Douglas PARTNERS

GROUNDED EXPERTISE

Groundwater Impact Assessment

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

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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
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Groundwater Impact Assessment
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1. Introduction

1.1 Purpose of this report

This groundwater impact assessment (GIA) 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 work was undertaken in accordance with Douglas' proposal 239528.00.P.001.Rev2, dated 23 March 2026.

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).

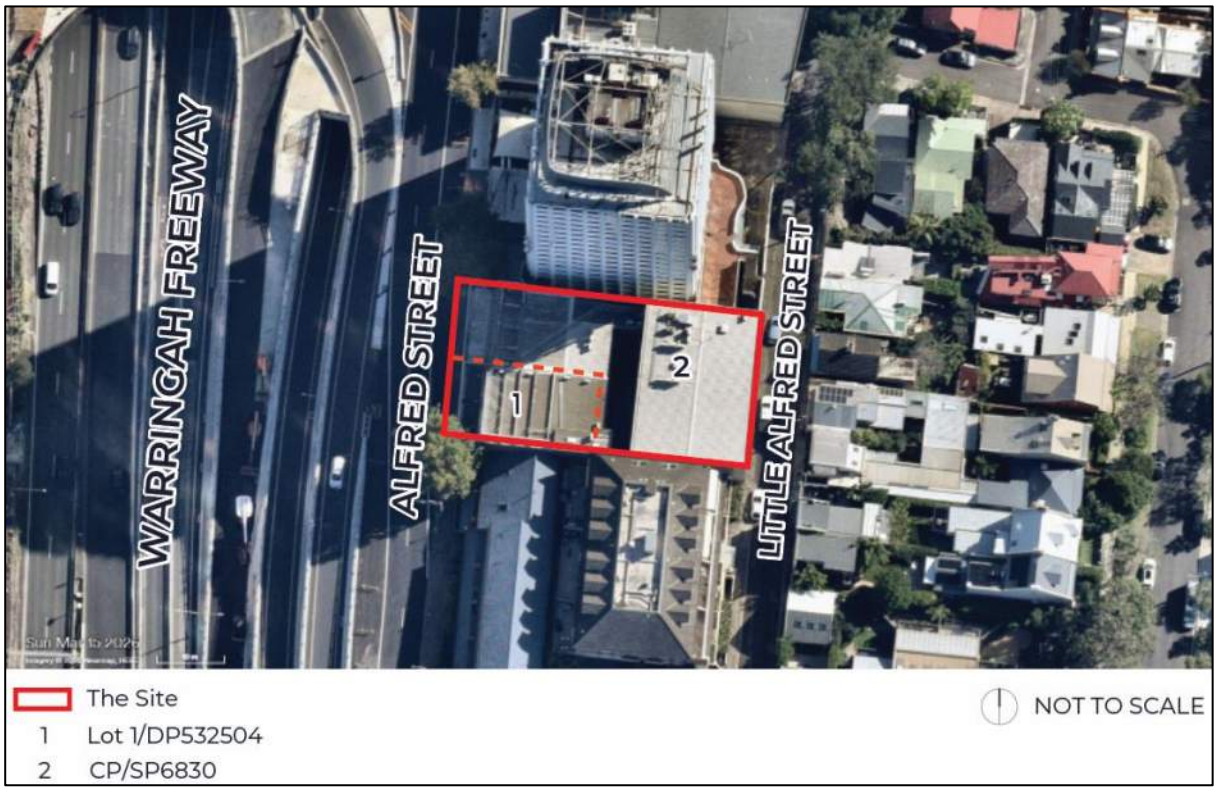

Figure 1: Site aerial map showing site location in red (source: Nearmap/edited by Colliers Urban Planning)

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; and
- 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.

The purpose of this GIA is to support the submission of a SSDA, addressing the assessment requirements specified in Section 1.3. Additionally, this document aims to assist in obtaining the necessary approvals for the disposal of extracted groundwater, where applicable.

A brief overview of the development is provided in Section 2. The site location is shown on Drawing 1, Appendix B.

This GIA is based on the findings of site-specific and nearby investigations and monitoring, including:

- Douglas Geotechnical Investigation Report (Douglas, 2026a);
- Douglas Detailed (contamination) Site Investigation (DSI) Report (Douglas, 2026b); and
- JK Geotechnics Pty Ltd (JK) Geotechnical Investigation and Preliminary Seepage Analysis Report (JK, 2025).

The following key information is relevant to the preparation of this GIA:

- The proposed works will intercept the groundwater table;
- Groundwater levels on site have been observed between approximately reduced level (RL) RL 17.1 m and RL 18.6 m relative to the Australian Height Datum (AHD);
- The depth of the proposed finished floor level (FFL) of the lower basement level is approximately RL 10.1 mAHD with an assumed basement bulk excavation level (BEL) of RL 9.6 mAHD;

- The basement is intended to be drained;
- The proposed method of dewatering is sump and pump; and
- The extracted groundwater is proposed to be disposed of via stormwater.

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

1.2 Regulatory framework and guidance

The following key guidelines and documents were consulted in preparation of this report:

- Guidelines for Groundwater Protection in Australia, National Water Quality Management Strategy (Australian Government, 2013);
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018);
- Minimum requirements for building site groundwater investigations and reporting (NSW DPE, 2022);
- NSW Aquifer Interference Policy (DPI-NSW Office of Water, 2012);
- NSW Aquifer Interference Policy (NSW DPI, 2013), supplementary version;
- Groundwater assessment toolbox for Major Projects in NSW (NSW DPE, 2022);
- Guidelines for Groundwater Documentation for SSD/SSI Projects (NSW DPE, 2022);
- Minimum Groundwater Modelling Requirements for SSD/SSI Projects (NSW DPE, 2022); and
- Cumulative Groundwater Impact Assessment Approaches (NSW DPE, 2022).

Additional regulatory requirements may also apply, including WaterNSW approvals for water take and disposal (see Section 9), and local council or EPA conditions depending on the nature and location of discharge.

1.3 SEARs Requirements

Assessment requirements are presented in Table 1.

Table 1: Compliance table

Assessment Requirement	Report Section / Response
12. Ground and Groundwater Conditions • Where required provide a Groundwater Impact Assessment in accordance with relevant Groundwater Guidelines.	Sections 4 to 10 of this report

2. Proposed development

2.1 Proposed development

Refer to Section 1 for a full description of the proposed development. Relevant to this GIA report, it is understood that the proposed development involves demolition of the existing building and

construction of a 38-storey mixed use tower and a 9-level basement for car parking, with a proposed finished floor level (FFL) of 10.06 mAHD for the lowest basement level.

2.2 Proposed dewatering and discharge methods

We expect that dewatering of the site will be achievable via conventional sumps and pumps and is expected to be redirected and discharged into council stormwater drains.

3. Site description

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.

At the time of reporting two multi-level commercial buildings were present at the site, which extended 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. 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 have been undertaken in recent years, resulting in the modification and construction of additional lanes. A large sandstone cutting was 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).

As of April 2025, the sandstone cutting was covered by a concrete wall. Photographs 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°) were 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 was visible on the exposed rock face in the photographs.

Figure 3: Ortho photograph 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 photographs looking east.

4. Hydrogeological setting

4.1 Topography and hydrology

The site is located toward the crest of north-northeast facing hill which naturally drains into Neutral Bay Harbour located approximately 320 m to the east.

4.2 Climate

The region experiences a generally subtropical climate, characterised by mild winters and hot, humid summers. The average annual rainfall is approximately 1.2 m.

4.3 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.

4.4 Hydrogeology and groundwater source

The site is within the Sydney Basin Central Groundwater source which is defined by the Water Sharing Plan for the Greater Metropolitan Region Groundwater Source as follows:

"The water source is bounded by the main arm of the Hawkesbury River to the north and the Nepean River to the west and south covering an area of 3,831.4 km^2. The Sydney Basin Central Groundwater Source is, for the most part, topographically low-lying within a broad structural depression. It is predominantly capped by low permeability shale units of the Wianamatta Group. The area receives relatively less rainfall compared to water sources in the west. The land use over the groundwater source is predominantly urban. Bores are evenly distributed across the area. Average bore depth and average yield are about 50 m and 1.6 L/s respectively. The targeted aquifer for water supply is sandstone which is interbedded with shales. Median water level of bores at the time of construction is 29 mbgl." (NSW DPIE, 2023)

Water can be encountered within hills as confined aquifers or perched water tables but, also as seepage through fractures and the general rock mass which may be sourced from rainfall infiltration and leaking services. Water can flow in a stepped manner through fractures and zones of higher permeability within the rock to form perched aquifers overlying a lower regional water table.

4.5 Groundwater receptors

In assessing potential impacts of dewatering on environmental receptors, those potential groundwater receptors need to be identified.

A search of the Bureau of Meteorology (BoM)'s Groundwater Dependent Ecosystems Atlas (the GDE Atlas) on 7 April 2026 indicated that there are no groundwater dependent ecosystems (GDE) within 500 m of the site.

A groundwater bore search of the WaterNSW database was conducted on 7 April 2026 for bores registered within a 500 m radius of the site. The search was undertaken to assess possible water levels and potential uses of groundwater in the vicinity of the site. There are no registered bores or available public groundwater data within a 500 m radius of the site.

4.6 **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. As such ASS is not considered a risk for this site and further assessment or management is not considered to be warranted.

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

4.7 **Contaminated sites**

The DSI (Douglas (2026b)) has been reviewed to assess contamination risk relevant to dewatering for the project.

A review of the desktop search information in Douglas (2026b) identified that:

- There were no records or notices pertaining to the site under Section 58 of the Contaminated Land Management Act (CLM Act), the site is not notified under Section 60 or the CLM Act and no licences listed under Section 308 of the Protection of the Environment Operations Act 1997 (POEO Act) pertaining to the site;
- A search of NSW EPA per- and polyfluoroalkyl substances (PFAS) investigation program found no records for the site or adjacent properties; and
- A Schedule 11 SafeWork NSW search was undertaken to identify records of historical or current storage of hazardous chemicals on site. The search did not locate any records pertaining to the site.

The DSI identified the following potential sources and contaminants of potential concern (CoPC) relevant to the proposed dewatering:

- Fill associated with levelling. Noted as the site has been excavated into natural sandstone, it is anticipated that any fill beneath the basement will be minimal;
  - CoPC: metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethyl benzene, total xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphorus pesticides (OPP), PFAS, and phenols.
- Historical commercial (office) use with basement carpark:
  - CoPC: TRH, BTEX, PAH.
- Existing buildings, including pest control:

- CoPC: PCB, metals, OCP.

- Surrounding commercial land uses:
  - CoPC: metals, TPH, BTEX, PAH, phenols, and PFAS.

5. Investigation results

5.1 Geotechnical

A geotechnical investigation was undertaken by Douglas in 2026 (Douglas, 2026a). The test locations are shown in Drawing 1 (Appendix B).

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.

The interpreted model can be summarised as follows:

- **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.
- **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.
- **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).
- **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.
- **M Siltstone/Sandstone**: slightly weathered to fresh interbedded and interlaminated siltstone and sandstone bands, with bands of massive sandstone (within Unit 6).
- **M & H Sandstone**: slightly weathered and fresh, medium and high strength.

5.2 Groundwater

A total of five groundwater monitoring wells were installed as part of the Douglas (2 wells) and JK (3 wells) investigations. Their locations are shown on Drawing 1 (Appendix B).

Groundwater results are summarised in subsequent sections.

Table 2 summarises the monitoring wells' attributes.

Table 2: Monitoring well details

Well ID	Surface (m AHD)	Response Zone[1] Interval (m) [RL mAHD]	Response Zone[1] Material	Description of Fracturing
BH201	38.5[2]	21 – 31 [17.5 – 7.5]	Fresh sandstone with bands of siltstone	Slightly fractured to unbroken
BH202	38.5[2]	24 – 31 [14.5 – 7.5]	Fresh sandstone, with bands of siltstone	Shear zone at 25.5m depth then slightly fractured to unbroken
JK1	31.3[2]	16.9 – 25.9 [14.4 – 5.4]	Mostly Fresh sandstone with occasional laminite (siltstone/sandstone)	Unbroken
JK2	31.3[3]	16.8 – 39.7 [14.5 - -8.4]	Moderately weathered and fresh sandstone	Mostly unbroken with a fractured zone between 18.7 m and 19.4 m depth
JK3	31.3[3]	16.5 – 25.9 [14.8 – 5.4]	Fresh sandstone with occasional siltstone bands	Slightly fractured to unbroken

Note: 1 – Comprises sand filter backfill and machine slotted PVC pipe
2 – Drilled within subject site existing lower basement level
3 – Drilled with existing lower basement level of neighbouring site (275 Alfred Street)

5.2.1 Groundwater levels

Groundwater was not observed during core drilling of any of the geotechnical boreholes. The necessary introduction of water to the borehole while coring precluded any further groundwater observations during drilling.

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 (BH201 and BH202) in March 2026 and were set up to record measurements of groundwater pressure at hourly intervals. The groundwater levels between 27 March 2026 and 6 March 2026 are shown on the hydrographs in Appendix D.

Table 3 summarises water level measurements taken for the groundwater wells at the site. All water levels shown are after the wells had been developed.

Table 3: Groundwater level measurements in Douglas wells

Borehole	Surface Level (m AHD)	Date Measured	Water Depth (m)	Water Level (m AHD)
BH201	38.5	23 March 2026	20.3	18.2
		27 March 2026	20.9	17.6
		2 April 2026	20.9	17.6
		8 April 2026	19.9	18.6
		28 April 2026	10.1[1]	28.4[1]
		6 May 2026	10.1[1]	28.4[1]
BH202	38.5	23 March 2026	20.5	18.1
		27 March 2026	21.1	17.5
		2 April 2026	21.4	17.1
		8 April 2026	21.4	17.1
		28 April 2026	21.3	17.2
		6 May 2026	21.2	17.3

Notes: 1. Anomalous BH201 water level inferred to be from external influence

As shown on the hydrograph, BH201 had a sudden rise in water level which occurred on 16 April 2026 from approximately RL19 to RL28.5 between 6pm and 10pm. The water level has stayed at this level until the end of the current monitoring period despite 60 L of water being removed from the well on 5 April 2026. The recovery curve of the water level back up to ~RL21.5 following the pumping is not representative of a permanent water table. In the absence of rainfall, this rise is inferred to be from external influences such as possible irrigation, a leaking pipe (leaking into a vertically continuous joint), or construction related activities on Warringah Freeway. The results of BH201 between 16 April 2026 and 6 May 2026 are considered anomalous and are excluded from inflow analysis within this report. This will need to be further assessed as part of further groundwater monitoring.

Impacts from rainfall in monitoring well BH202 are generally negligible. Between 27 March and 16 April 2026, and prior to the anomaly discussed above, groundwater levels within BH201 appear to have some impact from rainfall events. It should be noted that between approximately 30 March and 3 April 2026 during a 'dry' period, the groundwater levels deviate over short periods (drain and recover quickly) which could be due to external influences.

JK also carried out continuous monitoring within the wells JK1 to JK3 between 3 October 2025 (JK1 and JK2) or 10 October 2025 (JK3) to 5 November 2025 (i.e. approximately 1 month period). A summary of the results is shown below in Table 4.

Table 4: Groundwater level measurements in JK wells

Borehole	Measured groundwater Level (RL mAHD)			
	Minimum	Average	Median	Maximum
JK1	14.2	14.4	14.4	14.5
JK2	13.3	13.7	13.7	13.8
JK3	17.9	18.7	18.7	19.2

Based on the information presented in Table 3 and Table 4, groundwater appears to flow to the north. Groundwater levels within the site have been observed to be wholly within the bedrock profile between RL 17.1 m and RL 18.6 m (excluding the BH201 anomaly).

At the time of writing this report, long term (i.e. >3 months) groundwater monitoring data is not yet available. According to JK2025, groundwater does not appear to be responsive to rainfall or other external factors, which appears to also be the case for the two Douglas wells (excluding the anomaly in BH201). Note that the monitoring period was during a relatively dry period.

5.2.2 Hydraulic conductivity

Wireline permeability (Packer) testing was carried out within monitoring wells BH201 and BH202 to evaluate the mass hydraulic conductivity (or permeability) of the bedrock material. JK also carried out packer testing within JK1 to JK3 including pump out testing which involves removing a volume of water and measuring the corresponding rise in water level at regular time intervals.

Packer testing is a method of calculating the permeability and hydraulic conductivity of bedrock formations surrounding a drilled borehole. A rubber packer is inflated using high pressures against the borehole walls creating a watertight seal and isolates sections of the borehole. Water is then injected under pressure directly into the area of interest. During the test, water is injected over three equally stepped increasing pressures, followed by stepping back down over the same pressures. At each pressure step, the corresponding flow rates are recorded and plotted.

A lugeon value is then calculated using the Houlsby (1976) approach based on how the bedrock behaves under the various pressures and is then converted into a hydraulic conductivity (k) (m/s).

The results of the packer tests have been summarised in Table 5 and the detailed results sheets are provided in Appendix E. 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 5: 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	6.0×10^{-8}
2	BH201	27.00 – 35.08	0.1	1.0×10^{-8}
3	BH202	24.00 – 30.90	6.9	6.9×10^{-7}
4	BH202	27.00 – 30.90[1]	0.8	8.0×10^{-8}
			Geometric Mean	**7.6×10^{-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.

A summary of the JK packer and pump out testing results is shown in Figure 4 and Figure 5 noting that BH1 to BH3 is JK1 to JK3 for the purposes of this report.

Borehole	Packer Test Depth Range (m) [mAHD]	Permeability (1)	
		Lugeon (2)	Equivalent Rock Mass Permeability (3) (m/sec)
BH1	5 – 10.75 [RL26.3 – 20.55]	8.4 [4]	1.1×10^{-6} [4]
	12.5 – 18.6 [RL18.8 – RL12.7]	4.7	6.2×10^{-7}
	20.0 – 26.0 [RL11.3 – RL5.3]	3.1	4.0×10^{-7}
BH2	6.5 – 12.5 [RL24.8 – RL18.8]	0.7 [4]	9.7×10^{-8} [4]
	12.5 – 18.5 [RL18.8 – RL12.8]	0.2	2.2×10^{-8}
	18.5 – 23.0 [RL12.8 – RL8.3]	4	5.3×10^{-7}
BH3	14.0 – 17.0 [RL17.3 – RL14.3]	2.2	2.9×10^{-7}
	17.0 – 21.5 [RL14.3 – RL9.8]	4.0	5.2×10^{-7}
	21.5 – 26.0 [RL9.8 – RL5.3]	0.2	2.4×10^{-8}
Minimum Lugeon/Permeability		**0.2**	**2.2×10^{-8}**
Maximum Lugeon/Permeability		**4.7** [5]	**6.2×10^{-7}** [5]
Average Lugeon/Permeability		**2.6** [5]	**3.4×10^{-7}** [5]

NOTES:
1. This is the equivalent horizontal permeability (k_h).
2. A Lugeon is defined as the water loss of 1 litre/minute per metre of test section at an effective pressure of 1MPa.
3. This approximation is based on 1 Lugeon being equivalent to $k_h = 1.3 \times 10^{-7}$ m/sec, which assumes homogenous, isotropic conditions.
4. Test section is above the maximum recorded groundwater level measured within the borehole.
5. Excluded BH1 test 1 and BH2 test 1 in calculation as these tests were completed completely above the highest recorded groundwater level and are therefore considered irrelevant.

Figure 4 – Summary of JK packer testing results (excerpt from JK2025)

BH1 (approx. 17m to 26m depth): 6.9 x 10^{-8} m/s
BH2 (approx. 17m to 40m depth): 4.2 x 10^{-8} m/s
BH3 (approx. 17m to 26m depth): 2.6 x 10^{-8} m/s

Figure 5 - Summary of JK pump out testing results (excerpt from JK2025)

Based on the permeability testing results outlined above, permeability values range between 1.1 x 10^{-6} m/s and 1.0 x 10^{-8} m/s with a geometric mean of 1.2 x 10^{-7} m/s.

Permeability testing results between Douglas and JK are generally in good agreement.

5.2.3 Groundwater quality

Groundwater quality testing was undertaken as part of the DSI (Douglas, 2026b) from the two monitoring wells BH201 and BH202 installed by Douglas. The results provide an indication of baseline groundwater quality at the site and inform potential disposal options and management requirements (further discussed in Section 9.3).

Groundwater samples were collected and dispatched to a NATA accredited laboratory for the analysis of physical parameters, major ions, metals, TRH, BTEX, PAH, OCP, OPP, PCB, PFAS and phenols.

For the purposes of this GIA, the previous results have been assessed against the discharge criteria (refer to Appendix F). Note these criteria differ to those adopted in the DSI, the objective of which was to assess potential risk from contamination to on- and off-site receptors from long term exposure via the natural groundwater flow path.

Groundwater quality results are summarised as follows:

- pH values ranged from 6.14 to 6.48, indicating slightly acidic conditions, and slightly below the discharge criteria;
- Electrical conductivity (EC) values ranged from 436 to 793 µS/cm, indicating fresh water;
- Total suspended solids (TSS) in both samples (at 550 and 2200 µg/L) exceeded the discharge criteria of 50mg/L; No non-aqueous phase liquids or oily sheens were recorded;
- The following analytes were recorded above the discharge criteria:
    - Total chromium (total) in both samples (at 14 and 45 µg/L) exceeded the discharge criteria of 4.4 µg/L. It is noted that the dissolved concentrations of chromium (total) in all samples were below the laboratory practical quantitation limit (PQL) and the discharge criteria;
    - Total copper in both samples (at 35 and 72 µg/L) exceeded the discharge criteria of 0.6 µg/L. It is noted that the dissolved concentration of copper in all samples ranged between 4 and 6 µg/L, also above the criteria;
    - Total lead in both samples (at 9 and 29 µg/L) exceeded the discharge criteria of 4.4 µg/L. It is noted that the dissolved concentrations of lead in all samples were below the laboratory PQL and the discharge criteria;

- Total zinc in both samples (at 220 and 590 µg/L) exceeded the discharge criteria of 8 µg/L. Dissolved zinc concentration in all samples ranged between 80 to 220 µg/L, also exceeding the criteria; and
- The concentration of TRH was detected above the discharge criteria in both primary samples and the duplicate sample.

The analytical results suggest that groundwater beneath the site has not been significantly impacted by organic contaminants PAH, BTEX, OCP, OPP, PCB, and phenol. Where exceedances of guideline values were identified, appropriate treatment and disposal controls will be implemented (refer to Section 9).

Summary tables of analytical results and laboratory certificates are provided in Appendix G and Appendix H, respectively.

6. Conceptual hydrogeological model

The site is predominantly underlain by Hawkesbury Sandstone. The topography of the area generally grades down toward the north naturally draining into Neutral Bay approximately 320 m to the east.

Impacts from rainfall on the groundwater levels are negligible based on JK records. The recorded groundwater levels were observed to be wholly within the bedrock with an approximate flow direction to the north.

The aquifer has been identified as unconfined where groundwater sources flowing into the subject site are considered to originate from rain and surface water infiltration. Over time, these water sources permeate to the natural groundwater that has been observed to be within the bedrock profile.

It should be noted that groundwater levels are transient and fluctuate with climatic variations and other factors (e.g. adjacent excavations, pumping). Therefore, the water levels will temporarily rise during periods of heavy or prolonged rainfall and fall during dry periods. Groundwater levels in the vicinity of the site can also be affected by nearby dewatering activities and existing drained basements.

7. Groundwater inflow assessment

7.1 Numerical modelling methodology

A 2-dimensional (2D) numerical model was developed for the proposed excavation using SEEP/W, a component of GeoStudio 2023.1.2 R2 (version 23.1.2.11) developed by GEOSLOPE International Ltd. Transient and steady state analysis were undertaken to assess the potential dewatering rates and volumes during excavations works and for a long-term drained basement, respectively.

Douglas selected a single vertical cross-section in a roughly south to north direction, intercepting the basement footprint through the centre of the proposed excavation.

The BEL for the proposed development was modelled at RL 9.6 mAHD which is 0.5 m below the lowest basement FFL.

7.1.1 Model layers

The hydrogeological units were simulated as a single layer to simulate the bedrock profile. Surficial soils were excluded from the model and considered negligible for the purpose of this assessment as groundwater was measured wholly within the bedrock profile.

Adopted hydraulic properties are presented in Table 6. Parameters were selected based on the Geometric Mean result of the hydraulic conductivity testing (Section 5.2.2), ranges of values documented in the available literature for similar lithologies (e.g. Hoek & Bray 1981 and more recently Pells 2019) and previous experience with similar materials.

Table 6: Summary of material parameters for groundwater inflow analysis

Geological Unit	Saturated Kh (m/s)	Anisotropy Ratio (Kv/Kh)	Saturated Volumetric Water Content (%)	Residual Water Content (%)	Material Model Adopted
Bedrock	1.2×10^{-7}	0.3	20	5	Unsaturated / saturated

Notes: Kh: Horizontal hydraulic conductivity
Kv: Vertical hydraulic conductivity

7.2 Model calibration – Initial Heads

Initial groundwater levels were established in the model by setting constant head conditions at the lateral extents around 200 m to the north and south of the site. A surface flux was also applied along the ground surface to simulate rainfall.

The model was calibrated to roughly match the highest hydraulic gradient (effective total head) observed within the groundwater monitoring. The initial groundwater head levels prior to dewatering of the subject site are presented in Figure 6 below.

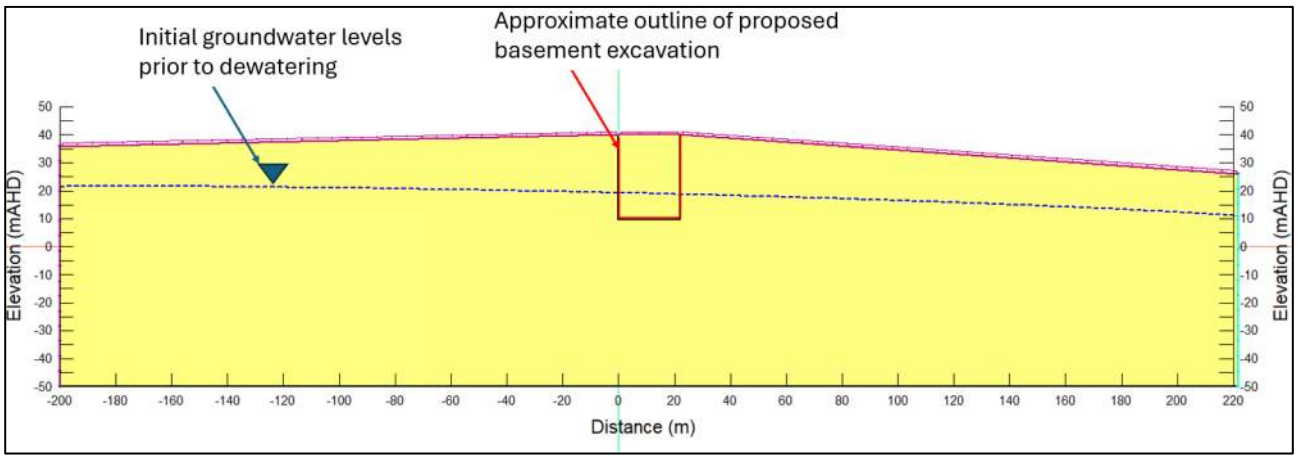

Figure 6: Simulation of initial groundwater levels prior to dewatering

An infiltration flux rate of 7.6 x 10^{-10} $m^3/s/m^2$, which is equivalent to 2% of an average annual rainfall of 1.2 m in Sydney, was adopted to simulate infiltration and seepage from rainfall to the model surface.

A 'free flow' boundary or 'drained' boundary conditions (i.e. 0 m^3/s) were applied to the base and the sides of the basement excavation to model a 'dry' excavation which will be required during construction.

7.3 Sensitivity scenarios

A sensitivity case analyses was undertaken to assess groundwater inflows under higher hydraulic conductivity (i.e. 6.2 x 10^{-7} m/s) conditions.

The model was then recalibrated to roughly match the highest hydraulic gradient (effective total head) observed within the groundwater monitoring.

7.4 Groundwater modelling results

7.4.1 Predicted groundwater inflow

The model assumes excavation and dewatering to the proposed BEL is instantaneous, resulting in substantial predicted inflows during the first days of construction. In reality, dewatering will be carried out in conjunction with the excavation staging of say 2 m depths to gradually lower the water table to the desired level.

Table 7: Base case - predictive model of simulated groundwater inflow rates with time

Elapsed Time (days)	Dewatering Inflow Rate	
	Inflow rate (L / min)	Cumulative Inflow (ML)
10	6.4	2.0
23	5.1	
39	4.6	
59	4.3	
85	4.1	
118	3.8	
160	3.6	
213	3.4	
280	3.2	
365	3.0	
Post-construction	1.6	0.8

Table 8: Sensitivity case 1 (higher hydraulic conductivity) - simulated groundwater inflow

Elapsed Time (days)	Dewatering Inflow Rate	
	Inflow rate (L / min)	Cumulative Inflow (ML)
10	24.5	7.1
23	20.2	
39	18.0	
59	16.4	
85	14.9	
118	13.7	
160	12.7	
213	11.8	
280	11.0	
365	10.4	
Post-construction	8.2	4.3

Note: GWL: groundwater level

It should be noted that these volumes are 'estimates' of the average inflows. It is possible that localised zones of higher permeability may be present within the site, through which the rate of inflow could be significantly higher, and considering the subsurface heterogeneity and fractured aquifer system, a safety margin for application in the field should be considered.

Also, simulated dewatering rates and drawdown are dependent on the dewatering scheme adopted for the site, and construction design (e.g., shoring walls), as included in the numerical models. If the depth of basement level and dewatering systems were to change then the currently predicted dewatering rates may change, in which case further modelling would be required.

7.4.2 Predicted groundwater drawdown and settlement

Groundwater levels immediately outside the basement excavation are expected to be drawn down to BEL as shown in Figure 7 below, with the drawdown curve rising away from the basement. As the basement is drained, there will be no mounding occurring. There are negligible impacts expected to surrounding properties and infrastructure from drawdown as the groundwater is contained within and flowing through the bedrock profile with high deformation moduli.

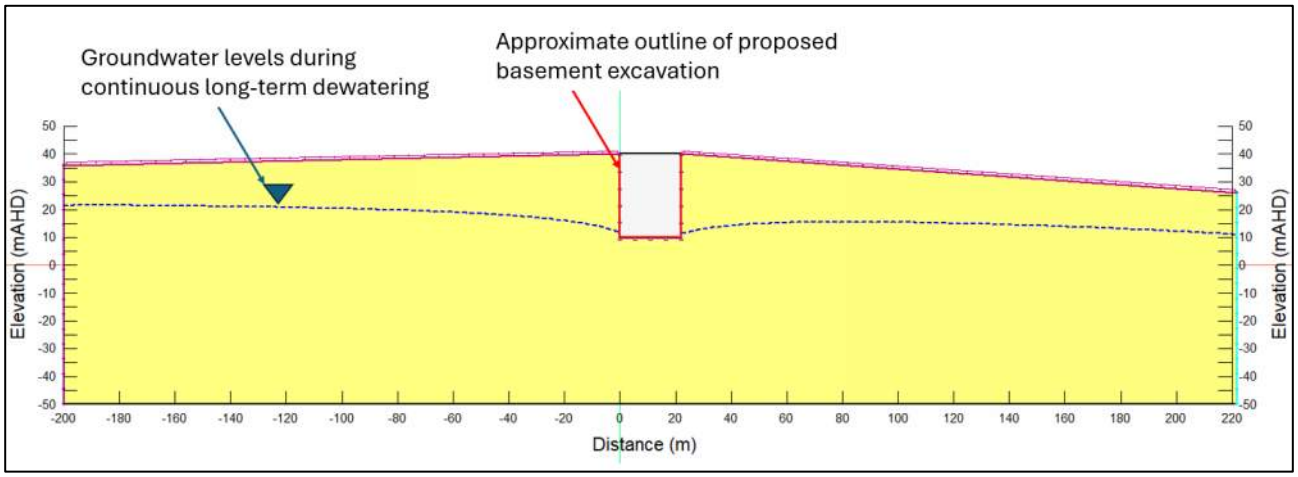

Figure 7: Simulation of excavation with drawdown

8. Impact assessment

8.1 Aquifer Interference Policy consideration

The NSW Aquifer Interference Policy (AIP) indicates that the term "aquifer" is commonly understood to mean a groundwater system that is sufficiently permeable to allow water to move within it, and which can yield productive volumes of groundwater. A groundwater system is defined as any type of saturated geological formation that can yield low or high volumes of water. However, for the purpose of the AIP, the term aquifer has the same meaning as groundwater system and includes low yielding and saline systems.

Table 1 in Section 3.2.1 of the AIP outlines minimal impact considerations. The AIP indicates that "if predicted impacts are less than the Level 1 minimal impact considerations, then these impacts will be considered as acceptable". The following minimal impact considerations are outlined for less productive porous and fractured rock groundwater sources:

- Less than or equal to 10% cumulative variation in water table 40 m from any high priority GDE or high priority culturally significant site;
- A cumulative pressure head decline of no more than a 2 m at any water supply work; and
- Any change in groundwater quality should not lower the beneficial use category of the groundwater source beyond 40 m from the activity.

8.2 Environmental risk assessment

An assessment of the potential effects of dewatering on neighbouring properties and groundwater receptors has been summarised in Table 9.

Table 9: Assessment of Potential Effects of Dewatering

Item	Comment
Impacts on potential GDEs	There are no GDEs within 500 m of the site (Section 4.5).
Water supply losses by neighbouring groundwater users	No water bores were located within 500 m of the site (Section 4.5).
Potential subsidence of neighbouring structures	Groundwater drawdown is predicted to occur within the bedrock profile with high deformation moduli. Therefore, risk of subsidence due to lowering of the water table is expected to be negligible.
Mounding of water upgradient of structure	As the basement is proposed to be drained, mounding of groundwater is not expected upgradient of the site.
Contamination and Water quality	A review of contamination risk (Section 4.7) and baseline water quality data (Section 5.2.3) has been undertaken. Based on this review and the project details it is considered that: • The available data indicates that dewatering will potentially extract groundwater with pH, TSS, metals (chromium (total), copper, lead and zinc) and TRH which exceeded the discharge criteria (refer to Section 5.2.3). • The available data does not indicate a potential for the dewatering to mobilise an off-site contamination plume. Controls to mitigate potential contamination impacts from discharge of the extracted groundwater are provided in Section 9, and include treatment and monitoring of the extracted water prior to discharge.
ASS	<u>On-site</u> Acid Sulphate Soils (ASS) are not considered to be present on the site. As such no further on-site assessment or management is considered warranted. <u>Off-site</u> For Class 5 land, development consent is required for works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land. The predicted groundwater drawdown (Section 7.4.2) indicates that the drawdown will be in bedrock and that the drawdown level will not extend to lands below 5 m AHD. As such, no management is considered warranted for off-site ASS.

Item	Comment
Salinity	Salinity is not a concern and thus further assessment, or management is not required.

9. Recommended management strategy

9.1 General

Dewatering will be required during the construction of the project. This section outlines the proposed management strategy based on the preferred methodology for dewatering and disposal.

The proposed dewatering and discharge approach is outlined in Section 2.2 and forms the basis of the groundwater inflow assessment and impact assessment given in Section 7 and 8, respectively.

Appropriate management strategies will be required during construction and operation, to ensure that the impact and inflows arising from dewatering remain within the expected values.

9.2 Groundwater inflow control

9.2.1 Control measures and monitoring

Effective management and monitoring of groundwater inflow should be undertaken to support safe excavation, minimise impacts and satisfy the regulatory requirements. The proposed control measures will be selected based on site-specific hydrogeological conditions, construction methodology and relevant guidelines, and will be detailed in construction drawings and specifications.

Groundwater inflow control measures may include:

- Perimeter drainage to capture and divert groundwater;
- Inflow reduction measures. Such as grouting or ground improvement.

Groundwater level and inflow monitoring should be undertaken during construction to:

- Validate inflow predictions and performance of control measures; and
- Implement trigger contingency responses if unexpected inflow or impacts occur.

More information on recommended monitoring is provided in Section 9.5.

9.2.2 Trigger levels

Control measures will be monitored against inflow volumes, with the trigger level being an exceedance of the predicted inflows as outlined in Section 7.4.1.

If the trigger is reached, dewatering and excavation must be halted, and a mitigation strategy (e.g. grouting) be implemented before work resumes.

9.3 Discharge options and contingency measures

Management options for groundwater disposal are presented in Table 10.

Based on groundwater quality testing and predicted dewatering rates, Option 1 (disposal to stormwater) is considered feasible. The other two options listed in Table 10 are provided as contingency plans.

Table 10: Summary of possible management options

Management Option	Comments
Option 1: On-site treatment and disposal to stormwater.	Generally applicable where the treatment required is routine, e.g., solids removal, alum dosing and pH adjustment. Treatment of specific contaminants may require more physical space and result in higher treatment costs. Water disposed to stormwater is typically required to meet general NSW DPE requirements (NSW DPE 2021 & 2022), ANZG (2018) water quality standards for the relevant receiving water body and any associated uses Further requirements may be enforced depending on the specific approval documentation.
Option 2: * Disposal to the sewer under a Trade Waste Agreement with Sydney Water.	Generally, will require further negotiation and establishment of water quality criteria prior to disposal. Water quality screening levels will depend on the specific trade waste agreement with Sydney Water.
Option 3: ** Tanker off-site for disposal at a licensed liquid waste treatment facility.	May be suitable for more heavily contaminated liquids where on-site treatment is not practicable. Appropriate as a contingency strategy. Can be limited in applicability for larger volumes of water. Water quality screening levels will depend on specific requirements of the waste facility (including their Environmental Protection Licence conditions)

Notes: * Sydney Water has a general policy of only issuing a trade waste agreement for disposal of water from excavations where all other options have been exhausted.
** Off-site disposal of water by a tanker is generally only considered suitable in cases where periodic / batch disposal of groundwater is required (e.g., ephemeral water sources / rainfall / minor seepage only). Where continuous discharge is anticipated, this option is not feasible from an economic and / or environmental (i.e., emissions) perspective given the requirement to transport large volumes via truck at distance. It may be considered as a contingency strategy if any notable contamination which may be outside the operating capacity of the on-site treatment system is identified prior to disposal.

9.4 Water quality control

As outlined in Section 2.2, the preferred disposal option is discharge to the stormwater, subject to approval from relevant authorities, and appropriate testing and treatment as described in subsequent sections.

Based on the water testing discussed in Section 5.2.3 and the environmental risk assessment conducted in Section 8.2, it is likely that some form of treatment of groundwater will be required prior to discharge.

9.4.1 Discharge criteria

The discharge criteria, and rationale for the criteria are provided in Appendix F. The adopted discharge criteria are based on the stormwater system discharging to Neutral Bay, a marine water body. The discharge criteria include levels adopted from:

- ANZG, 'Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018' (ANZG, 2018), with a 95% level of protection (LOP) for marine water ecosystems;
- NHMRC Guidelines for Managing Risks In Recreational Water (NHMRC, 2008);
- HEPA *PFAS National Environmental Management Plan (NEMP)* (HEPA, 2025), with a 95% level of protection (LOP) for marine water ecosystems; and
- ANZECC, Australian Water Quality Guidelines 2000, Tables 3.3.2 to 3.3.3 Default trigger values for physical and chemical stressors in south-east Australia for slightly disturbed ecosystems (i.e., marine waters) (ANZECC, 2000). Physiochemical parameters are considered indicative only, and should not necessitate treatment without further review, e.g., pH 7 (neutral) water would be practicable to discharge to a marine (pH ~8-8.5) environment.

It is noted that testing has not been conducted from the receiving body, but if this is undertaken in the future it would be appropriate to refine the discharge criteria based on the obtained water quality data.

The discharge criteria are subject to the approval of the Council or other consent authority responsible for the receiving water body and stormwater network.

9.4.2 Treatment options

Potential treatment options for managing groundwater quality prior to discharge may include:

- Sediment control: Settling tanks or flocculation to reduce turbidity and suspended solids.
- pH adjustment: Dosing with lime or acid to achieve acceptable discharge pH.
- Metals removal: Filtration or chemical precipitation, if metal concentrations exceed guidelines following flocculation.
- Hydrocarbon removal: Use of activated carbon filters.

The treatment system will be designed by the dewatering contractor based on construction specifications, groundwater quality results and the discharge criteria. A detailed treatment schematic will be provided in the detailed DMP prior to construction.

9.4.3 Proposed water quality monitoring

Water quality monitoring will be conducted in three phases, as follows:

- Baseline monitoring: conducted prior to commencement of dewatering to inform treatment requirement and disposal options;
- Treatment trial monitoring: conducted at the start up period of dewatering to assess the success of the treatment equipment prior to discharge;
- Routine monitoring: conducted throughout the dewatering and discharge period.

The requirements for each phase are provided below.

9.4.3.1 Baseline monitoring

The purpose of the baseline monitoring is to assess the quality of the untreated groundwater to inform the required treatment prior to discharge to prevent environmental harm of the receiving water body.

The previous groundwater testing (discussed in Section 5.2.3) is considered to be suitable to address baseline monitoring requirements and inform dewatering and treatment requirements, with the exception of contaminants that exceeded the discharge criteria, including metals and TRH. Accordingly, an additional round of groundwater sampling is recommended from all two groundwater wells for analysis of metals TRH and silica gel clean of TRH. The results will be used to further inform treatment requirements.

The following additional baseline water quality testing is also recommended to inform treatment / management requirements:

- Collection of a sample from the receiving surface water body (Neutral Bay) and analysis for:
  - Hardness, pH, temperature; and
  - Metals and TRH.

Sampling is to be conducted by a suitably qualified environmental consultant. Water quality sampling from groundwater wells should be conducted in accordance with Geoscience Australia's Groundwater Sampling and Analysis – A Field Guide (Geoscience Australia 2009).

Quality assurance / quality control (QA/QC) procedures should be used to establish accurate, reliable and precise results. QA/QC procedures should include: calibration of equipment, analyses of samples within holding times, keeping samples chilled and wearing gloves during sampling.

9.4.3.2 Treatment trial monitoring

The purpose of the treatment trial and associated monitoring is to assess the success of the treatment method in treating water to meet the discharge criteria, or any modifications required to treat the water to meet the discharge criteria.

The treatment trial may operate using a batch or continuous treatment. For a batch treatment approach, the treated water can be disposed to stormwater following confirmation it meets the discharge criteria, subject to Council approval. For a continuous treatment approach the treated water cannot be disposed to stormwater until the treatment trial has been successfully completed. The treated groundwater may be stored on site or dispose of via an alternative method (e.g. to a licenced liquid waste facility).

For batch-based treatment, sampling events can be conducted for each batch, with a maximum of one batch of water treated a day. For continuous treatment, testing should occur every one to three days.

The treatment trial monitoring is to include testing for the analytes listed in Section 9.4.3.4.

The treatment trial is to continue until three sequential samples of treated water meet the discharge criteria.

Sampling and analysis of three samples of untreated water (over three sampling events) for all analytes in Section 9.4.3.4 is also to be conducted, either as part of the treatment trial (if suitable water available for sampling), or otherwise in the initial stage of the routine testing.

9.4.3.3 Routine monitoring

The purpose of the routine monitoring is to assess ongoing compliance with the discharge criteria. Changes in the water quality post treatment may occur due to changes in the extracted / input water quality or changes during treatment (eg, filters nearing end of life).

The base requirements for routine monitoring are provided in Section 9.5. The sampling frequency and analytical suite should be reviewed by the Environmental Consultant during the dewatering period. Based on this review the Environmental Consultant may recommend:

- Removing some analytes, due to sufficient data being available to assess that they are not of concern;
- A reduction in the frequency of analysis of some analytes, due to sufficient data being available to show consistency in water quality;
- Analysis of additional analytes, or more frequent analysis of some or all analytes, due to variability in the results or additional risks being identified based on field observations of laboratory results.

Recommendations for reductions in the analytical programme should be approved by Council prior to being implemented.

9.4.3.4 Analytes

The testing suite has been adopted based on the following information:

- The requirements of DPE (2022);
- The contaminants of potential concern identified in the previous investigations (refer to Section 4.7);
- The baseline water quality data (refer to Section 5.2.3);
- The potential for spills / leaks during excavation works;
- General parameters to inform suitability of the water for discharge and changes in groundwater source.

Table 11: Proposed suite of analytes for water quality monitoring

Category	Analytes	Minimum frequency
Field parameters	pH, EC, REDOX potential (Eh), temperature, dissolved oxygen visible / olfactory signs of turbidity, oil / grease /noxious odours	Baseline [1] Treatment trial [1] Daily
Physical parameters	TDS, TSS	Baseline [1] Treatment trial [1] Monthly [1]
Major ions	Calcium (Ca), magnesium (Mg), sodium (Na), potassium (K) Cation/anion balance (as a percentage)	Treatment trial (one sampling event) [1] Monthly [1]
Metals (total)	Arsenic, cadmium, chromium, copper, iron, mercury, nickel, lead and zinc	Baseline [1] Treatment trial [2] Every routine sampling event [2]
Potential contaminants	TRH (or TPH), BTEX, PAH	Baseline [1] Treatment trial [2] Every routine sampling event [2]

Notes:

1. Based on requirements of DPE (2022)
2. Based on available data. Sampling requirements and frequencies may be reviewed as discussed in Section 9.4.3.3

Acronyms:

EC: electrical conductivity | TDS: total dissolved solids | TSS: total suspended solids
TRH: total recoverable hydrocarbons | TPH: total petroleum hydrocarbons
BTEX: benzene, toluene, ethylbenzene and xylenes
PAH: polycyclic aromatic hydrocarbons

9.5 Monitoring and reporting requirements

The following monitoring program and associated reporting is to be adopted until the end of excavation and construction works on-site.

Table 12: Monitoring and reporting requirements

Item	Monitoring requirements	Methodology
Visual inspection	No visible oil and grease, sheen, significant discolouration or odours.	Daily inspections (by contractor). **HOLD POINT -** If indicators are observed, discharge must be suspended pending analytical confirmation.
Field parameter assessment	pH, daily, preferably continuously Visible / olfactory signs of turbidity, oil / grease, chemical / noxious odours: daily	• Prior to discharge / daily during discharge (by contractor)
Water quality sampling and testing	Samples from treated water to assess compliance with discharge criteria (Appendix F). As per analytical requirements in Section 9.4.3.4. Samples from untreated water as required to inform treatment requirements.	All monitoring: • Sampling by suitably experienced environmental engineer / scientist. • Field parameters (pH, EC, turbidity) using field probes. • Chain of Custody (COC) documentation to accompany all samples. • Analysis by a NATA-accredited laboratory. Baseline and treatment trial • As per Section 9.4.3. Routine • Fortnightly for initial two months following completion of treatment trial, then monthly unless otherwise recommended by the Environmental Consultant. • Review and update frequency in accordance with Section 9.4.3.4. **HOLD POINT -** If water exceeds the discharge criteria, manage as per contingency strategy (Section 9.7).
Quality control sampling	Replicate sampling to verify lab result accuracy.	• Conducted during above sampling events. • Analyse at a rate of 10% of samples. • Testing suite: Metals, TRH, BTEX. • Results to be included in final dewatering completion report.

Item	Monitoring requirements	Methodology
Quantity of groundwater inflows	Measurements of groundwater volumes (as per Section 9.2).	• Weekly monitoring and reporting of groundwater abstraction volumes. • Weekly reporting of volumes to the Environmental Consultant. • Results to be included in final dewatering completion report. **HOLD POINT -** If volumes exceed trigger levels or Council discharge allowance, works must be halted to minimise inflow (e.g., via grouting).
Dewatering completion report	Final documentation of the dewatering program.	Prepared by a suitably qualified consultant and to include: • Summary of contractor records (e.g. visual inspections, unexpected finds) • Full analytical and quality control results. • Records of dewatering volumes. • Commentary on compliance and any non-conformances with the DMP.

9.6 Personnel and responsibilities

Table 13 below outlines the proposed project personnel and relevant responsibilities as part of the management plan.

Table 13: Personnel and Responsibilities

Role	Responsibilities
Site Manager / Contractor	Routine visual inspection. Monitoring / recording of dewatering / discharge volumes. Maintaining any unexpected / contingency records.
Dewatering Contractor	Design / specification and ongoing maintenance of the dewatering system.
Geotechnical Consultant	Groundwater level monitoring and review of disposal volumes. Assist in preparation of the dewatering completion report.
Environmental Consultant	Water quality sampling (analysis using NATA accredited laboratories). Interim advice for each sampling event to confirm (or otherwise) compliance with discharge criteria. Quality control sampling. Assist in preparation of the dewatering completion report.

9.7 Contingency plan

As per Section 9.5, at any hold point if any non-conformance is encountered then the following general contingency plan will be enacted:

- Entity recording the non-conformance to notify the Site Manager / Contractor and other relevant parties (eg geotechnical or Environmental Consultant);
- Dewatering volumes:
  - Suspend discharge;
  - Should dewatering volumes be higher than predicted or higher than discharge limits provided by relevant authorities, suspend construction and reduce pumping rates. Options could include grouting to reduce groundwater inflows;
- Water quality discharge criteria non-conformance:
  - Review of results by Environmental Consultant to assess potential risk to environment;
  - Should water quality be deemed unsuitable for disposal, suspend dewatering and (further) treat water prior to discharge;
  - If relevant, Environmental Consultant to inspect the site / unexpected finds and collect additional water quality samples to assess issue of concern;
  - Review treatment procedures and update methodology as required to improve treatment outcomes;
  - Written advice by the Environmental Consultant that additional laboratory analytical results meet the discharge criteria and / or that recommending that continued

discharge is not considered to pose an unacceptable environmental risk and / or recommending additional work (as applicable).

- Off-site tankering may be adopted to meet disposal requirements; and
- Notification to relevant regulatory authorities, as required under approvals.

10. Approvals and licensing

This section outlines the approvals, licences and other authorisations required for the proposed dewatering activities, consistent with the *Water Management Act 2000*, WaterNSW requirements, and any relevant local council or EPA obligations.

10.1 Water Access Licence (WAL) and entitlements

Dewatering of groundwater for construction purposes constitutes an aquifer interference activity under the *Water Management Act 2000* and may require a Water Access Licence (WAL) and appropriate water entitlement units (share and extraction components), depending on the water source and proposed take.

In accordance with the Water Management (General) Regulation Act 2018, extraction of water from the greater metropolitan region groundwater source for the purpose of construction dewatering are currently exempt from requiring a Water Access License (WAL) under the coastal construction of infrastructure exemption clause.

For long-term, continuous dewatering of the basement, the predicted groundwater inflows into the proposed basement in the base case are less than 3 ML per year, therefore the development is highly likely not to require a WAL as it meets exemption under Clause 21(2) of the Water Management (General) Regulation 2018. Should the monitoring of the actual inflow volume during the construction suggest it is likely to exceed 3 ML, a Water Access Licence would be required with appropriate groundwater share allocation from NRAR (1 water share per 1 ML).

Actual inflow volumes will only be known at the time of excavation and allowances for variation in the inflow rate should be made. In this regard, inflow volume records during construction when actual inflows are known should be maintained and reported to DCCEEW within 28 days of the water year finishing (i.e. Before 28 July).

10.2 Water Supply Works Approval (WSWA)

As the project is for an SSDA it is exempt from a water supply work approval (WSWA, under the *Water Management Act 2000*). The exemption is typically granted through the DCCEEW for SSDA projects.

10.3 Council and EPA approvals

Depending on the proposed discharge route and water quality:

- Discharge to stormwater: Council approval may be required. Acceptance criteria typically align with ANZG (2018) guidelines and site-specific conditions – refer to Section 9.4.1;
- Discharge off-site: A licensed contractor must be engaged, and records of transport and disposal must be maintained – refer to Section 9.3;
- Environmental Protection Licence (EPL): May be required if discharge volumes or quality trigger thresholds under the Protection of the Environment Operations Act 1997.

11. Conclusion

The proposed development is expected to have a basement FFL of RL 10.1 mAHD which will require excavations of up to 25 m below existing surface levels with deeper localised excavations required for the lift cores. The proposed building is expected to be designed as drained and is expected that dewatering of the site will be achievable via conventional sumps and pumps with groundwater discharging into the council stormwater system.

The maximum recorded groundwater levels and the geometric mean horizontal permeability values have been adopted in a 2D groundwater modelling for the proposed development. The results of the base case analysis indicate that the predicted annual inflow into the drained basement is 0.8 ML for long-term dewatering. As the predicted inflow rate (base case) is less than 3 ML per year, a WAL is unlikely to be required, unless the monitoring of the actual inflow during construction suggests otherwise.

A sensitivity case was also considered for a more conservative scenario, where the horizontal permeability value was assumed as 5 times the base-case value. The results of the sensitivity case indicates that inflows into the basement for continuous long-term dewatering could exceed 3 ML per annum with an estimated inflow of approximately 4.3 ML per year. Despite this increase of volume, the assessed impact remains within the 'Level 1 Minimal Impact Considerations' as defined by the AIP.

Disposal of the groundwater seepage should be managed appropriately with the relevant authorities, and will require treatment of the groundwater prior to disposal, which is typical. Ongoing monitoring of groundwater quality will be required during discharge periods to confirm compliance with the water quality acceptance criteria.

As any drawdown is predicted to be within the rock profile, the risk of subsidence in neighbouring structures and public infrastructure is expected to be negligible.

From a hydrogeological viewpoint, it is considered that a drained basement is feasible without significant impacts on surrounding groundwater systems or property, subject to review and approval from DCCEEW and other relevant authorities.

It should be noted that if there are changes to surrounding basements or water levels are found to be higher than assumed, there may be an increase in groundwater inflows which should be considered for basement design.

12. References

ANZECC. (2000). *Australian Water Quality Guidelines 2000', Tables 3.3.2 to 3.3.3 Default trigger values for physical and chemical stressors in south-east Australia for slightly disturbed ecosystems* .

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Douglas. (2024). *Report on geotechnical investigation - Proposed Mixed Use Development - BATA Phase 2 - Lot F.* Reference 85009.05.R.003.Rev0. Dated 14 June 2024: Prepared for Karimbla Constructions Services.

Douglas. (2026a). *Report on Geotechnical Investigation (Reference 239528.00.R.001.Rev1, dated 18 June 2026).*

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NSW DPIE. (2023). Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023. NSW Department of Planning and Environment.

WaterNSW. Fact Sheet – *Construction dewatering – Information for councils and applicants.*

WaterNSW. Fact Sheet – *Construction dewatering – General terms of approval.*

13. 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 (Reference 239528.00.P.001.Rev2, dated 23 March 2026) and acceptance received from John Basilisco of Tara Shore Pty Ltd ATF John Taylor Family Trust. 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 previous 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 / 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

About this report

About this Report

October 2024

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

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.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, 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.

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 Strength

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

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

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

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

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

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

Degree of Weathering

The degree of weathering of rock is classified as follows:

Weathering Term	Description	Abbreviation Code
Residual Soil[1]	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.	RS
Extremely weathered[1]	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible	XW
Highly weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching or may be decreased due to deposition of weathering products in pores.	HW
Moderately weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable but shows little or no change of strength from fresh rock.	MW
Slightly weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.	SW
Fresh	No signs of decomposition or staining.	FR
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.	DW

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

Degree of Alteration

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

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

Degree of Fracturing

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

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

Rock Quality Designation

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

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

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

Stratification Spacing

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

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

Defect Descriptions

Defect Type

Term	Abbreviation Code
Bedding plane	B
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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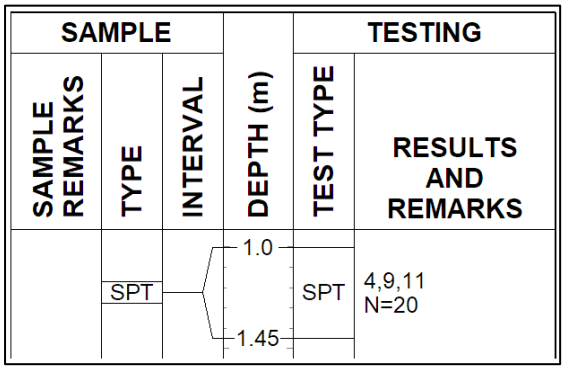
Sampling, Testing and Excavation Methodology

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

Douglas PARTNERS

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

A

A'

ELEVATION (AHD)

MOUNT ST SB RAMP (RECENTLY CONSTRUCTED)

ALFRED STREET

RL40.0-40.3

WARRINGAH FWY (LEVEL APPROXIMATE)

APPROXIMATE SITE BOUNDARY

EXISTING NO.273 FFL AT ~RL38.5

BH201

BH202

BH203

JK1 (+14.88)

JK3 (+17.36)

UNIT 1
CONCRETE FLOOR SLAB AND FILL

UNIT 4

UNIT 4

UNIT 6

UNIT 5

UNIT 5

UNIT 6

400mm thick low strength band

Zone of high water loss (multiple joints)

INFERRED SHALLOW SANDSTONE BELOW PAVEMENT LAYERS (TO BE INVESTIGATED AT A LATER DATE)

HA REFUSAL ON SANDSTONE

FOOTPATH

APPROXIMATE SITE BOUNDARY

NO.7 LITTLE ALFRED ST (+ OTHER RESIDENTIAL DWELLINGS)

RL 43.6

LITTLE ALFRED ST (EXTENDS ABOUT 1.8m INTO BOUNDARY)

MS SANDSTONE VISIBLE BEHIND BRICK WALL

PROPOSED 9 LEVEL BASEMENT FFL AT RL 10.06m AHD

UNIT 1: FILL
UNIT 2: RESIDUAL SOIL
UNIT 3: VL SANDSTONE
UNIT 4: L AND L-M SANDSTONE
UNIT 5: M SILTSTONE/SANDSTONE
UNIT 6: M AND H SANDSTONE

DISTANCE ALONG PROFILE (m)

LEGEND

CONCRETE
NO CORE
FILL
SANDSTONE
SILTSTONE
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
	38 / 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		
	1	SANDSTONE: pale grey, medium to coarse grained; medium strength.			NA	NA		D		0.50	PID	<1ppm		
	1.15	Continued as rock log												
	37 / 2									1				
	36 / 3									2				
	35 / 4									3				
	34 / 5									4			Sand	
	33 / 6									5				
	32 / 7									6				
	31 / 8									7				
	30 / 9									8				
	29									9				

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

PLANT: Comacchio 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

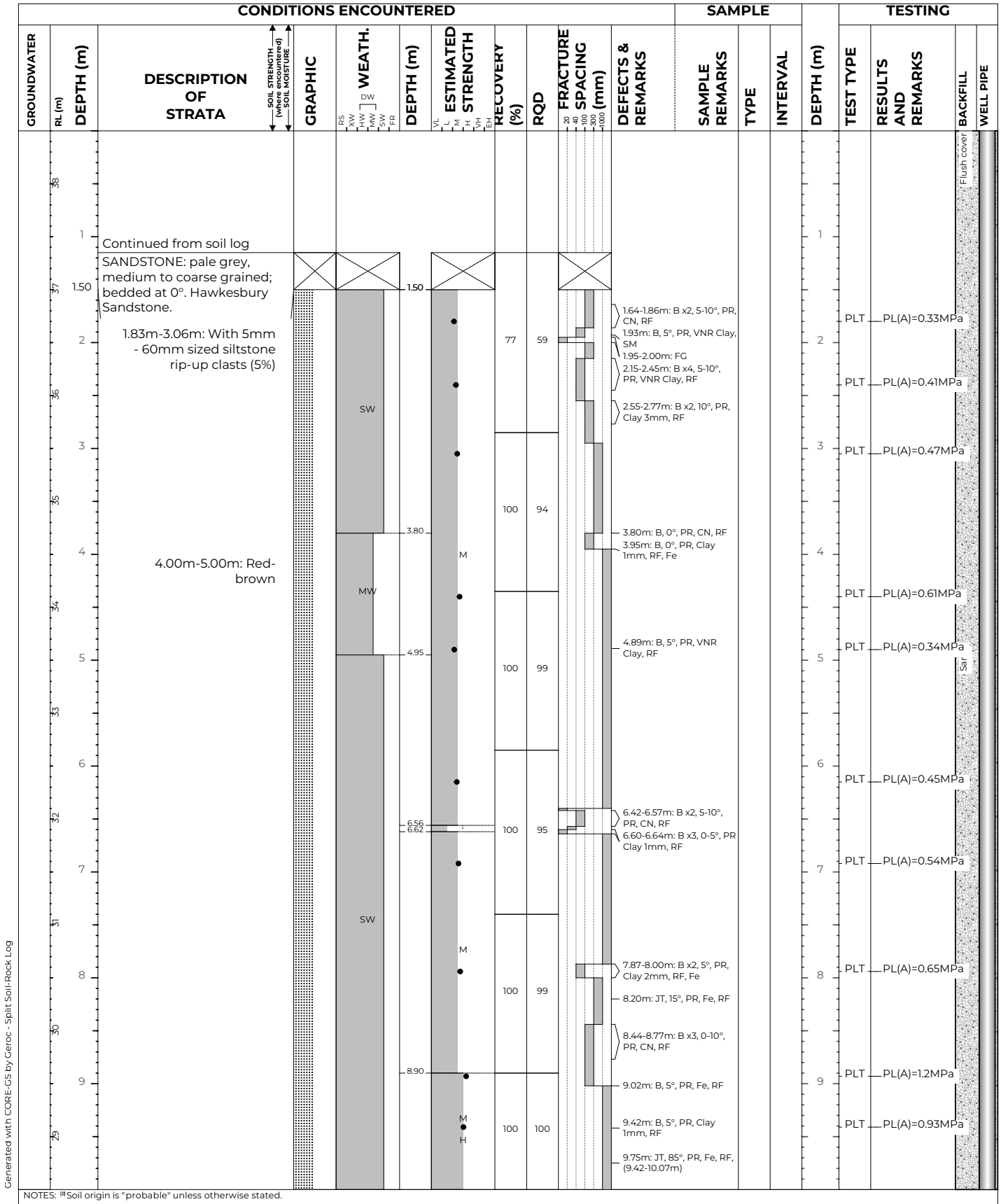
Douglas PARTNERS

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: 2 of 5



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

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

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

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	SOIL STRENGTH (where encountered) / SOIL MOISTURE	GRAPHIC	WEATH.	DEPTH (m)	ESTIMATED STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (mm)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	28	10.00	SANDSTONE: As previous.			SW		M - H	100	100		10.66m: JT, 85°, PR, Fe, RF, (10.28-11.03m)				11	PLT	PL(A)=1.1MPa		50mm PVC
	27	11							100	100		11.19m: B, 5°, PR, Clay 2mm, RF				12	PLT	PL(A)=1.2MPa		
	26	12					12.76		96	94		12.23-12.81m: B x4, 0-5°, PR, CN, RF				13	PLT	PL(A)=0.90MPa		
		12.84					12.90													
		12.90	12.90m-14.67m: With red-brown iron stained bands			SW	13.00													
	25					MW		M								14	PLT	PL(A)=0.36MPa		
	24	14	13.98m: Siltstone rip-up clast (~50mm diameter)						96	82		13.51-14.66m: B x7, 0-5°, PR, CN, RF								
						FR	14.66					14.75m: B, 5°, PR, Clay 2mm, RF								
		14.90					14.95									15	PLT	PL(A)=0.92MPa	Sa	
	23								100	100										
		16						M								16	PLT	PL(A)=0.85MPa		
	22											16.61m: B, 5°, PR, Clay 1mm, RF								
												16.78m: B, 5°, PR, VNR Clay, RF								
		17					17.05					17.05m: B, 0°, PR, Clay 1mm, RF				17	PLT	PL(A)=0.97MPa		
	21					FR			100	100										
		18	18.00m-21.00m: Massive					H								18	PLT	PL(A)=1.5MPa		
	20								100	100										
	19	19														19	PLT	PL(A)=1.4MPa		
									100	100										
																	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

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	ESTIMATED STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (mm)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
23/03/26 ▼	18	20.00	SANDSTONE: As previous.				H	100	100						21	PLT	PL(A)=1.3MPa	Bentonite	
27/03/26 ▼	17	21				21.00													
		22						100	93		21.86-21.96m: B x3, 0-5°, PR, Clay 2mm, RF				22	PLT	PL(A)=0.52MPa		
	16	23	23.35m: Siltstone rip-up clasts				M								23	PLT	PL(A)=0.87MPa		
	15	23.44	INTERBEDDED SANDSTONE/SILTSTONE: grey and dark grey, fine lithic sandstone. Hawkesbury Sandstone.					100	80		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					PLT	PL(A)=0.54MPa		
	14	24													24				
		24.38	SANDSTONE: grey, medium to coarse grained. Hawkesbury Sandstone.			24.38					24.32m: B, 0°, PR, Clay 2mm, RF								
	13	25			FR			100	100						25	PLT	PL(A)=1.1MPa	Sand	
							M - H												
		26									25.67-25.69m: EW, 15mm				26	PLT	PL(A)=1.0MPa		
	12					26.50		100	97		26.11-26.13m: B x2, 5°, PR, VR, patchy VNR								
		27					M								27	PLT	PL(A)=0.49MPa		50mm PVC
	11					27.40		100	100										
		28					H								28	PLT	PL(A)=1.2MPa		
	10																		
		29	29.15m: Quartz and siltstone clasts 29.27m-29.61m: With siltstone rip-up clasts (10mm)			29.20		100	100						29	PLT	PL(A)=1.1MPa		
	9	29.62	SILTSTONE: dark grey. Hawkesbury Sandstone.				M												
		29.86						100	100							PLT	PL(A)=0.55MPa		

NOTES: [d] 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

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: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

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	ESTIMATED STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (mm)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	8	30.12	SANDSTONE: grey. Hawkesbury Sandstone.				M	100	100									Sand	
		30.53	SILTSTONE: dark grey. Hawkesbury Sandstone.																
			SANDSTONE: grey, medium to coarse grained. Hawkesbury Sandstone.		FR	31.10									31			Bentonite	
	7	31	30.53m-30.72m: With siltstone rip-up clasts (10%)																
	6	32	31.67m: Siltstone rip-up clast				H	100	100						32	PLT	PL(A)=1.1MPa		
		33						100	100						33	PLT	PL(A)=1.3MPa	Sand	
	5																		
		34				33.95	M	100	100		34.07m: B, 5°, PR, Clay 1mm, RF				34	PLT	PL(A)=0.85MPa		
	4					34.08													
		35	Borehole discontinued at 35.08m depth. Target Depth Reached.				H	100	100						35	PLT	PL(A)=1.1MPa		
	3																		
		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

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

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
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

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								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
	38	0.14	CONCRETE.		NA	NA	NA		D		0.15	PID	<1ppm	Flush cover
		0.30	FILL / GRAVEL: dark grey; medium, angular, igneous; (subfloor drainage).		FILL	ND	ND		D		0.20	PID	<1ppm	
		0.50	FILL / SAND trace gravel: pale brown to orange; medium; trace plastic fragments.		FILL		M				0.40			
		1.00	SANDSTONE: pale grey, medium grained, medium strength. Hawkesbury Sandstone.			NA	NA							Sand
	37	2	Continued as rock log								1			
	36	3									2			
	35	4									3			
	34	5									4			
	33	6									5			
	32	7									6			
	31	8									7			
	30	9									8			
	29										9			

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

PLANT: Comacchio 305
OPERATOR: Ground Test (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

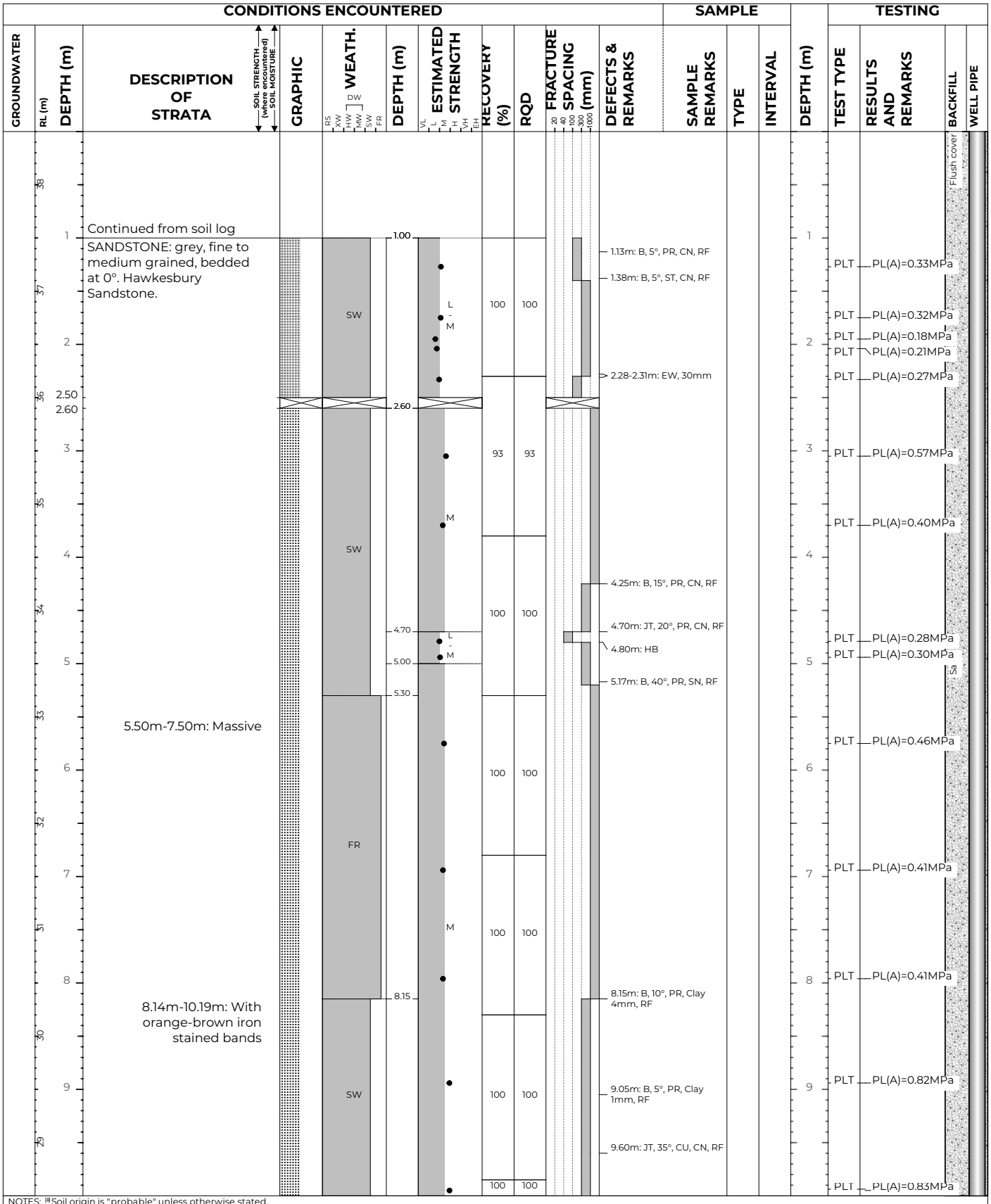
Generated with CORE-GS by Geroc - Split Soil-Rock Log

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 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

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**

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	SOIL STRENGTH (where encountered) / SOIL MOISTURE	GRAPHIC	WEATH.	DEPTH (m)	ESTIMATED STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (mm)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	28	10.00	[CONT] SANDSTONE: grey, fine to medium grained, bedded at 0°. Hawkesbury Sandstone.			SW			100	100		10.23-10.26m: EW, 30mm 10.75m: B, 5°, PR, Clay 1mm				11				
	27	11	10.23m-11.30m: With 5mm - 50mm sized siltstone clasts (5-10%)				11.35					11.28m: JT, 35°, PR, OP								
	26	12				FR			100	98		11.88m: EW, 2°, PR, 10mm 12.27m: B, 2°, PR, Clay 1mm 12.30m: B, 2°, PR, CN, RF				12	PLT	PL(A)=0.37MPa		50mm PVC
	25	13	From 13.00m: Red-brown and orange-brown				13.00									13	PLT	PL(A)=0.67MPa		
	24	14							100	100		13.90m: B, 5°, PR, CN, RF 14.40m: B, 5°, PR, CN, RF				14	PLT	PL(A)=0.65MPa		
	23	15				SW		M	100	96		14.89-14.92m: EW, 30mm				15	PLT	PL(A)=0.76MPa	Sand	
	22	16							100	100		16.33m: B, 5°, PR, CN, RF				16	PLT	PL(A)=0.69MPa		
	21	17	From 17.32m: Grey				17.35					17.59m: B, 10°, PR, Clay 1mm, RF 17.61m: B, 5°, PR, Clay 1mm, RF				17	PLT	PL(A)=0.58MPa		
	20	18	17.82m-22.46m: Massive			FR			100	98						18	PLT	PL(A)=0.48MPa		
	19	19							100	100						19	PLT	PL(A)=1.0MPa		
	18																PLT	PL(A)=0.90MPa		

NOTES: [d] 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

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: 4 of 5

CONDITIONS ENCOUNTERED

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	SOIL STRENGTH (where encountered) / SOIL MOISTURE	GRAPHIC	WEATH. (RS, XW, HW, DW, MW, SW, FR)	DEPTH (m)	ESTIMATED STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (mm)	DEFECTS & REMARKS
23/03/26	18	20.00	[CONT] SANDSTONE: grey, fine to medium grained, bedded at 0°. Hawkesbury Sandstone.					M	100	100		
27/03/26	17						20.50					
	21							H				21.30-21.37m: JT x2, 2°, PR, CN, RF
	16						21.50		100	95		
	22							M				22.68m: JT, 35°, PR, CN, SM 22.82m: B, 25°, IR, VR
	15	22.53	INTERBEDDED SANDSTONE/SILTSTONE: dark grey, fine lithic sandstone, with disturbed bedding. Hawkesbury Sandstone.						100	99		23.15m: JT, 80°, PR, Clay 5mm, (23-23.3m) 23.30m: EW, 5°, 35mm
	23	23.31	SANDSTONE: grey, fine to medium grained, slightly fractured. Hawkesbury Sandstone.				23.30	H				
	14								100	92		23.85-24.72m: JT, 90°, PR, Clay 1mm, RF
	24		24.70m-25.65m: Fractured zone (high water loss from packer testing)				24.70	L				24.72m: JT, 20°, PR, CN, RF
	13					FR	25.07					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
	25								100	81		
	12							M				26.37-27.25m: B x3, 2°, PR, CN, VR
	26								100	95		
	11						27.50					27.66-27.70m: B, 15°, PR, Clay 1mm
	27		28.34m: Band of 10mm rounded clasts									
	10	28.48	INTERBEDDED SANDSTONE/SILTSTONE: dark grey, fine. Hawkesbury Sandstone.					H	100	96		28.41m: JT, 75°, PR, CN 28.50-28.64m: B, 5°, PR, CN, RF
	28	28.80	SANDSTONE: grey, medium grained. Hawkesbury Sandstone.									
	9	29.45							100	100		
	29	29.82										

SAMPLE

SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)
			21
			22
			23
			24
			25
			26
			27
			28
			29

TESTING

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

BACKFILL: Sand; Bentonite; Sand
WELL PIPE

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

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: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

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	ESTIMATED STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (mm)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	8	30	INTERLAMINATED SANDSTONE/SILTSTONE: dark grey, fine lithic sandstone. Hawkesbury Sandstone.					100	100						30			Sand	
	7	31	SANDSTONE: grey, fine to medium grained, with intermittent cross bedding at 10-15°. Hawkesbury Sandstone.								31.22m: B, 10°, PR, RF				31	PLT	PL(A)=1.1MPa		
																PLT	PL(A)=1.3MPa	Bentonite	
	6	32			FR		H	100	100		32.10m: B, 10°, PR, RF				32				
	5	33	33.69m: 30mm band of 10mm siltstone clasts					100	100						33	PLT	PL(A)=1.1MPa	Backfill	
		34	Borehole discontinued at 34.00m depth. Target Depth Reached.													PLT	PL(A)=1.3MPa		
	4	35																	
	3	36																	
	2	37																	
	1	38																	
	0	39																	
	-1																		

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

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

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°/---°

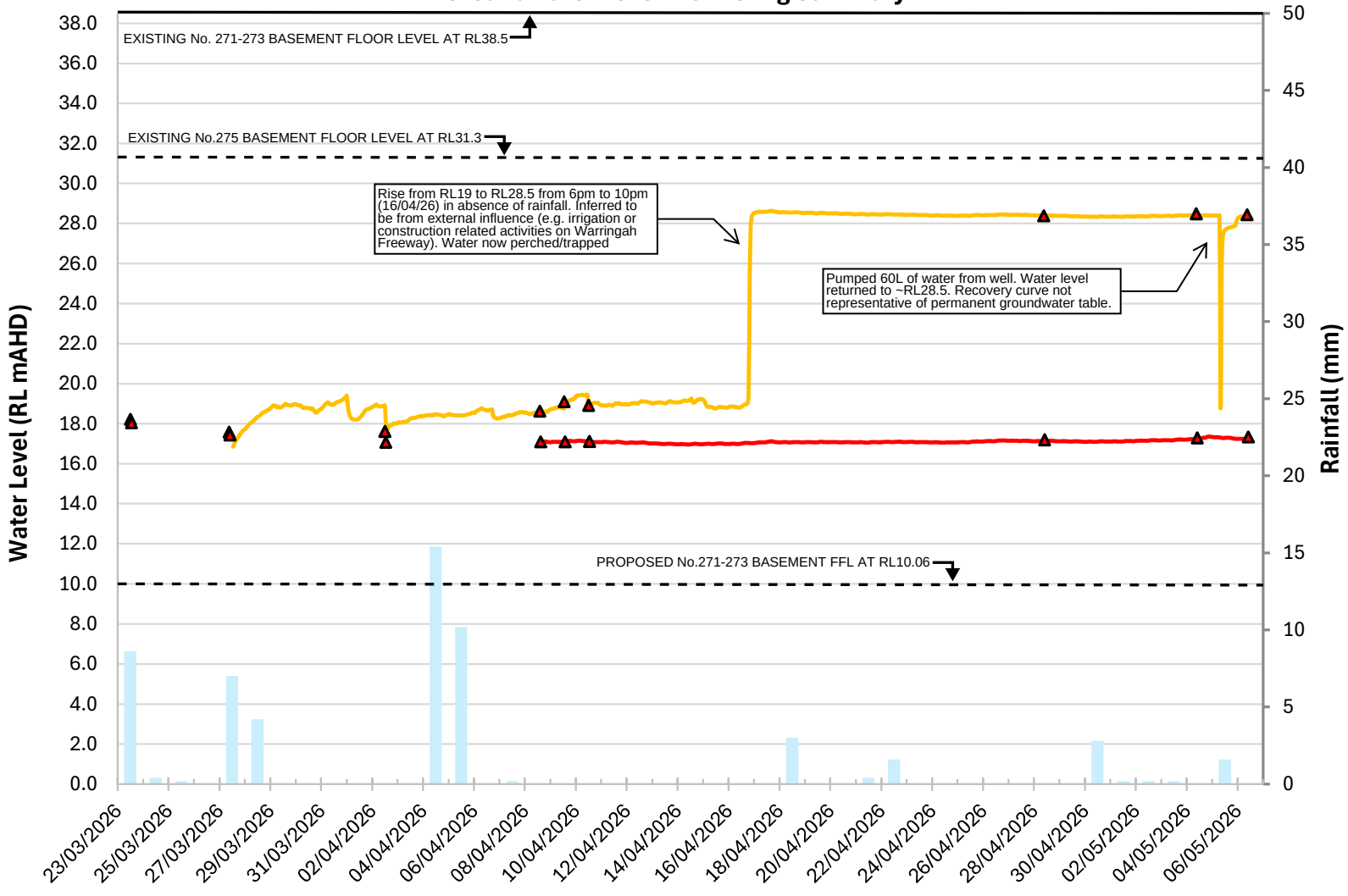
LOCATION ID: BH202
PROJECT No: 239528.00
DATE: 18/03/26 - 20/03/26
SHEET: 5 of 5

32.00-34.00 m depth

Appendix D

Hydrographs

Groundwater Level Monitoring Summary



Douglas PARTNERS

Rainfall
BH201
BH202
Dip Depths

Date:	From	Drawn:
6/05/2026	27/03/2026	JV
	To	Checked:
	6/05/2026	JV

Note: Reading Interval = 1 hour. Rainfall sourced from BOM Station: Sydney Observatory 66214

Appendix E

Hydraulic testing 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

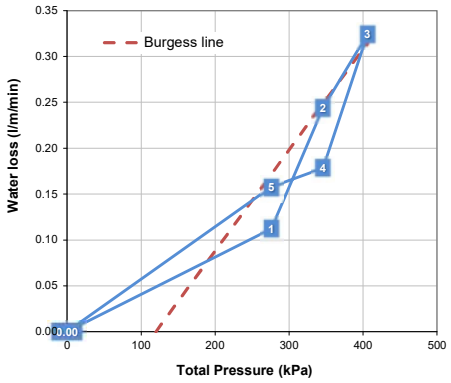
Test Details

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

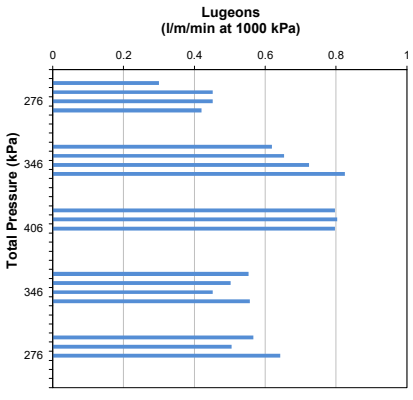
Notes



Averages			
Stage	Pressure	Water Loss	Lugeons (l/m/min at
	(kPa)	(l/m/min)	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

Calculated: 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 : Proposed Residential Development
Location : 271-273 Alfred Street, North Sydney

Project No. : 230928.00
Bore : BH201
Test section : 27 m - 35.08 m

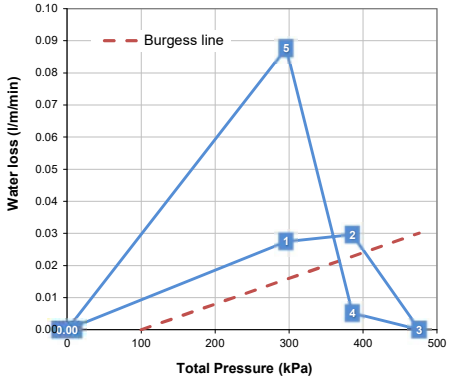
Test Details

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

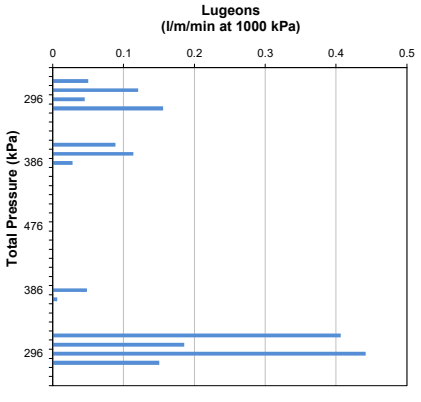
Notes



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

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



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

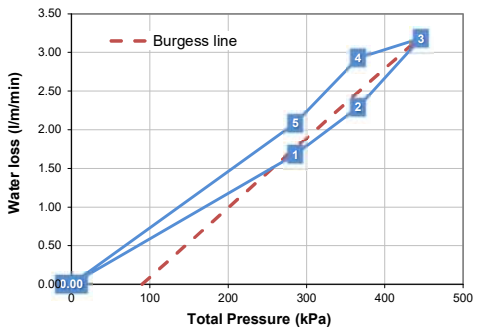
Test Details

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
				Flowmeter			Drum readings			Leakage	Assigned	Loss		Permeability
Hg	Hl	Total	Duration	Initial	Final	Total	Initial	Final	Equivalent		Flow		(l/m/min at	
(kPa)	(kPa)	(kPa)	(min)	(litres)	(litres)	(litres)	(mm)	(mm)	litres	(litres)	(litres)	(l/m/min)	1000 kPa)	(m/sec)
80	0	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

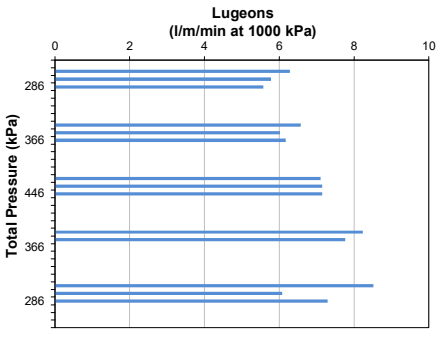
Notes



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



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

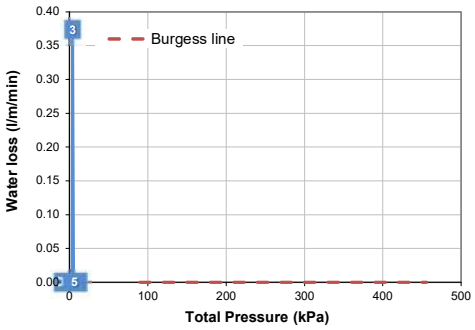
Test Details

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	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)
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

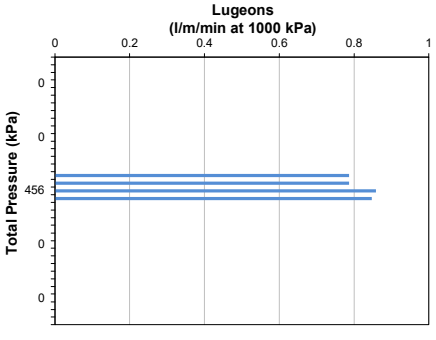
Notes Additional short packer test to identify zone of high permeability from 24m to 30.9m test.



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

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

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



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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

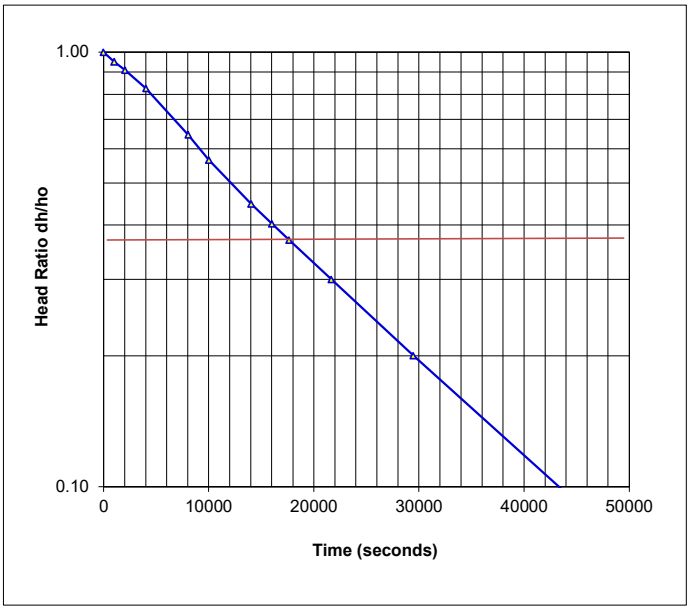
Test No. BH201
Easting: Refer to log m
Northing m
Surface Level: 38.5 m AHD

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

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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. BH202

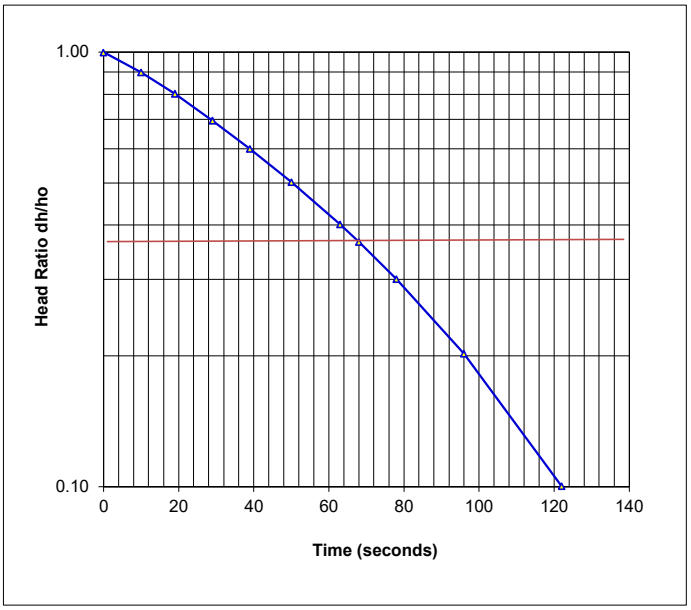
Easting:	Refer to log	m
Northing		m
Surface Level:	38.5	m AHD

Details of Well Installation

Effective diameter (2re)	50	mm	Depth to water before test	21.12	m
borehole diameter (2R)	96	mm	Depth to water at start of test	15.91	m
Effective Length of well screen (Le)	7.00	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

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Permeability Testing

Client:	Tara Shore Pty Ltd ATF the John Taylor Family Trust	Project No:	239528.00
Project:	Proposed Residential Development	Test date:	4-Apr-26
Location:	271-273 Alfred Street, North Sydney NSW	Tested by:	CLB

Test Location
Description: Falling Head - Test 2
Material: Sandstone

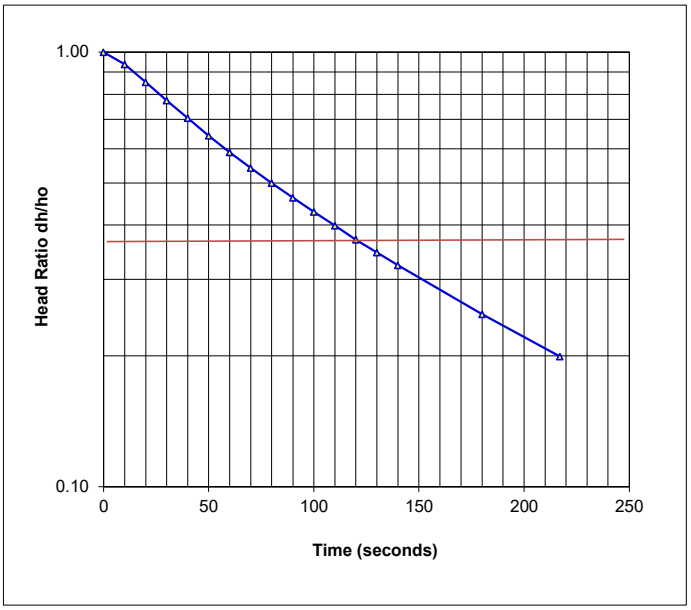
Test No. BH202
Easting: Refer to log m
Northing m
Surface Level: 38.5 m AHD

Details of Well Installation

Effective diameter (2re)	50	mm	Depth to water before test	20.50	m
borehole diameter (2R)	96	mm	Depth to water at start of test	14.51	m
Effective Length of well screen (Le)	7.00	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	14.51	5.99	1.00
10	14.89	5.61	0.94
20	15.40	5.10	0.85
30	15.86	4.64	0.77
40	16.28	4.22	0.70
50	16.65	3.85	0.64
60	16.98	3.52	0.59
70	17.26	3.24	0.54
80	17.51	2.99	0.50
90	17.73	2.77	0.46
100	17.93	2.57	0.43
110	18.12	2.38	0.40
120	18.28	2.22	0.37
130	18.43	2.07	0.35
140	18.57	1.93	0.32
180	19.01	1.49	0.25
217	19.31	1.19	0.20



To = 2.0 mins
120 secs

Theory: Falling Head Permeability calculated using equation by Hvorslev

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

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

Hydraulic Conductivity **k = 1.9E-06** m/sec
= 0.160 m/day

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Permeability Testing

Client:	Tara Shore Pty Ltd ATF the John Taylor Family Trust	Project No:	239528.00
Project:	Proposed Residential Development	Test date:	4-Apr-26
Location:	271-273 Alfred Street, North Sydney NSW	Tested by:	CLB

Test Location
Description: Falling Head - Test 3
Material: Sandstone

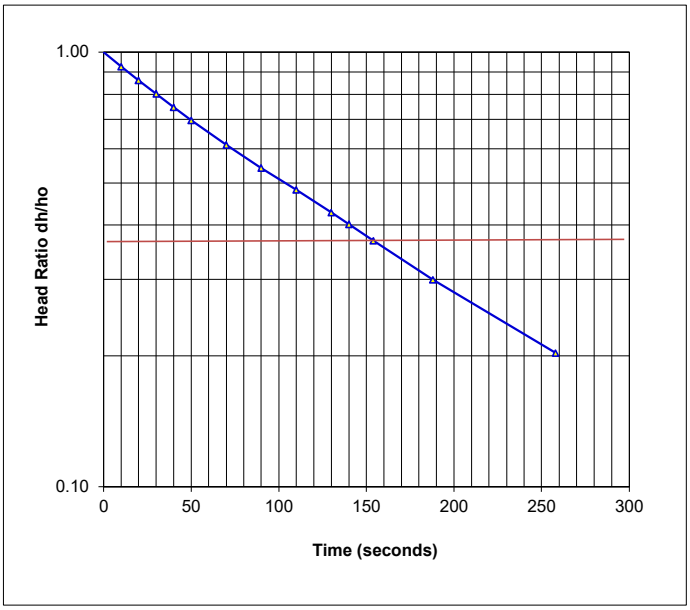
Test No. BH202
Easting: Refer to log m
Northing m
Surface Level: 38.5 m AHD

Details of Well Installation

Effective diameter (2re)	50	mm	Depth to water before test	20.50	m
borehole diameter (2R)	96	mm	Depth to water at start of test	13.54	m
Effective Length of well screen (Le)	7.00	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	13.54	6.96	1.00
10	14.05	6.45	0.93
20	14.50	6.00	0.86
30	14.92	5.58	0.80
40	15.30	5.20	0.75
50	15.65	4.85	0.70
70	16.24	4.26	0.61
90	16.73	3.77	0.54
110	17.15	3.35	0.48
130	17.52	2.98	0.43
140	17.70	2.80	0.40
154	17.94	2.56	0.37
188	18.42	2.08	0.30
258	19.09	1.41	0.20



To = 2.6 mins
154 secs

Theory: Falling Head Permeability calculated using equation by Hvorslev

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

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

Hydraulic Conductivity **k = 1.4E-06** m/sec
= 0.125 m/day

Appendix F

Discharge criteria

1. Introduction

The discharge criteria have been selected based on the potential risks posed from discharge of water via the preferred method (ie. stormwater). The receptors and exposure review is summarised in Table 1.

Table 1: Summary of potential receptors and exposure risks

Receptor	Location	Exposure point	Exposure
Surface water aquatic ecosystem	Down-gradient from site.	Receiving surface water body at the stormwater discharge point.	Exposure to contaminants and physical and chemical stressors.
Human recreation (e.g. swimming)	Down-gradient from site.	Receiving surface water body at the stormwater discharge point.	Ingestion / dermal absorption of contaminants during recreational activities (e.g. swimming).
Liquid waste facility (contingency plan only)	Off-site	Liquid waste facility	Overloading of treatment system / non-compliance at point of treatment system discharge

The rationale for the selection of discharge criteria is provided in Table 2.

Table 2: Discharge criteria rationale

Receptor / beneficial use	Source	Comments / rationale
Aquatic ecosystem	ANZG (2018)	Marine Water 95% LOP for bioaccumulative contaminants and non-bioaccumulative contaminants. The discharge will be via the stormwater system, with other runoff water in the stormwater system expected to be highly disturbed from runoff from urban streets, for which an 80% to 90% LOP is considered reasonable. The stormwater is expected to discharge to Neutral Bay. Whilst this is also expected to be a highly disturbed system, a 90% to 95% LOP is considered appropriate to preserve and improve ecosystem values. As such the discharge criteria have been adopted from the 95% LOP for bioaccumulative and non-bioaccumulative chemicals. pH adjustment for ammonia in accordance with ANZG (2018).
Aquatic ecosystem	HEPA (2025)	Marine water 95% LOP

Receptor / beneficial use	Source	Comments / rationale
		Screening values were only available for PFOS and PFOA at the time of this investigation. The stormwater is expected to discharge to Neutral Bay. Whilst this is also expected to be a highly disturbed system, a 90% to 95% LOP is considered appropriate to preserve and improve ecosystem values. As such the discharge criteria have been adopted from the 95% LOP has been adopted.
Aquatic ecosystem	ANZECC (2000) / Background levels	Physical and chemical stressors (pH, phosphorous and turbidity) in the absence of ANZG (2018) thresholds.
Recreational waters	NHMRC (2008)	Based on the NHMRC (2022) values x10 (lower limit of recommended 10-20x) to account for ingestion of water whilst undertaking recreational activities.

Notes: % LOP percentage level of protection of species

If the extracted water needs to be discharged to a liquid waste facility, the discharge criteria for this purpose will be as per the facility environment protection licence (EPL) requirements and any other facility acceptance criteria.

2. Discharge criteria

2.1 Aquatic ecosystems

The default guideline values (DGV) (in the absence of ecosystem specific data) for the protection of aquatic ecosystems derived from ANZG (2018) are in Table 3.

Table 3: Protection of aquatic ecosystems (µg/L)

Contaminant	Marine DGV 95% LOP	Notes
Metals / metalloids		
Arsenic	24 / 13	Levels provided for As III / As IV respectively as adopted from freshwater criteria in absence of marine criteria. Unknown reliability.
Cadmium	5.5	Very high reliability.
Chromium (VI)	4.4	Chromium VI levels adopted as initial screen for total chromium. Very high reliability.
Copper	0.6	Very high reliability.
Lead	4.4	Low reliability.
Mercury (inorganic)	0.4	Very high reliability.

Contaminant	Marine DGV 95% LOP	Notes
Nickel	70	Very high reliability.
Zinc	8	Very high reliability.
BTEX		
Benzene	700	Moderate reliability.
Ethylbenzene	80	Unknown reliability.
m-Xylene	75	Unknown reliability.
o-xylene	350	Adopted from freshwater criteria for in absence of marine criteria. Unknown reliability.
p-Xylene	200	Adopted from freshwater criteria for in absence of marine criteria. Unknown reliability.
Toluene	180	Unknown reliability.
PAH		
Anthracene	0.4	Unknown reliability.
Benzo(a)pyrene	0.2	Unknown reliability.
Fluoranthene	1.4	Unknown reliability.
Naphthalene	70	Moderate reliability.
Phenanthrene	2.0	Unknown reliability.
Phenols		
Phenol	400	Moderate reliability.
Pentachlorophenol	22	Moderate reliability.
OCP		
Aldrin	0.003	Unknown reliability and LOP.
Chlordane	0.001	Unknown reliability and LOP.
DDT	0.0004	Unknown reliability and LOP.
Dieldrin	0.01	Freshwater criteria adopted in absence of marine criteria. Unknown reliability and LOP.
Endosulfan	0.01	Moderate reliability.
Endrin	0.008	Moderate reliability.
Heptachlor	0.0004	Unknown reliability and LOP.
Methoxychlor	0.004	Unknown reliability and LOP.
Lindane	0.007	Unknown reliability and LOP.
OPP		

Contaminant	Marine DGV 95% LOP	Notes
Chlorpyrifos	0.009	Low reliability.
Diazinon	0.01	Freshwater criteria adopted in absence of marine criteria. Unknown reliability.
Dimethoate	0.15	Freshwater criteria adopted in absence of marine criteria. Unknown reliability.
Fenitrothion	0.001	Unknown reliability and LOP.
Malathion	0.05	Freshwater criteria adopted in absence of marine criteria. Unknown reliability.
Parathion	0.004	Freshwater criteria adopted in absence of marine criteria. Unknown reliability.
PCB		
Aroclor 1242	0.6	Adopted from freshwater criteria for in absence of marine criteria. Unknown reliability.
Aroclor 1254	0.03	Adopted from freshwater criteria for in absence of marine criteria. Unknown reliability.
PFAS		
PFOS	0.9	Adopted from freshwater criteria for in absence of marine criteria. Very high reliability. The ANZG (2018) PFOS DGV for aquatic ecosystem protection are not intended to specify species protection concentrations for air-breathing animals that live in aquatic ecosystems, or prey on aquatic organisms.
Inorganics		
Ammonia	910	At a receiving body pH of 8. Note: ammonia toxicity is pH and temperature dependent. Very high reliability.
Nitrate	1,100	Adopted from freshwater criteria for in absence of marine criteria. Very high reliability. Based on water hardness of <30 mg/L of CaCO3. Higher criteria may be acceptable, however the receiving site hardness must be tested to allow adjustment of this criteria.

Reference levels for physical and chemical stressors derived from ANZECC (2000) for slightly disturbed systems, or other sources as quoted, are provided in Table 4. Levels given here are based on expected ambient ranges for natural and slightly disturbed ecosystems and may, or may not be, relevant to actual conditions in the subject receiving environment. The footnotes to the table provide overarching guidance on the objectives for the actual receiving environment.

Note: ANZECC 2000 has been superseded. As such whilst it has been referenced for analytes which have no other endorsed guideline levels, the criteria are of variable quality and are considered to be reference values only.

Table 4: Physical and chemical stressors (µg/L) [1]

Stressor	Units	South East Australia - Marine	South East Australia - Lowland River (East flowing)
pH [2]	pH units	8 -8.4	6.5 - 8
Total phosphorous	µg/L	25	50
Filterable reactive phosphate (FRP)	µg/L	10	20
Turbidity [5]	NTU	0.5 - 10	6 – 50
Total suspended solids (TSS) [6]	mg/L	50	50

Notes:
1. Sourced from ANZECC (2000) Table 3.3.2 and 3.3.3 values for south east Australia (NSW)
2. Increase or decrease in pH can be a stressor, and the overarching objective is not to significantly change the pH in the receiving waters.
3. Reduction in DO is considered to be a stressor, and the overarching objective is not to reduce DO in the receiving waters. The dissolved oxygen concentration in a waterbody is highly dependent on temperature, salinity, biological activity (microbial, primary production) and rate of transfer from the atmosphere. Dissolved oxygen values were derived from daytime measurements. Dissolved oxygen concentrations may vary diurnally and with depth.
4. Increase or decrease in salinity can be a stressor, and the overarching objective is not to significantly change the salinity in the receiving waters. Salinity can be estimated using electrical conductivity (EC).
5. Increase in turbidity / suspected particulate matter is a stressor, and the overarching objective is not to increase turbidity or suspected particulate matter in the receiving waters. Discharged waters should be visibly clear. Where sufficient data is available to correlate to TSS, value should be consistent with TSS of 50 mg/L or less.
6. Landcom (2004) (the Blue Book)
7. Iron values sourced from aesthetic criteria in ADWG (NHMRC, NRMMC, 2022) as screen for potential to discolour water / precipitate. Further analysis of speciated iron may assist in assessing treatment requirements and potential for fouling.

In the absence of high reliability guidance for total petroleum hydrocarbons (TPH), where TPH or total recoverable hydrocarbons (TRH) (tested to screen for TPH) are recorded above the laboratory practical quantitation limit (PQL) the Environmental Consultant will assess the significance of the detection with respect to potential risk to the receiving waters ecosystem. This may include consideration of:

- What substances or compounds the recorded TPH/TRH may be recording.
- The presence of sheen, odours or other signs of gross contamination (no signs of gross contamination should be present in discharged water. Note oil and grease results above 10 mg/L are generally considered to be indicative of likely presence of gross contamination).
- The sensitivity of the receiving environment.
- Reference levels, such as the Airports (Environment Protection) Regulations (1997).

The DGV for the protection of aquatic ecosystems derived from HEPA (2025) are in Table 5.

Table 5: Groundwater investigation levels for protection of aquatic ecosystems (µg/L)

Contaminant / LOP	Interim marine water DGV
PFOS 95% LOP	0.13
PFOA 95% LOP	220

2.2 Recreational water

The GV for recreational water derived from NHMRC (2008) are in Table 5.

Table 5: Groundwater investigation levels for protection of recreational waters (µg/L)

Contaminant	Recreational water guideline values
Metals / metalloids	
Arsenic	100
Cadmium	20
Chromium (VI)	500
Copper	20000
Lead	100
Manganese	5000
Mercury (inorganic)	10
Nickel	200
Zinc	30000 (aesthetic only)
BTEX	
Benzene	10
Ethylbenzene	3000
Xylenes	6000
Toluene	8000
PAH	
Benzo(a)pyrene	0.1
Phenols	
2-chlorophenol	3000
2,4- dichlorophenol	2000
2,4,6-Trichlorophenol	200
Pentachlorophenol	100
OCP	

Contaminant	Recreational water guideline values
Aldrin + Dieldrin	3
Chlordane	20
DDT	90
Endosulfan	200
Heptachlor	3
Methoxychlor	3000
OPP	
Chlorpyrifos	100
Diazinon	40
Dimethoate	70
Fenitrothion	70
Malathion	700
Parathion	200

3. References

ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australia and New Zealand Environment and Conservation Council.

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

AUS Government. (1997). *Airports (Environment Protection) Regulations*. Canberra: Office of Legislative Drafting, Attorney-General's Department.

HEPA. (2025). *PFAS National Environmental Management Plan (NEMP)*. Version 3.0: Heads of EPAs Australia and New Zealand.

Landcom. (2004). *Managing Urban Stormwater: Soils and Construction, Volume 1 ("Blue Book")*. 4th Edition, March 2004: Landcom, New South Wales Government.

NHMRC, NRMMC. (2022). *Australian Drinking Water Guidelines 6 2011, Version 3.7*. Canberra: National Health and Medical Research Council, National Resource Management Ministerial Council.

Appendix G

Water quality summary table

Table G: Summary of laboratory results - groundwater

Sample ID	Sampled date	Metals - Total								Metals - Dissolved								TRH (NEPM 2013)					
		Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc	TRH C6-C10	TRH >C10-C16	TRH F1 (C6-C10 minus BTEX)	TRH F2 (>C10-C16 minus naphthalene)	TRH F3 (>C16-C34)	TRH F4 (>C34-C40)
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL		1	0.1	1	1	1	0.05	1	1	1	0.1	1	1	1	0.05	1	1	10	50	10	50	100	100
DGV Marine water 95% LOP		24/13	5.5[4]	4.4	0.6	4.4	0.4[5]	70[5]	8[6]	24/13	5.5[4]	4.4	0.6	4.4	0.4[5]	70[5]	8[6]	PQL	PQL	PQL	PQL	PQL	PQL
DGV Marine water 95% LOP (interim) (HEPA, 2025)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NHMRC (2008) Recreation		100	20	500[1]	20,000	50	10	200	-	100	20	500[1]	20,000	50	10	200	-	-	-	-	-	-	-
Physical and chemical stressors ANZECC (2000)																							
BH201	27/03/26	2	< 0.1	14	35	9	< 0.05	20	590	< 1	< 0.1	< 1	6	< 1	< 0.05	13	220	27	< 50	27	< 50	< 100	< 100
BD1/20260327	27/03/26	-	-	-	-	-	-	-	-	< 1	< 0.1	< 1	6	< 1	< 0.05	12	210	27	< 50	27	< 50	100	< 100
BH202	27/03/26	5	0.2	45	72	29	< 0.05	26	220	< 1	< 0.1	< 1	4	< 1	< 0.05	10	80	34	60	34	60	500	110

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DGV – default guideline value
HSL – health screening level
IMW – intrusive maintenance worker
LOP – level of protection of species
PQL – practical quantitation limit

Guideline Notes:
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[2]Equivalent to 500mg/L of nitrate as NO3 (1mg/L nitrate as N = 4.43 mg/L nitrate)
[3]Equivalent to 30mg/L of nitrite as NO2 (1mg/L nitrite as N = 3.29 mg/L nitrite)
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Table G: Summary of laboratory results - groundwater

Sample ID	Sampled date	BTEXN (all)						PAH																	Phenols	PCB							OCP																
		Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Naphthalene (VOC)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b+j+k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH (sum of analysed)	Phenolics (Total)(as phenol)	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	a-BHC	Aldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL		1	1	1	1	2	1	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01		0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.001
DGV Marine water 95% LOP		700[4]	180	80	350	200	-	-	-	0.4	-	0.2	-	-	-	-	1.4	-	-	70[5]	2	-	-	400	-	-	-	0.6	-	0.03	-	-	0.003	-	0.001	0.001	-	0.004	-	0.01	0.01	0.01	-	0.008
DGV Marine water 95% LOP (interim) (HEPA, 2025)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NHMRC (2008) Recreation		10	8,000	3,000	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90	-	-	-	-	-	-	-
Physical and chemical stressors ANZECC (2000)																																															
BH201	27/03/26	< 1	< 1	< 1	< 1	< 2	< 1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	<PQL	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002	< 0.001	< 0.001
BD1/20260327	27/03/26	< 1	< 1	< 1	< 1	< 2	< 1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	<PQL	< 0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH202	27/03/26	< 1	< 1	< 1	< 1	< 2	< 1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	<PQL	< 0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Criteria adopted from the following guidelines:
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[5]DGV may not protect key test species from chronic toxicity (this refers to experimental chronic values or geometric mean for species). Check toxicant DGV technical brief the resources listed in Read the detail, below, for spread of data and its significance

Table G: Summary of laboratory results - groundwater

Sample ID	Sampled date							OPP																						PFAS								
		g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene (HCB)	Methoxychlor	p,p'-DDE (4,4-DDE)	Azinophos methyl (Guthion)	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ronnel	Fenamiphos	Fenitrothion	Fenthion	Malathion	Methyl parathion	Methidathion	Mevinphos (Phosdrin)	Parathion	Phorate	Phosalone	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorobutane sulfonic acid (PFBS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	Sum of PFHxS and PFOS	Sum of PFAS (PFOS + PFOA)	Sum of PFAS
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL		0.001	0.001	0.001	0.001	0.001	0.001	0.02	0.05	0.009	0.05	0.05	0.01	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.004	0.05	0.05	0.0002	0.0002	0.0002	0.0004	0.0004	0.0004	0.0002	0.0002	0.0002
DGV Marine water 95% LOP		-	0.0004	-	-	0.004	-	-	-	0.009	-	-	0.01	-	0.15	-	-	-	0.001	-	-	0.05	-	-	-	0.004	-	-	0.9	-	-	-	-	-	-	-	-
DGV Marine water 95% LOP (interim) (HEPA, 2025)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.13	220	-	-	-	-	-	-	-
NHMRC (2008) Recreation		100	3	-	-	-	-	300	100	100	-	-	40	50	70	40	40	-	5	70	70	700	7	60	50	200	-	-	-	10	-	-	-	-	-	-	-
Physical and chemical stressors ANZECC (2000)																																						
BH201	27/03/26	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.02	< 0.05	< 0.009	< 0.05	< 0.05	< 0.01	< 0.05	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.004	< 0.05	< 0.05	0.0046	0.0045	0.0056	0.002	0.002	< 0.0004	0.01	0.0091	0.019
BD1/20260327	27/03/26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH202	27/03/26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	0.0006	0.0007	< 0.0004	0.0006	< 0.0004	0.002	0.002	0.0031

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Table G: Summary of laboratory results - groundwater

Sample ID	Sampled date	Nutrients									Physiochemical parameters		Anions and cations												
		Ammonia (as N)	Total Kjeldahl Nitrogen (TKN)	Nitrate (as N)	Nitrite (as N)	NOx (as N)	Total Organic Nitrogen (TON, as N)	Nitrogen (Total)	Total Phosphorus (Organic Phosphate)	Reactive Phosphorus as P (Orthophosphate as P)	Total Dissolved Solids	Total Suspended Solids (Lab)	Hardness	Calcium	Potassium	Sodium	Magnesium	Alkalinity (Carbonate as CaCO3)	Chloride	Alkalinity (total as CaCO3)	Alkalinity (Hydroxide as CaCO3)	Alkalinity (Bicarbonate as CaCO3)	Sulphate	Ionic Balance
Units		µg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%
PQL		5	0.1	0.005	5	0.005	0.2	0.1	0.05	0.005	5	5	3	0.5	0.5	0.5	0.5	5	1	5	5	5	1	
DGV Marine water 95% LOP		910	-	1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DGV Marine water 95% LOP (interim) (HEPA, 2025)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NHMRC (2008) Recreation		-	-	113[2]	9,000[3]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical and chemical stressors ANZECC (2000)									25			50												
BH201	27/03/26	< 5	0.1	0.86	20	0.88	< 0.2	1	0.2	0.006	240	550	100	33	6	37	5.2	< 5	34	110	< 5	110	54	-6
BD1/20260327	27/03/26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH202	27/03/26	10	0.3	0.05	< 5	0.05	0.3	0.3	0.54	< 0.005	520	2200	140	39	3	120	9.6	< 5	44	200	< 5	200	170	-4

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Appendix H

Laboratory reports

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 405457

Client Details

Client	Douglas Partners Pty Ltd
Attention	Cathy Li
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**239528.01 North Sydney**
Number of Samples	6 Water
Date samples received	27/03/2026
Date completed instructions received	27/03/2026

Analysis Details

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

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

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

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

Report Details

Date results requested by	07/04/2026
Date of Issue	07/04/2026

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

Results Approved By
Dragana Tomas, Senior Chemist
Jenny He, Inorganic Team Leader
Nancy Zhang, Laboratory Manager, Sydney
Sally Chen, Metals prep team leader
Sean McAlary, Senior Chemist
Tabitha Roberts, Senior Chemist
Timothy Toll, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water						
Our Reference		405457-1	405457-2	405457-3	405457-4	405457-5
Your Reference	UNITS	BH201	BH202	BD1/20260327	TB1	TS1
Date Sampled		27/03/2026	27/03/2026	27/03/2026	27/03/2026	27/03/2026
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	30/03/2026	30/03/2026	30/03/2026	30/03/2026	30/03/2026
Date analysed	-	31/03/2026	31/03/2026	31/03/2026	31/03/2026	31/03/2026
TRH C_6 - C_9	µg/L	26	31	27	<10	[NA]
TRH C_6 - C_{10}	µg/L	27	34	27	<10	[NA]
TRH C_6 - C_{10} less BTEX (F1)	µg/L	27	34	27	<10	[NA]
Benzene	µg/L	<1	<1	<1	<1	96%
Toluene	µg/L	<1	<1	<1	<1	103%
Ethylbenzene	µg/L	<1	<1	<1	<1	103%
m+p-xylene	µg/L	<2	<2	<2	<2	105%
o-xylene	µg/L	<1	<1	<1	<1	99%
Naphthalene	µg/L	<1	<1	<1	<1	[NA]
Surrogate Dibromofluoromethane	%	106	107	108	105	101
Surrogate Toluene-d8	%	98	98	98	98	95
Surrogate 4-Bromofluorobenzene	%	92	92	90	90	92

vTRH(C6-C10)/BTEXN in Water		
Our Reference		405457-6
Your Reference	UNITS	Rinsate
Date Sampled		27/03/2026
Type of sample		Water
Date extracted	-	30/03/2026
Date analysed	-	31/03/2026
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	103
Surrogate Toluene-d8	%	98
Surrogate 4-Bromofluorobenzene	%	90

svTRH (C10-C40) in Water					
Our Reference	UNITS	405457-1	405457-2	405457-3	405457-6
Your Reference		BH201	BH202	BD1/20260327	Rinsate
Date Sampled		27/03/2026	27/03/2026	27/03/2026	27/03/2026
Type of sample		Water	Water	Water	Water
Date extracted	-	30/03/2026	30/03/2026	30/03/2026	30/03/2026
Date analysed	-	30/03/2026	30/03/2026	30/03/2026	30/03/2026
TRH C_{10} - C_{14}	µg/L	<50	53	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	440	<100	120
TRH C_{29} - C_{36}	µg/L	<100	110	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	610	<50	120
TRH >C_{10} - C_{16}	µg/L	<50	60	<50	130
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	60	<50	130
TRH >C_{16} - C_{34}	µg/L	<100	500	100	<100
TRH >C_{34} - C_{40}	µg/L	<100	110	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	670	100	130
Surrogate o-Terphenyl	%	78	#	90	91

PAHs in Water - Trace Level				
Our Reference	UNITS	405457-1	405457-2	405457-3
Your Reference		BH201	BH202	BD1/20260327
Date Sampled		27/03/2026	27/03/2026	27/03/2026
Type of sample		Water	Water	Water
Date extracted	-	30/03/2026	30/03/2026	30/03/2026
Date analysed	-	01/04/2026	02/04/2026	02/04/2026
Naphthalene	µg/L	<0.02	<0.02	<0.02
Acenaphthylene	µg/L	<0.01	<0.01	<0.01
Acenaphthene	µg/L	<0.01	<0.01	<0.01
Fluorene	µg/L	<0.01	<0.01	<0.01
Phenanthrene	µg/L	<0.01	<0.01	<0.01
Anthracene	µg/L	<0.01	<0.01	<0.01
Fluoranthene	µg/L	<0.01	<0.01	<0.01
Pyrene	µg/L	<0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L	<0.01	<0.01	<0.01
Chrysene	µg/L	<0.01	<0.01	<0.01
Benzo(b,j+k)fluoranthene	µg/L	<0.02	<0.02	<0.02
Benzo(a)pyrene	µg/L	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	µg/L	<0.01	<0.01	<0.01
Indeno(1,2,3-c,d)pyrene	µg/L	<0.01	<0.01	<0.01
Benzo(g,h,i)perylene	µg/L	<0.01	<0.01	<0.01
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	83	93	103

OP in water LL ANZECCF/ADWG		
Our Reference		405457-1
Your Reference	UNITS	BH201
Date Sampled		27/03/2026
Type of sample		Water
Date extracted	-	30/03/2026
Date analysed	-	01/04/2026
Dichlorvos	µg/L	<0.05
Mevinphos	µg/L	<0.05
Phorate	µg/L	<0.05
Dimethoate	µg/L	<0.1
Diazinon	µg/L	<0.01
Disulfoton	µg/L	<0.05
Chlorpyriphos-methyl	µg/L	<0.05
Parathion-Methyl	µg/L	<0.05
Ronnel	µg/L	<0.05
Fenitrothion	µg/L	<0.05
Malathion	µg/L	<0.05
Chlorpyriphos	µg/L	<0.009
Fenthion	µg/L	<0.05
Parathion	µg/L	<0.004
Bromophos ethyl	µg/L	<0.05
Methidathion	µg/L	<0.05
Fenamiphos	µg/L	<0.05
Ethion	µg/L	<0.05
Phosalone	µg/L	<0.05
Azinphos-methyl (Guthion)	µg/L	<0.02
Coumaphos	µg/L	<0.05
Surrogate 4-Chloro-3-NBTF	%	96

OCPs in Water - Trace Level		
Our Reference	UNITS	405457-1
Your Reference		BH201
Date Sampled		27/03/2026
Type of sample		Water
Date extracted	-	30/03/2026
Date analysed	-	01/04/2026
alpha-BHC	µg/L	<0.001
HCB	µg/L	<0.001
beta-BHC	µg/L	<0.001
gamma-BHC	µg/L	<0.001
Heptachlor	µg/L	<0.001
delta-BHC	µg/L	<0.001
Aldrin	µg/L	<0.001
Heptachlor Epoxide	µg/L	<0.001
gamma-Chlordane	µg/L	<0.001
alpha-Chlordane	µg/L	<0.001
Endosulfan I	µg/L	<0.002
pp-DDE	µg/L	<0.001
Dieldrin	µg/L	<0.001
Endrin	µg/L	<0.001
Endosulfan II	µg/L	<0.002
pp-DDD	µg/L	<0.001
pp-DDT	µg/L	<0.001
Endosulfan Sulphate	µg/L	<0.001
Methoxychlor	µg/L	<0.001
Surrogate 4-Chloro-3-NBTF	%	96

PCBs in Water - Trace Level		
Our Reference		405457-1
Your Reference	UNITS	BH201
Date Sampled		27/03/2026
Type of sample		Water
Date extracted	-	30/03/2026
Date analysed	-	01/04/2026
Aroclor 1016	µg/L	<0.01
Aroclor 1221	µg/L	<0.01
Aroclor 1232	µg/L	<0.01
Aroclor 1242	µg/L	<0.01
Aroclor 1248	µg/L	<0.01
Aroclor 1254	µg/L	<0.01
Aroclor 1260	µg/L	<0.01
Surrogate 2-Fluorobiphenyl	%	69

Total Phenolics in Water					
Our Reference		405457-1	405457-2	405457-3	405457-6
Your Reference	UNITS	BH201	BH202	BD1/20260327	Rinsate
Date Sampled		27/03/2026	27/03/2026	27/03/2026	27/03/2026
Type of sample		Water	Water	Water	Water
Date extracted	-	31/03/2026	31/03/2026	31/03/2026	31/03/2026
Date analysed	-	31/03/2026	31/03/2026	31/03/2026	31/03/2026
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05

HM in water - dissolved				
Our Reference	UNITS	405457-1	405457-2	405457-3
Your Reference		BH201	BH202	BD1/20260327
Date Sampled		27/03/2026	27/03/2026	27/03/2026
Type of sample		Water	Water	Water
Date prepared	-	30/03/2026	30/03/2026	30/03/2026
Date analysed	-	30/03/2026	30/03/2026	30/03/2026
Arsenic-Dissolved	µg/L	<1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1
Copper-Dissolved	µg/L	6	4	6
Lead-Dissolved	µg/L	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	13	10	12
Zinc-Dissolved	µg/L	220	80	210

HM in water - total			
Our Reference		405457-1	405457-2
Your Reference	UNITS	BH201	BH202
Date Sampled		27/03/2026	27/03/2026
Type of sample		Water	Water
Date prepared	-	30/03/2026	30/03/2026
Date analysed	-	30/03/2026	30/03/2026
Arsenic-Total	µg/L	2	5
Cadmium-Total	µg/L	<0.1	0.2
Chromium-Total	µg/L	14	45
Copper-Total	µg/L	35	72
Lead-Total	µg/L	9	29
Mercury-Total	µg/L	<0.05	<0.05
Nickel-Total	µg/L	20	26
Zinc-Total	µg/L	590	220

Ion Balance			
Our Reference		405457-1	405457-2
Your Reference	UNITS	BH201	BH202
Date Sampled		27/03/2026	27/03/2026
Type of sample		Water	Water
Date prepared	-	30/03/2026	30/03/2026
Date analysed	-	30/03/2026	30/03/2026
Calcium - Dissolved	mg/L	33	39
Potassium - Dissolved	mg/L	6.0	3
Sodium - Dissolved	mg/L	37	120
Magnesium - Dissolved	mg/L	5.2	9.6
Hardness (calc) equivalent $CaCO_3$	mg/L	100	140
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	110	200
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	<5
Total Alkalinity as $CaCO_3$	mg/L	110	200
Sulphate, SO4	mg/L	54	170
Chloride, Cl	mg/L	34	44
Ionic Balance	%	-6.0	-4.0

Nutrients			
Our Reference	UNITS	405457-1	405457-2
Your Reference		BH201	BH202
Date Sampled		27/03/2026	27/03/2026
Type of sample		Water	Water
Date prepared	-	30/03/2026	30/03/2026
Date analysed	-	30/03/2026	30/03/2026
Ammonia as N in water	mg/L	<0.005	0.01
Nitrate as N in water	mg/L	0.86	0.05
Nitrite as N in water	mg/L	0.02	<0.005
NOx as N in water	mg/L	0.88	0.05
Total Nitrogen in water	mg/L	1.0	0.3
Phosphate as P in water	mg/L	0.006	<0.005
TKN in water	mg/L	0.1	0.3
Organic Nitrogen as N	mg/L	<0.2	0.3

Metals in Waters - Acid extractable			
Our Reference		405457-1	405457-2
Your Reference	UNITS	BH201	BH202
Date Sampled		27/03/2026	27/03/2026
Type of sample		Water	Water
Date prepared	-	30/03/2026	30/03/2026
Date analysed	-	30/03/2026	30/03/2026
Phosphorus - Total	mg/L	0.2	0.54

Miscellaneous Inorganics			
Our Reference		405457-1	405457-2
Your Reference	UNITS	BH201	BH202
Date Sampled		27/03/2026	27/03/2026
Type of sample		Water	Water
Date prepared	-	02/04/2026	02/04/2026
Date analysed	-	02/04/2026	02/04/2026
Total Suspended Solids	mg/L	550	2,200
Total Dissolved Solids (grav)	mg/L	240	520

PFAS in Water TRACE Short			
Our Reference		405457-1	405457-2
Your Reference	UNITS	BH201	BH202
Date Sampled		27/03/2026	27/03/2026
Type of sample		Water	Water
Date prepared	-	31/03/2026	31/03/2026
Date analysed	-	01/04/2026	01/04/2026
Perfluorobutanesulfonic acid	µg/L	0.002	<0.0004
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0056	0.0007
Perfluorooctanesulfonic acid PFOS	µg/L	0.0046	0.001
Perfluorooctanoic acid PFOA	µg/L	0.0045	0.0006
6:2 FTS	µg/L	0.002	0.0006
8:2 FTS	µg/L	<0.0004	<0.0004
Surrogate $^{13}C_8$ *PFOS*	%	97	94
Surrogate $^{13}C_2$ *PFOA*	%	109	117
Extracted ISTD $^{13}C_3$ *PFBS*	%	94	86
Extracted ISTD $^{18}O_2$ *PFHxS*	%	86	41
Extracted ISTD $^{13}C_4$ *PFOS*	%	73	48
Extracted ISTD $^{13}C_4$ *PFOA*	%	76	42
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	102	84
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	105	91
Total Positive PFHxS & PFOS	µg/L	0.010	0.0020
Total Positive PFOS & PFOA	µg/L	0.0091	0.002
Total Positive PFAS	µg/L	0.019	0.0031

Method ID	Methodology Summary
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180+/-10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation below:- TDS = EC * 0.6
Inorg-019	Suspended Solids - determined gravimetricially by filtration of the sample. The samples are dried at 104+/-5°C.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055	Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-060	Phosphate determined colourimetrically based on EPA365.1 and APHA latest edition 4500 P E. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-062	TKN - determined colourimetrically based on APHA latest edition 4500 Norg. Alternatively, TKN can be derived from calculation (Total N - NOx).
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.

Method ID	Methodology Summary
Metals-020	Determination of various metals/elements by ICP-AES. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation. Where molecular anion forms are calculated from an element (e.g. SO4 from S or PO4 from P stoichiometrically), the assumption is that the element is only present in that molecular anion form. Submission of low masses of sample e.g. for dust samples, may result in raised PQLs.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS.
Org-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Note, the Total +ve PFAS PQL is reflective of the lowest individual PQL and is therefore "Total +ve PFAS" is simply a sum of the positive individual PFASs (or a described sub-set). Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Date analysed	-			31/03/2026	[NT]	[NT]	[NT]	[NT]	31/03/2026	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	111	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	111	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	112	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate Toluene-d8	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	92	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Date analysed	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate o-Terphenyl	%		Org-020	81	[NT]	[NT]	[NT]	[NT]	122	[NT]

QUALITY CONTROL: PAHs in Water - Trace Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Date analysed	-			02/04/2026	[NT]	[NT]	[NT]	[NT]	02/04/2026	[NT]
Naphthalene	µg/L	0.02	Org-022/025	<0.02	[NT]	[NT]	[NT]	[NT]	91	[NT]
Acenaphthylene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	110	[NT]
Fluorene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	112	[NT]
Phenanthrene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	114	[NT]
Anthracene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	102	[NT]
Pyrene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	106	[NT]
Benzo(a)anthracene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	87	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.02	Org-022/025	<0.02	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	107	[NT]
Dibenzo(a,h)anthracene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	113	[NT]	[NT]	[NT]	[NT]	109	[NT]

QUALITY CONTROL: OP in water LL ANZECCF/ADWG						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Date analysed	-			01/04/2026	[NT]	[NT]	[NT]	[NT]	01/04/2026	[NT]
Dichlorvos	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	115	[NT]
Mevinphos	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Phorate	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dimethoate	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Disulfoton	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos-methyl	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion-Methyl	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	100	[NT]
Fenitrothion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	107	[NT]
Malathion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	130	[NT]
Chlorpyriphos	µg/L	0.009	Org-022/025	<0.009	[NT]	[NT]	[NT]	[NT]	116	[NT]
Fenthion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion	µg/L	0.004	Org-022/025	<0.004	[NT]	[NT]	[NT]	[NT]	98	[NT]
Bromophos ethyl	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Methidathion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fenamiphos	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	131	[NT]
Phosalone	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Azinphos-methyl (Guthion)	µg/L	0.02	Org-022/025	<0.02	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Coumaphos	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 4-Chloro-3-NBTF	%		Org-022/025	100	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: OCPs in Water - Trace Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Date analysed	-			01/04/2026	[NT]	[NT]	[NT]	[NT]	01/04/2026	[NT]
alpha-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	89	[NT]
HCB	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	94	[NT]
gamma-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	112	[NT]
delta-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	96	[NT]
Heptachlor Epoxide	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	105	[NT]
gamma-Chlordane	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-Chlordane	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	µg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	97	[NT]
Dieldrin	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	93	[NT]
Endrin	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	92	[NT]
Endosulfan II	µg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	107	[NT]
pp-DDT	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	93	[NT]
Methoxychlor	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 4-Chloro-3-NBTF	%		Org-022/025	100	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: PCBs in Water - Trace Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Date analysed	-			01/04/2026	[NT]	[NT]	[NT]	[NT]	01/04/2026	[NT]
Aroclor 1016	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	114	[NT]
Aroclor 1254	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1260	µg/L	0.01	Org-021/022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-Fluorobiphenyl	%		Org-021/022/025	70	[NT]	[NT]	[NT]	[NT]	75	[NT]

QUALITY CONTROL: Total Phenolics in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	405457-2
Date extracted	-			31/03/2026	1	31/03/2026	31/03/2026		31/03/2026	31/03/2026
Date analysed	-			31/03/2026	1	31/03/2026	31/03/2026		31/03/2026	31/03/2026
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	1	<0.05	<0.05	0	96	95

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W6	[NT]
Date prepared	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Date analysed	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	88	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: HM in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Date analysed	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Arsenic-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Chromium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Copper-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Lead-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Mercury-Total	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	89	[NT]
Nickel-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Zinc-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	405457-2
Date prepared	-			30/03/2026	1	30/03/2026	30/03/2026		30/03/2026	30/03/2026
Date analysed	-			30/03/2026	1	30/03/2026	30/03/2026		30/03/2026	30/03/2026
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	33	32	3	115	91
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	6.0	5.8	3	108	93
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	37	35	6	107	#
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	5.2	5	4	117	96
Hardness (calc) equivalent $CaCO_3$	mg/L	3	Metals-020	[NT]	1	100	100	0	[NT]	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	[NT]	1	<5	[NT]		[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	1	110	[NT]		[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	1	<5	[NT]		[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	110	[NT]		90	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	1	54	[NT]		117	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	1	34	[NT]		98	[NT]
Ionic Balance	%		Inorg-040	[NT]	1	-6.0	[NT]		[NT]	[NT]

QUALITY CONTROL: Nutrients						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			30/03/2026	1	30/03/2026	30/03/2026		30/03/2026	[NT]
Date analysed	-			30/03/2026	1	30/03/2026	30/03/2026		30/03/2026	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	<0.005	0.008	46	106	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.86	0.75	14	92	[NT]
Nitrite as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.02	0.02	0	95	[NT]
NOx as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.88	0.76	15	92	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	1	1.0	[NT]		92	[NT]
Phosphate as P in water	mg/L	0.005	Inorg-060	<0.005	1	0.006	<0.005	18	113	[NT]
TKN in water	mg/L	0.1	Inorg-062	<0.1	1	0.1	[NT]		[NT]	[NT]
Organic Nitrogen as N	mg/L	0.2	Inorg-055/062/127	<0.2	1	<0.2	[NT]		[NT]	[NT]

QUALITY CONTROL: Metals in Waters - Acid extractable					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Date analysed	-			30/03/2026	[NT]	[NT]	[NT]	[NT]	30/03/2026	[NT]
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			02/04/2026	[NT]	[NT]	[NT]	[NT]	02/04/2026	[NT]
Date analysed	-			02/04/2026	[NT]	[NT]	[NT]	[NT]	02/04/2026	[NT]
Total Suspended Solids	mg/L	5	Inorg-019	<5	[NT]	[NT]	[NT]	[NT]	110	[NT]
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: PFAS in Water TRACE Short						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			31/03/2026	[NT]	[NT]	[NT]	[NT]	31/03/2026	[NT]
Date analysed	-			01/04/2026	[NT]	[NT]	[NT]	[NT]	01/04/2026	[NT]
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	100	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	96	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	98	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	97	[NT]
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	98	[NT]
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	97	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	77	[NT]	[NT]	[NT]	[NT]	96	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	77	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	73	[NT]	[NT]	[NT]	[NT]	95	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	80	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD$^{13}C_2$ *6:2FTS*	%		Org-029	89	[NT]	[NT]	[NT]	[NT]	110	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	94	[NT]	[NT]	[NT]	[NT]	119	[NT]

Result Definitions

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

Quality Control Definitions

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

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

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

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

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

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

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

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

Report Comments

TRH Water(C10-C40) NEPM - # Percent recovery for the surrogate is not possible to report as the high concentration of analytes in sample 405457-2 have caused interference.
TRH Water(C10-C40) NEPM - The positive result in samples labelled with 'Rinsate/Blank/QC' (or similar) is due to a single peak with no hydrocarbon profile that is consistent with the use of plastic containers.

Ion Balance - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

PFAS in Water TRACE Short - For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

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CERTIFICATE OF ANALYSIS 405457-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Cathy Li
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**239528.01 North Sydney**
Number of Samples	Additional analysis
Date samples received	27/03/2026
Date completed instructions received	13/04/2026

Analysis Details

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

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

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

Report Details

Date results requested by	14/04/2026
Date of Issue	14/04/2026

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Results Approved By
Timothy Toll, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

svTRH (C10-C40) in Water NEPM Silica gel		
Our Reference	UNITS	405457-A-2
Your Reference		BH202
Date Sampled		27/03/2026
Type of sample		Water
Date extracted	-	14/04/2026
Date analysed	-	14/04/2026
TRH (Silica) C_{10} - C_{14}	µg/L	<50
TRH (Silica) C_{15} - C_{28}	µg/L	<100
TRH (Silica) C_{29} - C_{36}	µg/L	<100
TRH (Silica) >C_{10} - C_{16}	µg/L	<50
TRH (Silica) >C_{16} - C_{34}	µg/L	<100
TRH (Silica) >C_{34} - C_{40}	µg/L	<100
Surrogate 1-Chlorooctadecane	%	80

Method ID	Methodology Summary
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.

QUALITY CONTROL: svTRH (C10-C40) in Water NEPM Silica gel					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			14/04/2026	[NT]	[NT]	[NT]	[NT]	14/04/2026	[NT]
Date analysed	-			14/04/2026	[NT]	[NT]	[NT]	[NT]	14/04/2026	[NT]
TRH (Silica) C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	94	[NT]
TRH (Silica) C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH (Silica) C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH (Silica) >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	94	[NT]
TRH (Silica) >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH (Silica) >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
Surrogate 1-Chlorooctadecane	%		Org-020	85	[NT]	[NT]	[NT]	[NT]	86	[NT]

Result Definitions

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<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
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Quality Control Definitions

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

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

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

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

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

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

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

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

Anna Bui

From: Cathy Li <cathy.li@douglaspartners.com.au>
Sent: Monday, 13 April 2026 1:49 PM
To: Liam Timmins; Stuart Chen; Customer Service
Subject: RE: Results for Registration 405457 239528.01 North Sydney

Hi Liam,

(2

Can I please order the silica gel clean of TRH on samples BH201 and BH202. What's the earliest time we can get it?

Thanks.

Regards,

EUD REF: 405457-A
TAT: 1 DAY
DUE: 14/4/26
AB-

Cathy Li | Environmental Engineer

02 9809 0666 0484 789 919 Cathy.Li@douglaspartners.com.au

www.douglaspartners.com.au 96 Hermitage Road, West Ryde
NSW 2114 | Wallumedegal Country
PO Box 472, West Ryde, NSW 1685

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From: Liam Timmins <LTimmins@envirolab.com.au>
Sent: Friday, 10 April 2026 4:52 PM
To: Cathy Li <cathy.li@douglaspartners.com.au>; Stuart Chen <SChen2@envirolab.com.au>; Customer Service <CustomerService@envirolab.com.au>
Subject: RE: Results for Registration 405457 239528.01 North Sydney

HI Cathy,

Please see requested attached, I do not believe they resemble anything strongly in the library that I have attached

In my experience this could be attributed to sediment in the bottle

Please let me know if you need anything else

Thanks

Kind Regards,

Liam Timmins | Operations Manager | Envirolab Services

Great Science. Great Service.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Cathy Li

Sample Login Details

Your reference	239528.01 North Sydney
Envirolab Reference	405457-A
Date Sample Received	27/03/2026
Date Instructions Received	13/04/2026
Date Results Expected to be Reported	14/04/2026

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	Additional analysis
Turnaround Time Requested	1 day
Temperature on Receipt (°C)	10
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	svTRH (C10-C40) in Water NEPM Silica gel	svTRH (C10-C40) in Water Pre Clean Up	On Hold
BH201			✓
BH202	✓	✓	
BD1/20260327			✓
TB1			✓
TS1			✓
Rinsate			✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

We acknowledge receipt of your samples and Purchase Order (PO) (if provided). If a PO includes your terms & conditions, Envirolab hereby expressly rejects and will not be bound by any external or third-party terms and conditions, including those referenced or attached to a PO.

All services to be performed by Envirolab will be governed exclusively by Envirolab's General Terms and Conditions attached to this acknowledgement (Envirolab Terms) via hyperlink or found on our websites.

If you do not object in writing within two (2) business days of the date of this acknowledgement, you will be deemed to have accepted the Envirolab Terms. In addition, your provision of further instructions, additional samples, payment of any invoice, or acceptance of services or results from Envirolab will constitute acceptance of the Envirolab Terms. For clarity, Envirolab's commencement or continuation of work following receipt of the PO is performed solely under the Envirolab Terms and does not constitute acceptance of any external terms. All rights are expressly reserved.

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	239528.01	**Suburb:**	North Sydney	**To:**	Envirolab Services
Project Manager:	Cathy Li	**Order Number:**		**Sampler:** JC	12 Ashley St, Chatswood NSW 2067
Email:	laboratory+68ff061edd8b9@datanest.earth; **cathy.li/Johann.Chalache@douglaspartners.com.au**			**Attn:**	Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day				(02) 9910 6200 samplereceipt@envirolab.com
Prior Storage:	☑ Fridge ☐ Freezer ☐ Esky ☐ Shelf	**Do samples contain 'potential' HBM?**	☐ No ☐ Yes, then handle, transport and store in accordance with FPM HAZID)		

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water M - Material	Container Type: G - glass P - plastic	Analytes: Heavy Metals (dissolved and total)	TRH, BTEX, Phenols	trace PAH	trace OCP, OPP and PCB	TDS, TSS, nutrients	ionic balance suite	BTEX	Heavy metals dissolved	PFAS -short - trace)			Notes/ Preservation/ Additional Requirements
1	BH201			27.03.2026	W	G,P,V	X	X	X	X	X	X			X			
2	BH202			27.03.2026	W	G,P,V	X	X	X		X	X			X			
3	BD1/20260327			27.03.2026	W	G,P,V		X	X					X				
4	TB1			27.03.2026	W	G,P,V							X					
5	TS1			27.03.2026	W	G,P,V							X					
6	Rinsate			27.03.2026	W	G,P,V		X										

ENVIROLAB — Envirolab Services, 12 Ashley St, Chatswood NSW 2067, Ph: (02) 9910 6200

Job No: 405457
Date Received: 27/3/26
Time Received: 1515
Received By: RH
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Metals to analyse:

Number of samples in container:

Transported to laboratory by:

Send results to: Douglas Partners Pty Ltd

Address: 96 Hermitage Road, West Ryde NSW 2114 **Phone:** (02) 9809 0666

Relinquished by: **Date:** **Signed:**

LAB RECEIPT

Lab Ref. No: 405457

Received by: Rachael Huang

Date & Time: 27/3/26 1515

Signed:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Cathy Li

Sample Login Details

Your reference	239528.01 North Sydney
Envirolab Reference	405457
Date Sample Received	27/03/2026
Date Instructions Received	27/03/2026
Date Results Expected to be Reported	07/04/2026

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	6 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	10
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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Sample ID	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Trace Level	OP in water LL ANZECCF/ADWG	OCPs in Water - Trace Level	PCBs in Water - Trace Level	Total Phenolics in Water	HM in water - dissolved	HM in water - total	Calcium - Dissolved	Potassium - Dissolved	Sodium - Dissolved	Magnesium - Dissolved	Hardness (calc) equivalent CaCO3	Hydroxide Alkalinity (OH-) as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulphate, SO4	Chloride, Cl	Ionic Balance	Nutrients	Metals in Waters - Acid extractable	Total Suspended Solids	Total Dissolved Solids (grav)	PFAS in Water TRACE Short
BH201	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH202	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BD1/20260327	✓	✓	✓				✓	✓																		
TB1	✓																									
TS1	✓																									
Rinsate	✓	✓					✓																			

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

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