:**	BH201
PROJECT:	Proposed Residential Development	**COORDINATE:**	E:334503.7, N:6254142.8	**PROJECT No:**	239528.00
LOCATION:	271-273 Alfred Street, North Sydney, NSW	**DATUM/GRID:**	MGA2020 Zone 56	**DATE:**	16/03/26
		DIP/AZIMUTH:	90°/---°	**SHEET:**	5 of 5

33.00-35.08 m depth

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334520.7, N:6254143.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 1 of 5

CONDITIONS ENCOUNTERED

GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	ORIGIN(#)	CONSIS.(*) ▒ DENSITY.(*) ▨	MOISTURE
	0.14	CONCRETE.	NA	NA	NA
	0.30	FILL / GRAVEL: dark grey; medium, angular, igneous; (subfloor drainage).	FILL	ND	ND
	0.50	FILL / SAND trace gravel: pale brown to orange; medium; trace plastic fragments.	FILL		M
	1.00	SANDSTONE: pale grey, medium grained, medium strength. Hawkesbury Sandstone.		NA	NA
		Continued as rock log			

SAMPLE / TESTING AND REMARKS

REMARKS	TYPE	INTERVAL DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	D	0.15 - 0.20	PID	<1ppm	Flush cover	
	D	0.30 - 0.40	PID	<1ppm	Sand	

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 (JJ & SS)
LOGGED: P. Shrestha
METHOD: Diacore (150mm) to 0.14m, A/D to 1.0m, HQ wireline to 34m
CASING: HQ to 1m
REMARKS: 70% water loss from 25m
100% water loss from 29.8-34m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

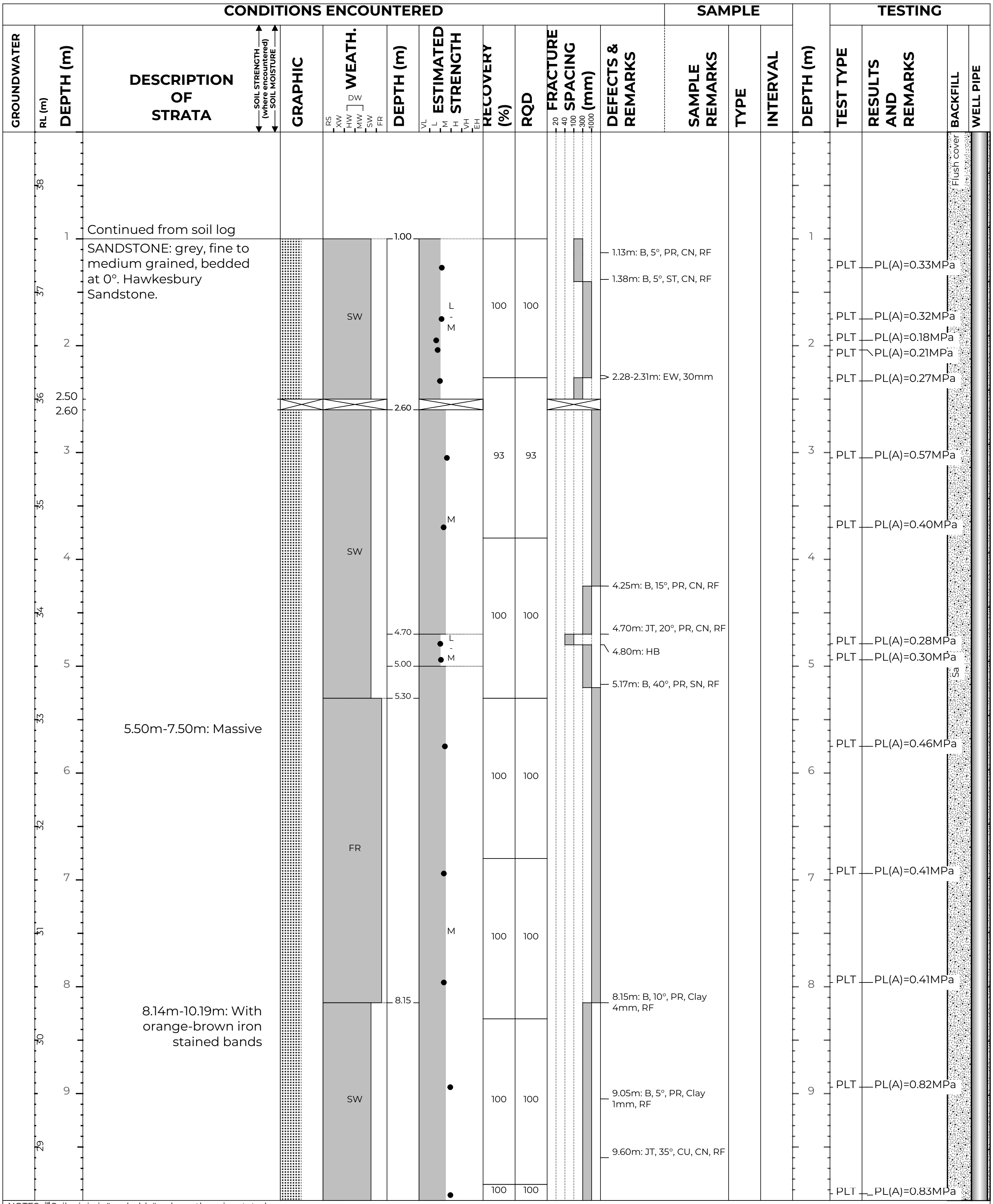
Generated with CORE-GS by Geroc - Split Soil-Rock Log

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334520.7, N:6254143.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 2 of 5



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

PLANT: Comacchio 305
OPERATOR: Ground Test (JJ & SS)
LOGGED: P. Shrestha
METHOD: Diacore (150mm) to 0.14m, A/D to 1.0m, HQ wireline to 34m
CASING: HQ to 1m
REMARKS: 70% water loss from 25m
100% water loss from 29.8-34m

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334520.7, N:6254143.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 3 of 5

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

DEPTH (m)	DESCRIPTION OF STRATA
10.00	[CONT] SANDSTONE: grey, fine to medium grained, bedded at 0°. Hawkesbury Sandstone.
	10.23m-11.30m: With 5mm - 50mm sized siltstone clasts (5-10%)
	From 13.00m: Red-brown and orange-brown
	From 17.32m: Grey
	17.82m-22.46m: Massive

DEPTH (m)	WEATH.
10.00	SW
11.35	FR
13.00	SW
17.35	FR

ESTIMATED STRENGTH: M

RECOVERY (%)	RQD
100	100
100	98
100	100
100	96
100	100
100	98
100	100

DEFECTS & REMARKS

- 10.23-10.26m: EW, 30mm
- 10.75m: B, 5°, PR, Clay 1mm
- 11.28m: JT, 35°, PR, OP
- 11.88m: EW, 2°, PR, 10mm
- 12.27m: B, 2°, PR, Clay 1mm
- 12.30m: B, 2°, PR, CN, RF
- 13.90m: B, 5°, PR, CN, RF
- 14.40m: B, 5°, PR, CN, RF
- 14.89-14.92m: EW, 30mm
- 16.33m: B, 5°, PR, CN, RF
- 17.59m: B, 10°, PR, Clay 1mm, RF
- 17.61m: B, 5°, PR, Clay 1mm, RF

TEST TYPE	RESULTS AND REMARKS
PLT	PL(A)=0.37MPa
PLT	PL(A)=0.67MPa
PLT	PL(A)=0.65MPa
PLT	PL(A)=0.76MPa
PLT	PL(A)=0.69MPa
PLT	PL(A)=0.58MPa
PLT	PL(A)=0.48MPa
PLT	PL(A)=1.0MPa
PLT	PL(A)=0.90MPa

BACKFILL: Sand
WELL PIPE: 50mm PVC

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

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

PLANT: Comacchio 305
OPERATOR: Ground Test (JJ & SS)
LOGGED: P. Shrestha
METHOD: Diacore (150mm) to 0.14m, A/D to 1.0m, HQ wireline to 34m
CASING: HQ to 1m
REMARKS: 70% water loss from 25m
100% water loss from 29.8-34m

Refer to explanatory notes for symbol and abbreviation definitions

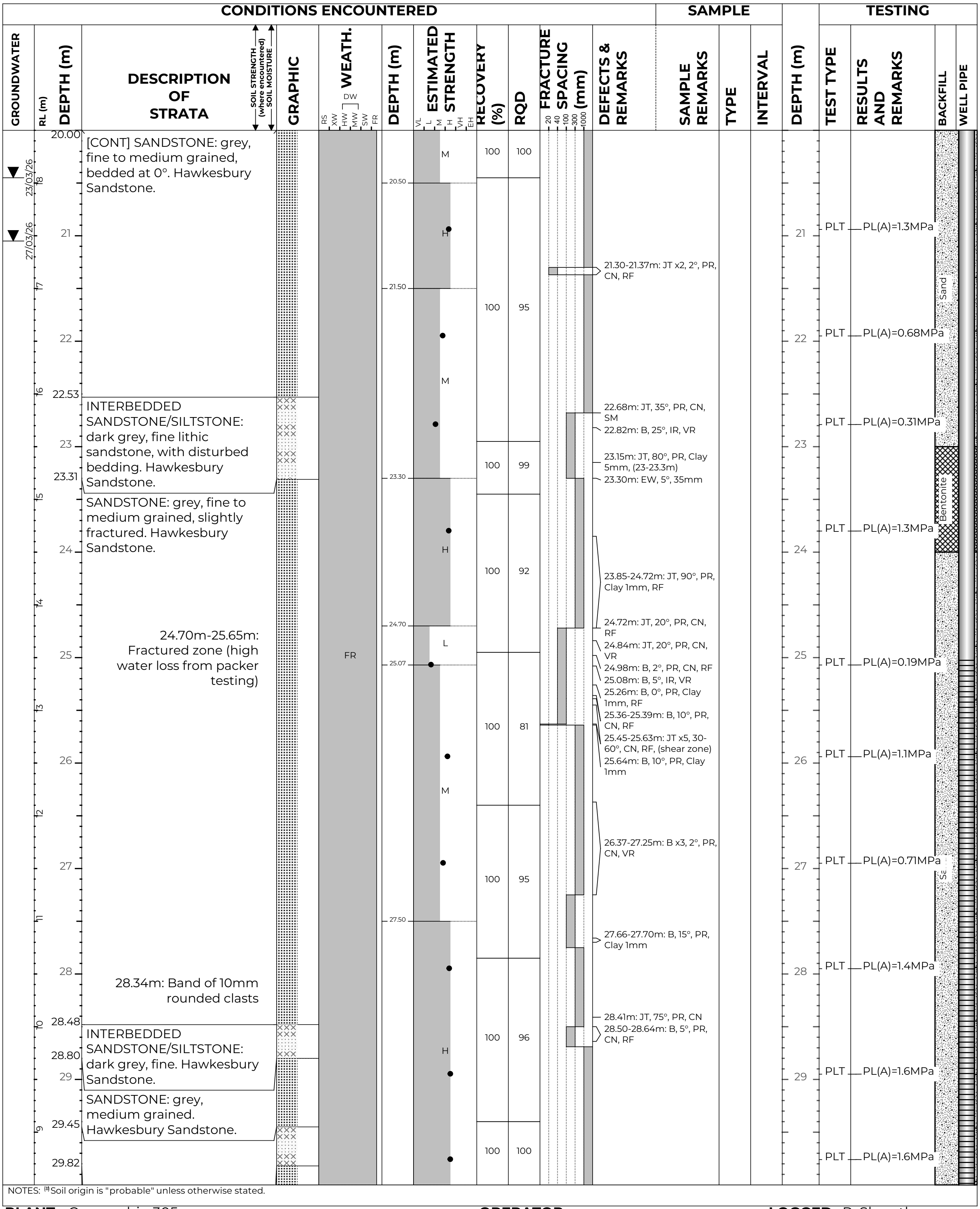
Douglas PARTNERS

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334520.7, N:6254143.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 4 of 5



Depth (m)	Description of strata
20.00	[CONT] SANDSTONE: grey, fine to medium grained, bedded at 0°. Hawkesbury Sandstone.
22.53	INTERBEDDED SANDSTONE/SILTSTONE: dark grey, fine lithic sandstone, with disturbed bedding. Hawkesbury Sandstone.
23.31	SANDSTONE: grey, fine to medium grained, slightly fractured. Hawkesbury Sandstone. 24.70m-25.65m: Fractured zone (high water loss from packer testing) 28.34m: Band of 10mm rounded clasts
28.48	INTERBEDDED SANDSTONE/SILTSTONE: dark grey, fine. Hawkesbury Sandstone.
28.80	SANDSTONE: grey, medium grained. Hawkesbury Sandstone.
29.45	
29.82	

Weath.	Depth (m)	Estimated strength
FR		M
	20.50	H
	21.50	M
	23.30	H
	24.70	L
	25.07	M
	27.50	H

Recovery (%)	RQD
100	100
100	95
100	99
100	92
100	81
100	95
100	96
100	100

Defects & Remarks:

21.30-21.37m: JT x2, 2°, PR, CN, RF
22.68m: JT, 35°, PR, CN, SM
22.82m: B, 25°, IR, VR
23.15m: JT, 80°, PR, Clay 5mm, (23-23.3m)
23.30m: EW, 5°, 35mm
23.85-24.72m: JT, 90°, PR, Clay 1mm, RF
24.72m: JT, 20°, PR, CN, RF
24.84m: JT, 20°, PR, CN, VR
24.98m: B, 2°, PR, CN, RF
25.08m: B, 5°, IR, VR
25.26m: B, 0°, PR, Clay 1mm, RF
25.36-25.39m: B, 10°, PR, CN, RF
25.45-25.63m: JT x5, 30-60°, CN, RF, (shear zone)
25.64m: B, 10°, PR, Clay 1mm
26.37-27.25m: B x3, 2°, PR, CN, VR
27.66-27.70m: B, 15°, PR, Clay 1mm
28.41m: JT, 75°, PR, CN
28.50-28.64m: B, 5°, PR, CN, RF

Test type	Results and remarks
PLT	PL(A)=1.3MPa
PLT	PL(A)=0.68MPa
PLT	PL(A)=0.31MPa
PLT	PL(A)=1.3MPa
PLT	PL(A)=0.19MPa
PLT	PL(A)=1.1MPa
PLT	PL(A)=0.71MPa
PLT	PL(A)=1.4MPa
PLT	PL(A)=1.6MPa
PLT	PL(A)=1.6MPa

NOTES: $^{(a)}$Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 305
OPERATOR: Ground Test (JJ & SS)
LOGGED: P. Shrestha
METHOD: Diacore (150mm) to 0.14m, A/D to 1.0m, HQ wireline to 34m
CASING: HQ to 1m
REMARKS: 70% water loss from 25m
100% water loss from 29.8-34m

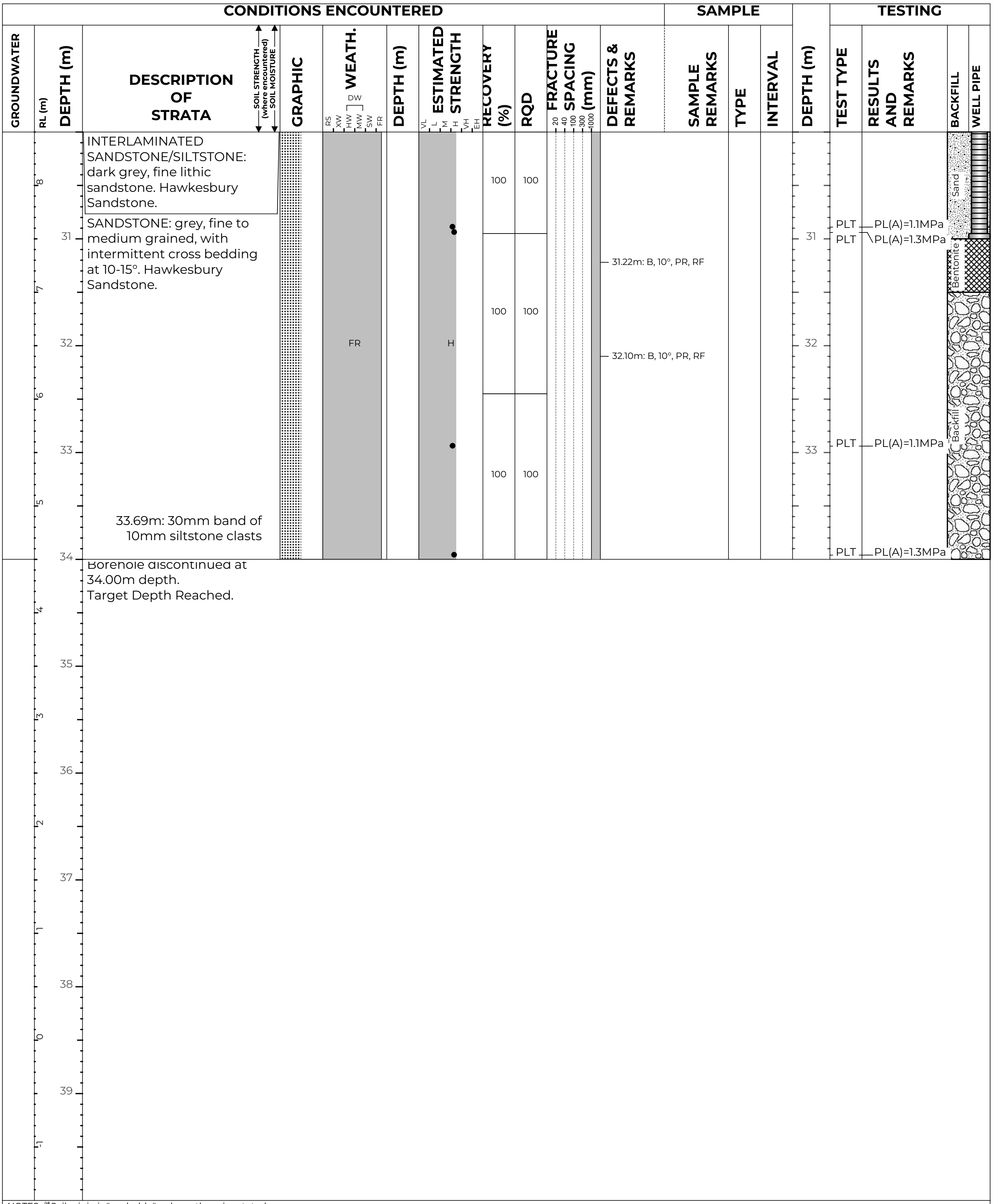
Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334520.7, N:6254143.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 5 of 5



INTERLAMINATED SANDSTONE/SILTSTONE: dark grey, fine lithic sandstone. Hawkesbury Sandstone.

SANDSTONE: grey, fine to medium grained, with intermittent cross bedding at 10-15°. Hawkesbury Sandstone.

33.69m: 30mm band of 10mm siltstone clasts

Borehole discontinued at 34.00m depth.
Target Depth Reached.

31.22m: B, 10°, PR, RF

32.10m: B, 10°, PR, RF

PLT PL(A)=1.1MPa
PLT PL(A)=1.3MPa
PLT PL(A)=1.1MPa
PLT PL(A)=1.3MPa

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 (JJ & SS)
LOGGED: P. Shrestha
METHOD: Diacore (150mm) to 0.14m, A/D to 1.0m, HQ wireline to 34m
CASING: HQ to 1m
REMARKS: 70% water loss from 25m
100% water loss from 29.8-34m

Refer to explanatory notes for symbol and abbreviation definitions

CORE PHOTO LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334520.7, N:6254143.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 1 of 5

1.00-4.00 m depth

4.00-8.00 m depth

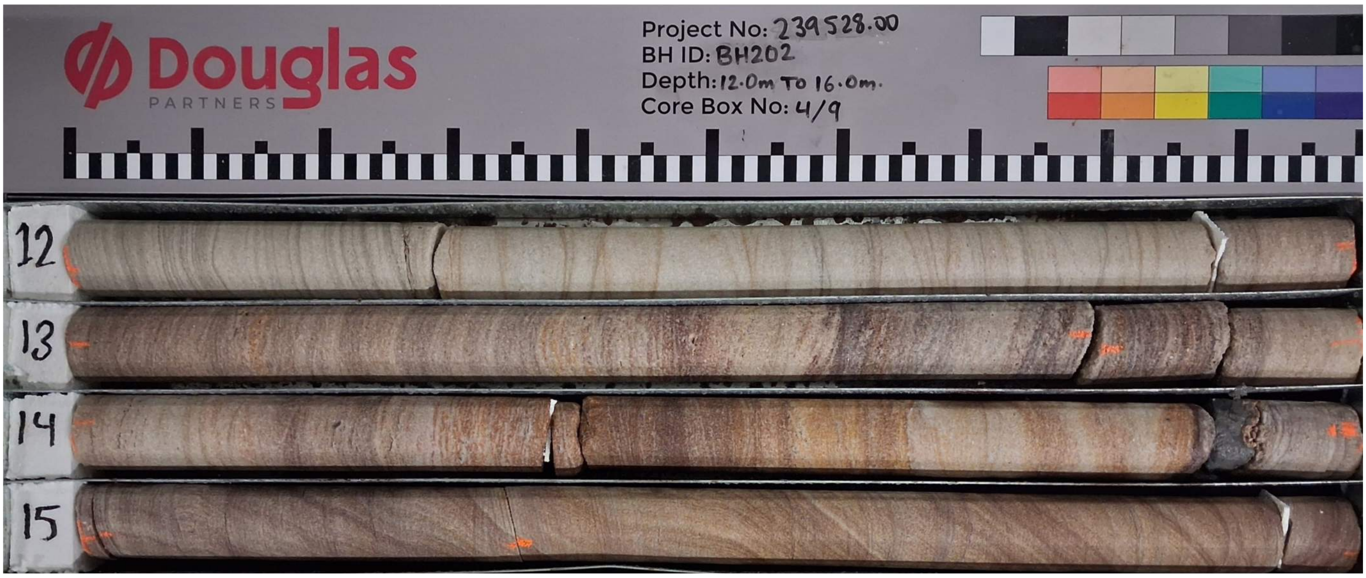
CORE PHOTO LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334520.7, N:6254143.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 2 of 5

8.00-12.00 m depth



12.00-16.00 m depth

CORE PHOTO LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334520.7, N:6254143.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 3 of 5

16.00-20.00 m depth

20.00-24.00 m depth

CORE PHOTO LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334520.7, N:6254143.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 4 of 5

24.00-28.00 m depth

28.00-32.00 m depth

CORE PHOTO LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334520.7, N:6254143.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 5 of 5

32.00-34.00 m depth

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.4 AHD
COORDINATE: E:334540.0, N:6254144.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH203
PROJECT No: 239528.01
DATE: 16/03/26
SHEET: 1 of 1

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
16/03/26 No free ground water observed whilst augering			CONCRETE; 130mm thick.		NA	ND	ND						
		0.13	FILL / Clayey SAND: pale brown; fine to medium; trace fine to coarse grained igneous and sandstone gravel.		FILL		M		ES		0.13 0.16		
			Borehole discontinued at 0.16m depth. Refusal on inferred sandstone bedrock.										
	38.0												
		0.5											
	37.5												

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: Hand Tools
METHOD: DT to 0.13m, HA to 0.16m
REMARKS: Surface level inferred from information provided by Geosurv (email 17 March 2026).
Coordinates estimated from measurements of distance to site features.

OPERATOR:

LOGGED: S. Ferguson
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.4 AHD
COORDINATE: E:334537.8, N:6254129.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH204
PROJECT No: 239528.01
DATE: 16/03/26
SHEET: 1 of 1

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
16/03/26 No free ground water observed whilst augering			CONCRETE; 170mm thick.	▨	NA	ND	ND						
		0.17	FILL / GRAVEL: dark grey to pale brown; fine to medium, angular to sub-angular, igneous; with fine to medium sand.	▦	FILL		M		ES		0.17 0.20		
			Borehole discontinued at 0.20m depth. Refusal on inferred sandstone bedrock.										
	38.0												
		0.5											
	37.5												

Generated with CORE-GS by Geroc - Soil Log

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: Hand Tools
METHOD: DT to 0.17m, HA to 0.2m
REMARKS: Surface level inferred from information provided by Geosurv (email 17 March 2026).
Coordinates estimated from measurements of distance to site features.

OPERATOR:

LOGGED: S. Ferguson
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.4 AHD
COORDINATE: E:334531.8, N:6254135.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH205
PROJECT No: 239528.01
DATE: 16/03/26
SHEET: 1 of 1

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
16/03/26 No free ground water observed whilst augering			CONCRETE; 140mm thick.		NA	ND	ND						
		0.14	FILL / GRAVEL: dark grey; fine to medium, angular to sub-angular, igneous.		FILL		M		ES		0.14 0.25		
			Borehole discontinued at 0.25m depth. Refusal on inferred sandstone bedrock.										
	38.0												
		0.5											
	37.5												

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: Hand Tools
METHOD: DT to 0.14m, HA to 0.25m
OPERATOR:
LOGGED: S. Ferguson
CASING: Uncased

REMARKS: Surface level inferred from information provided by Geosurv (email 17 March 2026).
Coordinates estimated from measurements of distance to site features.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334514.1, N:6254148.1
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH206
PROJECT No: 239528.01
DATE: 16/03/26
SHEET: 1 of 1

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
16/03/26 No free ground water observed whilst augering			CONCRETE; 160mm thick.		NA	ND	ND						
		0.16	FILL / GRAVEL: dark grey; fine to medium, angular to sub-angular, igneous; trace steel rods.		FILL		M		ES		0.16 0.19		
			Borehole discontinued at 0.19m depth. Refusal on inferred sandstone bedrock.										
	38.0	0.5											

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: Hand Tools
METHOD: DT to 0.16m, HA to 0.19m
REMARKS: Surface level inferred from information provided by Geosurv (email 17 March 2026).
Coordinates estimated from measurements of distance to site features.

OPERATOR:

LOGGED: S. Ferguson
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.5 AHD
COORDINATE: E:334512.2, N:6254130.6
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH207
PROJECT No: 239528.01
DATE: 16/03/26
SHEET: 1 of 1

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
16/03/26 No free ground water observed whilst augering			CONCRETE; 130mm thick.		NA	ND	ND						
		0.13	FILL / Gravelly SAND: dark brown; fine to coarse; fine to coarse, angular to sub-angular, igneous and sandstone gravel.		FILL		M		ES		0.13		
			Borehole discontinued at 0.26m depth. Refusal on inferred sandstone bedrock.								0.26		
	38.0	0.5											

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: Hand Tools
METHOD: DT to 0.13m, HA to 0.26m
REMARKS: Surface level inferred from information provided by Geosurv (email 17 March 2026).
Coordinates estimated from measurements of distance to site features.

OPERATOR:

LOGGED: S. Ferguson
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Tara Shore Pty Ltd ATF The John Taylor Family Trust
PROJECT: Proposed Residential Development
LOCATION: 271-273 Alfred Street, North Sydney, NSW

SURFACE LEVEL: 38.4 AHD
COORDINATE: E:334501.7, N:6254131.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH208
PROJECT No: 239528.01
DATE: 16/03/26
SHEET: 1 of 1

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
16/03/26 No free ground water observed whilst augering			CONCRETE; 100mm thick.		NA	ND	ND						
		0.10	FILL / Gravelly SAND: dark brown; fine to coarse; fine to coarse, angular to sub-angular, igneous and sandstone gravel.		FILL		M		ES		0.10 0.23		
			Borehole discontinued at 0.23m depth. Refusal on inferred sandstone bedrock.										
	38.0												
		0.5											
	37.5												

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: Hand Tools
METHOD: DT to 0.1m, HA to 0.23m
OPERATOR:
LOGGED: S. Ferguson
CASING: Uncased

REMARKS: Surface level inferred from information provided by Geosurv (email 17 March 2026).
Coordinates estimated from measurements of distance to site features.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Appendix D

Permeability Results

WATER PRESSURE TEST RESULTS

Client :	Tara Shore Pty Ltd ATF the John Taylor Family Trust	**Project No. :**	230928.00
Project :	Proposed Residential Development	**Bore :**	BH201
Location :	271-273 Alfred Street, North Sydney	**Test section :**	20 m - 26.85 m

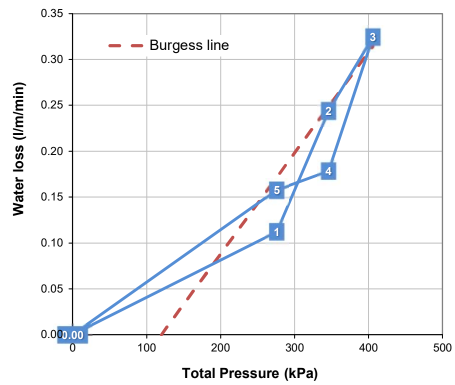
Test Details

Date:	17.03.2026	Bottom of packer (m	20.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):	
Bore diameter (mm):	96	Bore depth (m):	26.85	Vertical Depth to groundwater (m):	20.0		0.264
Bore inclination (deg):	90	Section length (m):	6.85	(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**
Hg	**Hl**	**Total**	**Duration**	**Flowmeter**			**Drum readings**			**Leakage**	**Assigned**	**Loss**		**Permeability**
				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	276	5	1823.1	1829.3	6.2	520.0	495.0	6.6	3.4	2.8	0.1	0.3	3.0E-08
70	0	276	5	1829.3	1836.1	6.8	495.0	460.0	9.2	2.5	4.3	0.1	0.5	4.5E-08
70	0	276	5	1836.1	1842.9	6.8	460.0	420.0	10.6	2.5	4.3	0.1	0.5	4.5E-08
70	0	276	5	1842.9	1849.4	6.5	420.0	385.0	9.2	2.5	4.0	0.1	0.4	4.2E-08
140	0	346	5	1862.6	1873.3	10.7	740.0	705.0	9.2	3.4	7.3	0.2	0.6	6.2E-08
140	0	346	5	1873.3	1884.4	11.1	705.0	660.0	11.9	3.4	7.7	0.2	0.7	6.5E-08
140	0	346	5	1884.4	1895.5	11.1	660.0	605.0	14.5	2.5	8.6	0.3	0.7	7.2E-08
140	0	346	5	1895.5	1907.8	12.3	605.0	565.0	10.6	2.5	9.8	0.3	0.8	8.3E-08
200	0	406	5	1914.8	1928.4	13.6	820.0	770.0	13.2	2.5	11.1	0.3	0.8	8.0E-08
200	0	406	5	1928.4	1942.1	13.7	770.0	715.0	14.5	2.5	11.2	0.3	0.8	8.0E-08
200	0	406	5	1942.1	1955.7	13.6	715.0	655.0	15.9	2.5	11.1	0.3	0.8	8.0E-08
140	0	346	5	1968.5	1980.1	11.6	775.0	725.0	13.2	5.0	6.6	0.2	0.6	5.5E-08
140	0	346	5	1980.1	1991.1	11.0	725.0	670.0	14.5	5.0	6.0	0.2	0.5	5.0E-08
140	0	346	5	1991.1	2001.5	10.4	670.0	630.0	10.6	5.0	5.4	0.2	0.5	4.5E-08
140	0	346	5	2001.5	2012.3	10.8	630.0	585.0	11.9	4.2	6.6	0.2	0.6	5.6E-08
70	0	276	5	2028.7	2037.0	8.3	750.0	715.0	9.2	2.9	5.4	0.2	0.6	5.7E-08
70	0	276	5	2037.0	2044.3	7.3	715.0	680.0	9.2	2.5	4.8	0.1	0.5	5.1E-08
70	0	276	5	2044.3	2052.9	8.6	680.0	645.0	9.2	2.5	6.1	0.2	0.6	6.4E-08

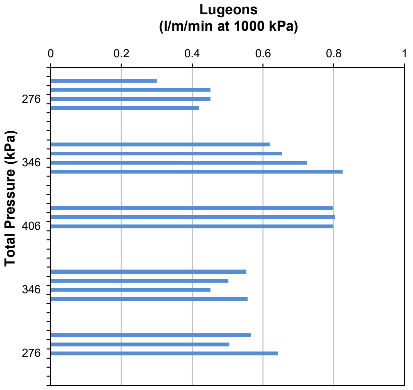
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons l/m/min at 1000kPa)
1	276	0.11	0.41
2	346	0.24	0.71
3	406	0.32	0.80
4	346	0.18	0.52
5	276	0.16	0.57

Houlsby Flow Patter	Laminar Flow
Houlsby Lugeon valu	0.6
Burgess Lugeon valu	1

Calculatec JDS/JV
Checked: JV
Date: 24-Mar-26



Douglas Partners | GROUNDED EXPERTISE

WATER PRESSURE TEST RESULTS

Client : Tara Shore Pty Ltd ATF the John Taylor Family Trust **Project No. :** 230928.00
Project : Proposed Residential Development **Bore :** BH201
Location : 271-273 Alfred Street, North Sydney **Test section :** 27 m - 35.08 m

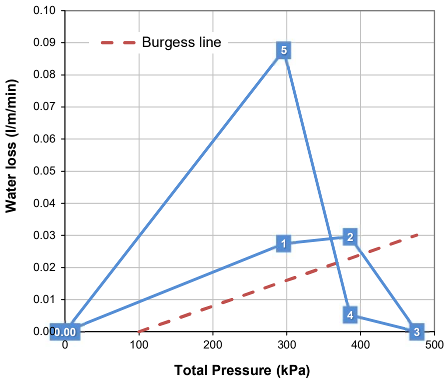
Test Details

Date:	17.03.2026	Bottom of packer (m	27.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	96	Bore depth (m):	35.08	Vertical Depth to groundwater (m):	20.0	0.264
Bore inclination (deg):	90	Section length (m):	8.08	(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**
Hg	**Hl**	**Total**	**Duration**	**Flowmeter**			**Drum readings**			**Leakage**	**Assigned**	**Loss**		**Permeability**
				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)
90	0	296	5	2080.9	2080.9	0.0	640.0	625.0	4.0	3.4	0.6	0.0	0.1	5.0E-09
90	0	296	5	2080.9	2081.0	0.1	625.0	610.0	4.0	2.5	1.4	0.0	0.1	1.2E-08
90	0	296	5	2081.0	2081.1	0.1	610.0	600.0	2.6	2.1	0.5	0.0	0.0	4.5E-09
90	0	296	5	2081.1	2081.2	0.1	600.0	585.0	4.0	2.1	1.9	0.0	0.2	1.6E-08
180	0	386	5	2083.3	2087.2	3.9	530.0	500.0	7.9	2.5	1.4	0.0	0.1	8.8E-09
180	0	386	5	2087.2	2091.5	4.3	500.0	490.0	2.6	2.5	1.8	0.0	0.1	1.1E-08
180	0	386	5	2091.5	2095.3	3.8	490.0	480.0	2.6	3.4	0.4	0.0	0.0	2.8E-09
270	0	476	5	2102.1	2109.7	7.6	730.0	690.0	10.6	12.2	0.0	0.0	0.0	0.0E+00
270	0	476	5	2109.7	2116.6	6.9	690.0	665.0	6.6	10.5	0.0	0.0	0.0	0.0E+00
270	0	476	5	2116.6	2122.9	6.3	665.0	640.0	6.6	7.6	0.0	0.0	0.0	0.0E+00
180	0	386	5	2128.6	2132.7	4.1	770.0	740.0	7.9	8.4	0.0	0.0	0.0	0.0E+00
180	0	386	5	2132.7	2136.7	4.0	740.0	730.0	2.6	7.1	0.0	0.0	0.0	0.0E+00
180	0	386	5	2136.7	2142.5	5.8	730.0	710.0	5.3	5.0	0.8	0.0	0.0	4.8E-09
180	0	386	5	2142.5	2144.7	2.2	710.0	685.0	6.6	2.1	0.1	0.0	0.0	6.3E-10
90	0	296	5	2146.0	2146.1	0.1	760.0	740.0	5.3	0.4	4.9	0.1	0.4	4.1E-08
90	0	296	5	2146.1	2146.2	0.1	740.0	730.0	2.6	0.4	2.2	0.1	0.2	1.9E-08
90	0	296	5	2146.2	2146.3	0.1	730.0	710.0	5.3	0.0	5.3	0.1	0.4	4.4E-08
90	0	296	5	2146.3	2146.4	0.1	710.0	700.0	2.6	0.8	1.8	0.0	0.2	1.5E-08

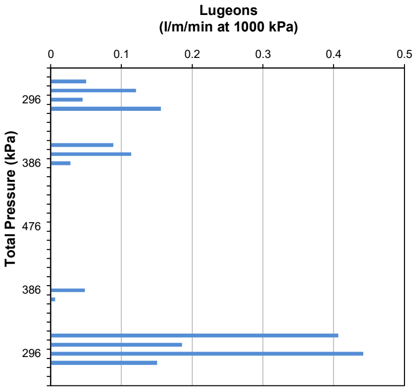
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons l/m/min at 1000kPa)
1	296	0.03	0.09
2	386	0.03	0.08
3	476	0.00	0.00
4	386	0.01	0.01
5	296	0.09	0.30

Houlsby Flow Patter	Not applicable
Houlsby Lugeon valu	<0.1
Burgess Lugeon valu	<0.1

Calculate(JDS/JV
Checked: JV
Date: 24-Mar-26



Douglas PARTNERS

WATER PRESSURE TEST RESULTS

Client :	Tara Shore Pty Ltd ATF the John Taylor Family Trust	**Project No. :**	239528
Project :	Proposed Residnetial Development	**Bore :**	BH202
Location :	271-273 Alfred Street, North Sydney	**Test section :**	24.00 - 30.90m

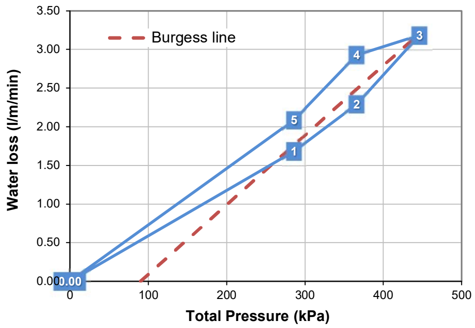
Test Details

Date:	20-Mar-26	Bottom of packer (m):	24.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	96	Bore depth (m):	30.90	Vertical Depth to groundwater (m):	20.0	0.264
Bore inclination (deg):	90	Section length (m):	6.90	(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**
Hg	**Hl**	**Total**	**Duration**	**Flowmeter**			**Drum readings**			**Leakage**	**Assigned Flow**	**Loss**		**Permeability**
(kPa)	(kPa)	(kPa)	(min)	Initial (litres)	Final (litres)	Total (litres)	Initial (mm)	Final (mm)	Equivalent litres	(litres)	(litres)	(l/m/min)	(l/m/min at 1000 kPa)	(m/sec)
80	0	286	5	2276.0	2338.0	62.0	720.0	650.0	18.5	0.0	62.0	1.8	6.3	6.3E-07
80	0	286	5	2338.0	2395.0	57.0	650.0	330.0	84.5	0.0	57.0	1.7	5.8	5.8E-07
80	0	286	5	2395.0	2450.0	55.0	330.0	150.0	47.6	0.0	55.0	1.6	5.6	5.6E-07
160	0	366	5	2520.0	2603.0	83.0	730.0	470.0	68.7	0.0	83.0	2.4	6.6	6.6E-07
160	0	366	5	2603.0	2679.0	76.0	470.0	230.0	63.4	0.0	76.0	2.2	6.0	6.0E-07
160	0	366	5	2679.0	2757.0	78.0	230.0	0.0	60.8	0.0	78.0	2.3	6.2	6.2E-07
240	0	446	5	2873.0	2983.0	110.0	790.0	640.0	39.6	0.7	109.3	3.2	7.1	7.1E-07
240	0	446	5	2983.0	3094.0	111.0	640.0	460.0	47.6	1.0	110.0	3.2	7.1	7.1E-07
240	0	446	5	3094.0	3205.0	111.0	460.0	300.0	42.3	1.0	110.0	3.2	7.1	7.1E-07
160	0	366	5	3280.0	3384.0	104.0	700.0	420.0	74.0	0.0	104.0	3.0	8.2	8.2E-07
160	0	366	5	3384.0	3482.0	98.0	420.0	120.0	79.3	0.0	98.0	2.8	7.8	7.8E-07
80	0	286	5	3588.0	3672.0	84.0	770.0	500.0	71.3	0.0	84.0	2.4	8.5	8.5E-07
80	0	286	5	3672.0	3732.0	60.0	500.0	250.0	66.1	0.0	60.0	1.7	6.1	6.1E-07
80	0	286	5	3732.0	3804.0	72.0	250.0	0.0	66.1	0.0	72.0	2.1	7.3	7.3E-07

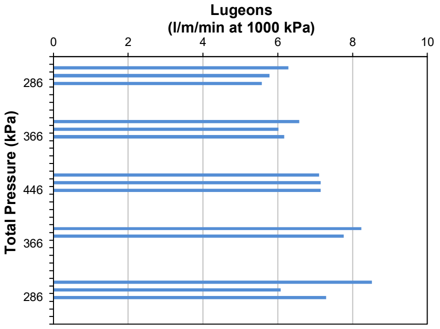
Notes



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1	286	1.68	5.88
2	366	2.29	6.26
3	446	3.18	7.13
4	366	2.93	8.00
5	286	2.09	7.30

Houlsby Flow Pattern	Laminar Flow
Houlsby Lugeon value	6.9
Burgess Lugeon value	9

Calculated: JS
Checked: JV
Date: 20-Mar-26



Douglas PARTNERS

WATER PRESSURE TEST RESULTS

Client :	Tara Shore Pty Ltd ATF the John Taylor Family Trust	**Project No. :**	239528
Project :	Proposed Residential Development	**Bore :**	BH202
Location :	271-273 Alfred Street, North Sydney	**Test section :**	27.00 - 30.90m

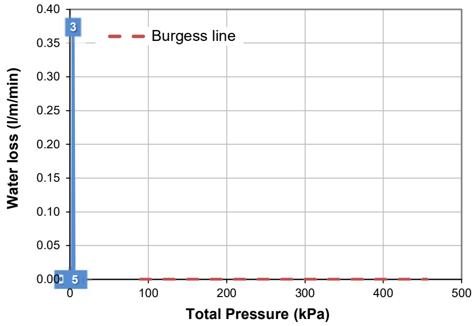
Test Details

Date:	20-Mar-26	Bottom of packer (m):	27.00	Height of pressure gauge (m):	1.0	Drum Area (m^2):
Bore diameter (mm):	96	Bore depth (m):	30.90	Vertical Depth to groundwater (m):	20.0	0.264
Bore inclination (deg):	90	Section length (m):	3.90	(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 Duration**	**FLOW RATES**								**Water Loss**	**Lugeons**	**Approx Permeability**
Hg	**Hl**	**Total**		**Flowmeter**			**Drum readings**			**Leakage**	**Assigned Flow**			
(kPa)	(kPa)	(kPa)	(min)	Initial (litres)	Final (litres)	Total (litres)	Initial (mm)	Final (mm)	Equivalent litres	(litres)	(litres)	(l/m/min)	(l/m/min at 1000 kPa)	(m/sec)
250	0	456	5	3812.1	3825.7	13.6	760.0	740.0	5.3	6.6	7.0	0.4	0.8	7.9E-08
250	0	456	5	3825.7	3839.3	13.6	740.0	690.0	13.2	6.6	7.0	0.4	0.8	7.9E-08
250	0	456	5	3839.3	3854.2	14.9	690.0	650.0	10.6	7.3	7.6	0.4	0.9	8.6E-08
250	0	456	5	3854.2	3869.0	14.8	650.0	570.0	21.1	7.3	7.5	0.4	0.8	8.5E-08

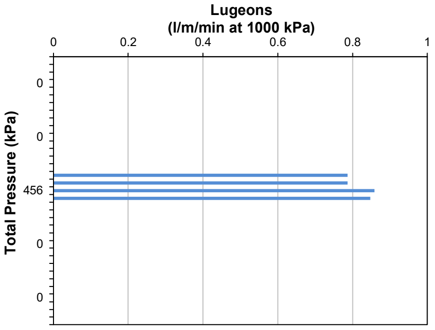
Notes Additional short packer test to identify zone of high permeability from 24m to 30.9m test.



Averages			
Stage	Pressure (kPa)	Water Loss (l/m/min)	Lugeons (l/m/min at 1000kPa)
1 2 3 4 5	456	0.37	0.82

Houlsby Flow Pattern	Not applicable
Houlsby Lugeon value	0.8
Burgess Lugeon value	

Calculated: JS
Checked: JV
Date: 20-Mar-26



Permeability Testing

Client:	Tara Shore Pty Ltd ATF the John Taylor Family Trust	Project No:	239528.00
Project:	Proposed Residential Development	Test date:	23-Mar-26
Location:	271-273 Alfred Street, North Sydney NSW	Tested by:	SAF

Test Location

Description: Rising Head
Material: Sandstone

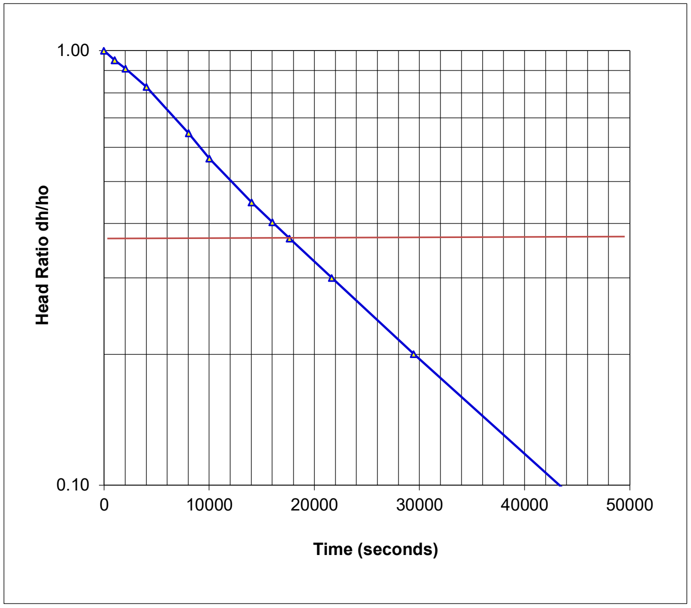
Test No. BH201
Easting: Refer to log m
Northing m
Surface Level: 38.5 m AHD

Details of Well Installation

Effective diameter (2re)	96	mm	Depth to water before test	21.69	m
borehole diameter (2R)	96	mm	Depth to water at start of test	29.01	m
Effective Length of well screen (Le)	10.00	m	Depth of top of PVC standpipe	21.00	m
			Depth of base of PVC standpipe	31.00	m

Test Results

Time (sec)	Depth (m)	Change in Head δH (m)	δH/Ho
0	29.01	7.32	1.00
1020	28.66	6.97	0.95
2040	28.35	6.66	0.91
4020	27.74	6.05	0.83
8040	26.42	4.73	0.65
10020	25.83	4.14	0.57
14040	24.96	3.27	0.45
16020	24.64	2.95	0.40
17640	24.39	2.70	0.37
21660	23.88	2.19	0.30
29460	23.16	1.47	0.20
43620	22.41	0.72	0.10



To = 294.0 mins
17640 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 = 3.5E-08** m/sec
= 0.003 m/day

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au

Permeability Testing

Client: Tara Shore Pty Ltd ATF the John Taylor Family Trust
Project: Proposed Residential Development
Location: 271-273 Alfred Street, North Sydney NSW

Project No: 239528.00
Test date: 23-Mar-26
Tested by: SAF

Test Location
Description: Rising Head
Material: Sandstone

Test No. BH202
Easting: Refer to log m
Northing m
Surface Level: 38.5 m AHD

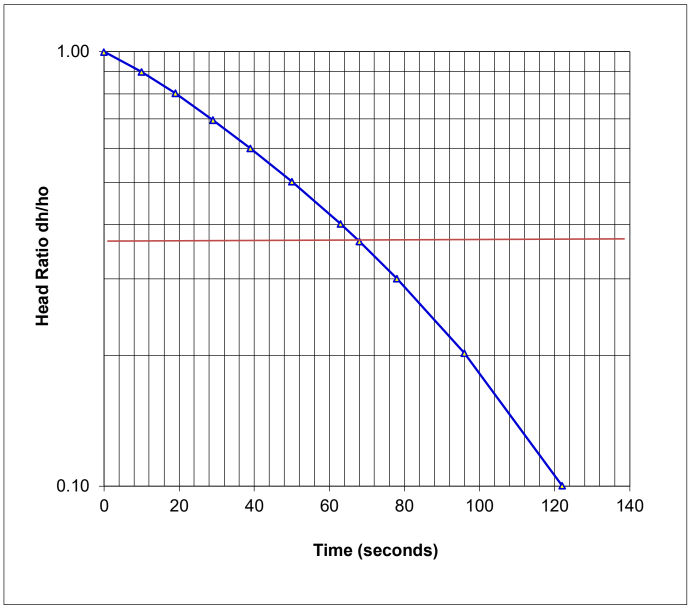
Details of Well Installation

Effective diameter (2re)	50	mm
borehole diameter (2R)	96	mm
Effective Length of well screen (Le)	7.00	m

Depth to water before test	21.12	m
Depth to water at start of test	15.91	m
Depth of top of PVC standpipe	24.00	m
Depth of base of PVC standpipe	31.00	m

Test Results

Time (sec)	Depth (m)	Change in Head δH (m)	δH/Ho
0	15.91	5.31	1.00
10	16.45	4.77	0.90
19	16.96	4.26	0.80
29	17.52	3.70	0.70
39	18.04	3.18	0.60
50	18.55	2.67	0.50
63	19.09	2.13	0.40
68	19.28	1.94	0.37
78	19.62	1.60	0.30
96	20.15	1.07	0.20
122	20.69	0.53	0.10



To = 1.1 mins
68 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 = 3.3E-06** m/sec
= 0.283 m/day