Douglas PARTNERS

GROUNDED EXPERTISE

Specialist Advice

Report on Geotechnical Investigation

Proposed Mixed Use Development

402-420 Pacific Hwy, Crows Nest NSW

Prepared for Prosper Atrium Pty Ltd

Project 236315.00

1 July 2026

Douglas Partners Pty Ltd
ABN 75 053 980 117
douglaspartners.com.au
96 Hermitage Road, West Ryde, NSW 2114
(02) 9809 0666

Document History

Details

Project No.	236315.00
Document Title	Report on Geotechnical Investigation
Site Address	402-420 Pacific Hwy, Crows Nest NSW
Report Prepared For	Prosper Atrium Pty Ltd
Filename	236315.00.R.002.Rev1

Status and Review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Yeongbin Gim	Scott Easton	21 October 2025
Revision 1	Harini Shankar	Per Henrikson	01 July 2026

Distribution of Copies

Status	Issued to
Revision 0	Natalie Bocock, Prosper Atrium Pty Ltd
Revision 1	Natalie Bocock, Prosper Atrium Pty Ltd

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

Signature		Date
Author	p.p. 	01 July 2026
Reviewer		01 July 2026

FS604853

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

Douglas PARTNERS | GROUNDED EXPERTISE

Table of Contents

Page No

1. Introduction 1
2. Site description 2
3. Sydney metro considerations 3
4. Previous investigations 5
   - 4.1 Summary of the previous investigations 5
   - 4.2 Results of the previous investigations 6
5. Published data 6
   - 5.1 Geology 6
   - 5.2 Hydrogeology 6
   - 5.3 Soil landscape 7
   - 5.4 Acid sulfate soils 7
   - 5.5 Salinity 7
   - 5.6 Groundwater Dependant Ecosystems (GDEs) 7
   - 5.7 Riparian lands 7
6. Field work 7
   - 6.1 Field work methods 7
   - 6.2 Field work results 8
7. Laboratory testing 10
   - 7.1 Soil and rock aggressivity testing 10
8. Geotechnical model 11
9. Proposed development 12
10. Comments 13
    - 10.1 Excavation 13
    - 10.2 Excavation support 14
    - 10.3 Ground movement and stress relief 18
    - 10.4 Excavation monitoring adjacent to TfNSW and Sydney Water assets 18
    - 10.5 Foundations 19
    - 10.6 Groundwater 21
    - 10.7 Aggressivity 21
    - 10.8 Seismic design 21

11. Additional geotechnical investigation 22
12. Limitations 22

Appendix A: About This Report

Appendix B: Borehole Location Plan

Appendix C: Field Work Results

Appendix D: Laboratory Results

Appendix E: Architectural Drawings

Executive Summary

This geotechnical investigation report has been prepared by Douglas Partners Pty Ltd on behalf of Prosper Atrium Pty Ltd as part of the Environmental Impact Statement (EIS) for a State Significant Development Application (SSDA) for a mixed-use development at 402-420 Pacific Highway, Crows Nest (the site).

The report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-83076206) on 29 April 2025.

The site is located adjacent to Crows Nest Metro Station and is within the Crows Nest Transit Oriented Development (TOD) Accelerated Precinct which has been identified by the NSW Government to support housing delivery. The Crows Nest TOD Precinct has been the subject of recent amendments to the planning controls which came into effect in November 2024.

The site comprises 2,127.7 m^2 of land at 402-420 Pacific Highway, Crows Nest (SP54033) within North Sydney LGA.

The SSD application seeks approval for demolition of existing structures and construction of a 38-storey mixed-use building.

This report concludes that the proposed mixed-use development is considered feasible from a geotechnical perspective, subject to the implementation of the comments and recommendations outlined in this report.

The report has been revised to reflect changes to the proposed basement configuration, which has increased from the previously proposed four-level basement (RL 75.2 m AHD to 73.8 m AHD) to a six-level basement (RL 69.2 m AHD), seven levels including the lift pit (RL 64.2 m AHD).

Report on Geotechnical Investigation
Proposed Mixed Use Development
402-420 Pacific Hwy, Crows Nest NSW

1. Introduction

This Specialist Advice report prepared by Douglas Partners Pty Ltd (Douglas) presents the results of Geotechnical Investigation undertaken for a proposed mixed-use development at 402-420 Pacific Highway, Crows Nest NSW (the site). The investigation was commissioned by Natalie Bocock of Prosper Atrium Pty Ltd and was undertaken in accordance with Douglas' proposal 236315.00.P.001.Rev0 dated 11 June 2025.

The SSD application seeks consent for the following:

- Demolition of all existing structures on the site, tree removal, excavation and site preparation works.
- Construction of a 38-storey mixed-use building comprising:
  - Six levels of basement car parking;
  - A four-storey podium comprising retail and commercial floor space;
  - Above podium resident communal open space and communal floor space;
  - 273 residential apartments including affordable housing; and
  - Rooftop servicing.
- Retention of existing access from Oxley Street to access basement car parking and construction of a new driveway from Oxley Street to access ground floor loading dock;
- Associated landscaping and public domain works; and
- Infrastructure servicing.

The report has been revised to reflect changes to the proposed basement configuration, which has increased from the previously proposed four-level basement (RL 75.2 m AHD to 73.8 m AHD) to a six-level basement (RL 69.2 m AHD), seven levels including the lift pit (RL 64.2 m AHD).

The proposed basement has been deepened by up to a maximum of approximately 6 m (excluding the lift pit). All three boreholes completed as part of this investigation extend below the proposed Basement 6 level, however, the investigation conducted does not strictly comply with the guidelines imposed by the 'Minimum requirements for building site groundwater investigations and reporting' by Department of Climate Change, Energy, the Environment and Water (DCCEEW), as such, one additional cored borehole is recommended, as is discussed in Section 11.

The report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-83076206) on 29 April 2025 as detailed in the table below.

Table 1: Relevant SEARs considered

Issue	SEARs requirement	Section reference
12. Ground and Groundwater Conditions	Assess potential impacts on soil resources and related infrastructure and riparian lands on and near the site and including soil erosion.	Section 3 to 7
	If the proposed development is on land identified as having high salinity or acid sulfate soil potential in an EPI provide a Salinity Management Plan or Acid Sulfate Soil Management Plan that includes appropriate management measures and strategies.	

The investigation included the drilling of three boreholes, installation of three groundwater monitoring wells and laboratory testing of selected samples. The details of the field work are presented in this report, together with comments and recommendations on the geotechnical aspects of the project.

Douglas also carried out a concurrent Preliminary Site Investigation (PSI) with limited sampling for preliminary assessment on contamination at the site. The PSI report is provided separately (Douglas report ref: 236315.01.R.001.Rev3 dated June 2026).

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

2. Site description

The site is located adjacent to Crows Nest Metro Station and is within the Crows Nest Transit Oriented Development (TOD) Accelerated Precinct which has been identified by the NSW Government to support housing delivery. The Crows Nest TOD Precinct has been subject of recent amendments to the planning controls which came into effect in November 2024.

The site comprises 2,127.7 m^2 of land at 402-420 Pacific Highway, Crows Nest (SP54033) within North Sydney LGA.

The site is currently developed with a four-storey mixed-use building. Vehicular access to existing basement car parking is from Oxley Street via the adjacent landholding with an easement granting right of carriageway. An overview of the site locality is provided in Figure 1.

The uses surrounding the site comprise:

- Crows Nest Metro Station to the east which has approval for over-station development up to 22-storeys of mixed-use and is the subject of a current SSD application for up to 27-storeys;
- An existing car wash facility and four-storey commercial building to the north which is subject of a proposal for a 52-storey mixed-use development being considered through the Housing Delivery Authority pathway as SSD with a concurrent rezoning;
- A three-storey commercial building to the northwest with potential for up to 16-storey commercial under the Crows Nest TOD controls;

- Three to five storey mixed-use and commercial buildings fronting Pacific Highway located to the south of the site which are the subject of a separate SSD application for a 40-storey mixed-use development; and
- Three-storey multi-dwelling housing to the west with potential for up to 12-storey residential buildings under the Crows Nest TOD controls.



Figure 1: Subject site

3. Sydney metro considerations

The site is located to the west of the Crows Nest Metro Station. Based on information provided by Sydney Metro and Prosper Atrium Pty Ltd, the site is understood to be outside the Second Reserve of the Sydney Metro corridor, except at the north-east corner where the reserve encroaches into the site by up to approximately 500 mm, as shown in Figure 2.

According to the anchor de-stressing information provided by Sydney Metro, the temporary anchors installed from the metro station box have not been de-stressed. These anchors are located beneath the Pacific Highway within the Second Reserve of the Sydney Metro corridor, with lengths ranging from approximately 3 m to 20 m, depending on the anchor type and founding material. An indicative section prepared by fjcstudio is presented in Figure 3.

The design of the proposed development should take into account relevant Sydney Metro documentation (e.g. Sydney Metro At-grade and Elevated Sections Corridor Protection Technical Guidelines, dated 1 August 2025) as well as existing Sydney Metro structures (i.e. anchors).



Figure 2: Aerial image of the subject site and Sydney Metro Second Reserve

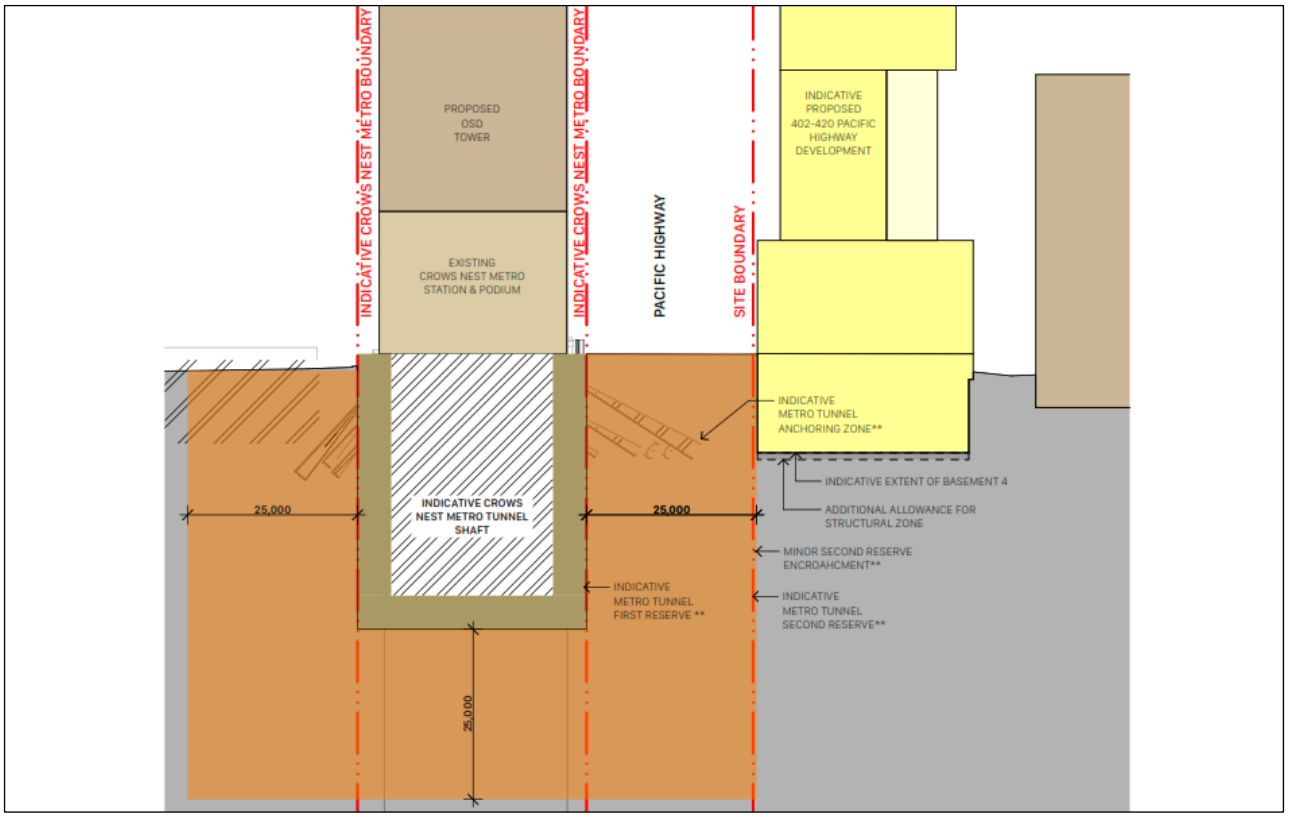


Figure 3: Indicative section showing Sydney Metro Second Reserve and anchor zone

4. Previous investigations

4.1 Summary of the previous investigations

Douglas has undertaken a geotechnical investigation at the subject site and two nearby investigations. The locations of Douglas' previous investigations are provided in Figure 4.

A summary of Douglas' previous geotechnical investigations is provided below:

- 402-420 Pacific Highway, Crows Nest (the subject site and 35-51 Nicholson Street) – Douglas Project 7856 (February 1983): Geotechnical investigation for the proposed office and townhouse development which included four augered boreholes to a maximum depth of 6 m and three cored boreholes to a maximum depth of 17 m;
- 521 Pacific Highway, Crows Nest (approximately 30 m northeast of the subject site) – Douglas Project 72923.00 (May 2012): Geotechnical investigation for the proposed mixed-use development which included four cored boreholes to a maximum depth of about 17 m; and
- 378-398 Pacific Highway, Crows Nest (southeast boundary of the subject site) – Douglas Project 224162.01 (9 April 2025): Geotechnical investigation for the proposed mixed-use development which included four cored boreholes to a maximum depth of about 30 m and installation of three groundwater monitoring wells for groundwater assessment. In-situ permeability tests were conducted in the groundwater wells.

The available data from the previous investigations has been considered for this report and included the results of point load strength index tests, soil aggressivity and groundwater measurement.

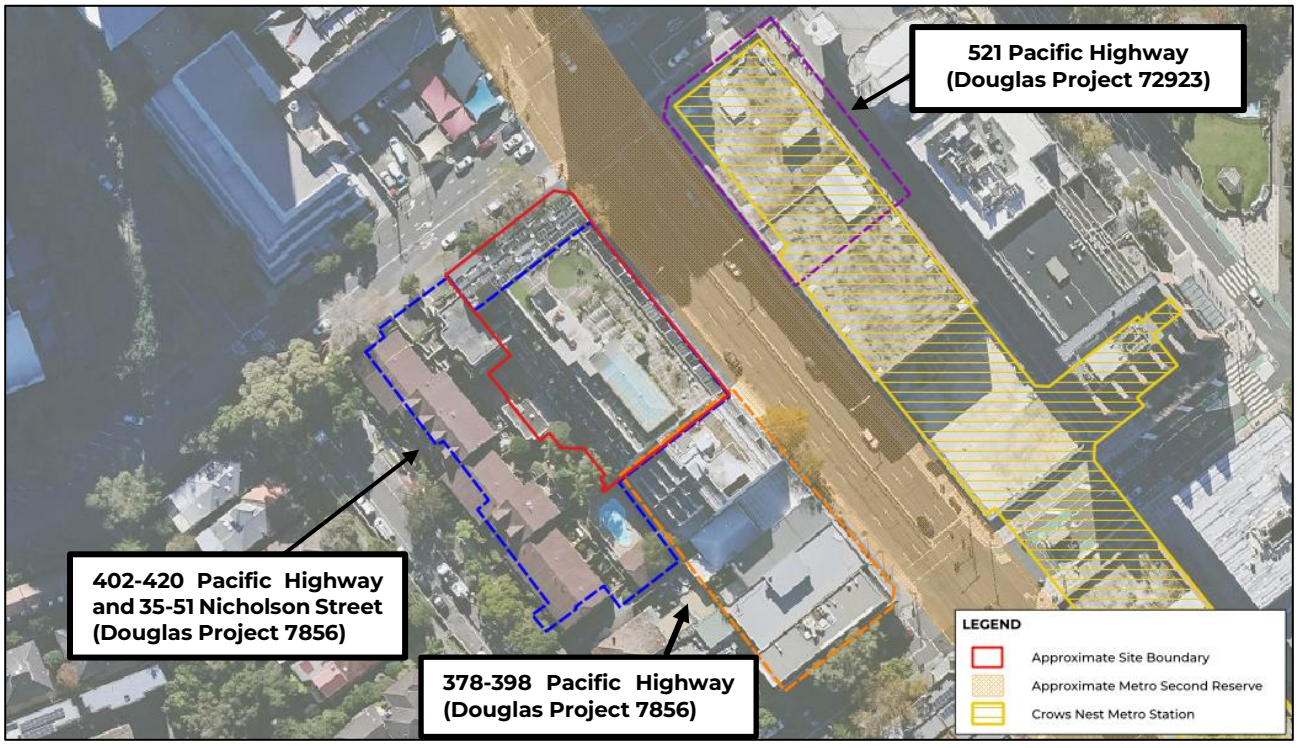


Figure 4: Aerial image of the subject site and Douglas' previous project locations

4.2 Results of the previous investigations

The typical subsurface conditions encountered during the previous investigations on and near the site comprised fill to a maximum depth of approximately 3.0 m, overlying stiff to hard residual clay, grading to extremely weathered shale/siltstone bedrock at depths between 1.5 m and 5.0 m. Very low to low strength shale/siltstone/laminite (Ashfield Shale) was encountered at depths between 4.5 m and 9.0 m, with medium strength laminite/sandstone (Mittagong Formation) encountered between 11.0 m and 19.0 m, improving to medium to high strength sandstone (Hawkesbury Sandstone) with depth.

The results of point load strength index tests ($I_{s(50)}$) range from less than 0.1 MPa to 4.8 MPa in the underlying bedrock, indicating rock strength of very low to very high strength.

During the previous investigations, groundwater was generally not observed in the augered sections of the boreholes but was encountered in some boreholes at depths between 3.0 m and 6.5 m.

Groundwater levels have been measured in monitoring wells at depths ranging from about 3 m to 13 m and possibly falling towards the south-west from about RL 83 m to RL 77 m AHD in the vicinity of the site. The shallower water is expected to be associated with perched seepage flow along the clay or rock surface.

5. Published data

5.1 Geology

Reference to the Sydney 1:100,000 Geological Series Sheet indicates that the site is underlain by Ashfield Shale.

The Ashfield Shale overlies the Hawkesbury Sandstone and, in some areas, there is a transitional geological unit between these two main rock formations known as the Mittagong Formation.

The units typically comprise:

- Ashfield Shale – Black to dark grey shale, siltstone and laminite (finely interbedded sandstones and siltstones);
- Mittagong Formation – Interbedded shale, laminite and fine grained sandstone. This unit is a relatively thin formation that varies in thickness, typically between 3 m and 8 m thick, and is not always present; and
- Hawkesbury Sandstone – medium to coarse grained quartz sandstone, very minor shale and laminite lenses.

This investigation confirmed the mapping encountering Ashfield Shale and Mittagong Formation bedrock over Hawkesbury Sandstone.

5.2 Hydrogeology

A groundwater bore search of the WaterNSW database was conducted for any 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 and available public groundwater data within a 500 m radius of the site.

Groundwater monitoring carried out by Douglas in the area has indicated groundwater levels within the rock at depths ranging from 7 m to 13 m (RL 77 m to RL 83 m AHD) and typically falling towards the south-west.

5.3 Soil landscape

Reference to Sydney 1:100,000 Soil Landscape Sheet indicates the site is underlain by 'Blacktown' residual soils. The Blacktown residual soil landscape unit is characterised by gently undulating rises on Wianamatta Group Shales and Hawkesbury Shale. The map notes indicate that the ground slope grades usually less than 5 %.

5.4 Acid sulfate soils

Reference to the Environmental Planning Instrument (EPI) – Acid Sulfate Soils Mapping (SEED Web Map), published by the State Government of NSW and the NSW Department of Planning, Housing and Infrastructure, indicates that the site is not within an area mapped as being at risk of acid sulfate soil occurrence.

Given the elevation (RL 84.4 m AHD at the existing basement) and the known geology of the site, it is expected that acid sulfate soils are not present on the site.

5.5 Salinity

Reference to the Environmental Planning Instrument (EPI) – Salinity Mapping (SEED Web Map), published by the State Government of NSW and the NSW Department of Planning, Housing and Infrastructure, indicates the site is located outside the mapped area of salinity potential.

5.6 Groundwater Dependant Ecosystems (GDEs)

A review of the Bureau of Meteorology Groundwater Dependant Ecosystems Atlas indicates that there are no aquatic, subterranean or terrestrial GDEs within 1 km of the site.

5.7 Riparian lands

Reference to the NSW Riparian Lands and Watercourses Map indicates that the site is not within an area mapped as a protection area.

6. Field work

6.1 Field work methods

Field work for the current geotechnical investigation was carried out from 11 September to 18 September 2025 and included:

- Electro-magnetic scanning for buried services at the proposed borehole locations;

- Drilling of three boreholes using a tracked mounted drill rig. The boreholes were drilled down to weathered rock using solid flight augers. The boreholes were then extended to depths of between 19.5 m and 26.7 m below existing surface level using HQ diamond coring methods to recover continuous rock core samples;
- Dynamic Cone Penetrometer (DCP) tests were carried out from beneath the slab at all borehole locations to assess the soil consistency and attempt to find the top of weathered bedrock;
- On completion of the borehole drilling, installation of groundwater monitoring wells in all boreholes to allow for the measurement of groundwater levels and long term monitoring. The wells were developed (purged) following installation. Rising-head permeability tests have been undertaken in all groundwater monitoring wells which will be reported separately; and
- Supervision of drilling by a geotechnical engineer, who logged the encountered subsurface conditions, collected samples for geotechnical and separate contamination testing, and completed Point Load Strength Index ($I_{S(50)}$) testing on recovered rock core.

The coordinates and RLs for all test locations could not be recorded during the investigation as they were within the basement. The borehole locations were measured using site features (e.g. distance from the wall) during the investigation, and their rough coordinates were approximated from Metro Map satellite imagery. The surface level on the borehole logs has been estimated from the existing basement slab level in the provided site survey plan prepared by Rygate Surveyors (Drawing ref: 80505, Rev. A, dated 5 May 2025).

The location of the boreholes is shown on Drawing 1 in Appendix B.

6.2 Field work results

6.2.1 Boreholes

A summary of the subsurface conditions encountered at the recent boreholes is presented below. 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 C.

The general strata encountered in the boreholes is summarised as follows:

Concrete:	Concrete slab thickness of 120 mm to 150 mm; overlying
Fill:	Sandy fill with some ironstone and igneous gravel encountered to depths ranging from 0.2 m to 0.3 m; overlying
Extremely Weathered Material:	High plasticity, hard silty clay with some ironstone and shale gravel to depths ranging from 0.6 m to 3.9 m; overlying
Very Low to Low Strength Siltstone:	Highly to moderately weathered, very low to low strength, highly fractured to fragmented siltstone with a significant number of joints with dipping angles typically between 40° and 85°, with frequent extremely weathered seams and occasional low to medium strength ironstone bands encountered to depths ranging from 8.4 m to 10.3 m. Possible shear zone (core loss) observed at depths of between 5.0 m and 7.0 m; overlying

Low to Medium and Medium Strength Siltstone and Sandstone	Slightly weathered to fresh, low to medium and medium strength interbedded and laminated siltstone and sandstone with occasional extremely weathered seams encountered to depths ranging from 15 m to 17.4 m with some lower and higher strength bands; overlying
Medium to High Strength Sandstone:	Fresh, slightly fractured to unbroken, medium to high strength sandstone encountered to termination depth in all boreholes.

Groundwater was not observed during auger drilling of any of the boreholes. The necessary introduction of water to the boreholes while coring precluded any further groundwater observation during drilling.

Groundwater monitoring wells screened in the bedrock were installed at all borehole locations. Data loggers were installed in all wells on 16 September 2025 (BH01 and BH03) and 18 September 2025 (BH02) for long term monitoring to assess likely fluctuations; the results will be reported separately. An overview of the monitoring wells including screen depth and screened lithology is provided in the Table 2.

Details of well construction are shown on the borehole logs in Appendix C.

Three rounds of groundwater measurements were taken in the monitoring wells in September and October 2025, and January 2026. A summary of the groundwater level measurements is presented in Table 3. It should be noted that groundwater levels will vary according to seasonal rainfall patterns and other factors.

Table 2: Monitoring wells overview

Location ID	Surface RL (m AHD)	Screen Depth (m bgl)	Screened Lithology
BH01	84.4	3.5 – 7.5	Highly weathered, highly fractured to fractured, very low to low strength Siltstone.
BH02	84.4	7.4 – 14.5	Highly to slightly weathered, fractured to slightly fractured, very low to low strength Siltstone and medium strength Sandstone.
BH03	84.4	10.8 – 18.0	Slightly weathered to fresh, slightly fractured to unbroken, medium to high strength Sandstone with interbedded Siltstone.

Note: bgl denotes below ground level

Table 3: Manual groundwater measurements

Date of Reading	Measured Depth to Groundwater (m) [Groundwater Level (m AHD)]		
	BH01	BH02	BH03
26/09/2025	2.6 [81.8]	9.3 [75.1]	10.8 [73.6]
17/10/2025	3.2 [81.2]	9.9 [74.5]	11.1 [73.3]
5/01/2025	4.1 [80.3]	10.4 [74.0]	11.6 [72.8]

7. Laboratory testing

7.1 Soil and rock aggressivity testing

Soil samples were tested for soil and rock aggressivity suites to assess the exposure classification to buried steel and concrete elements in accordance with the provisions of AS2159-2009 "Piling – Design and Installation. NATA accredited test results are presented in Appendix D, and a summary of the results is presented in Table 4.

Table 4: Summary of soil and rock aggressivity test results

Location ID	Depth (m)	Material	pH	EC (µS/cm)	Cl (mg/kg)	SO_4 (mg/kg)
BH01	8.95 – 9.0	Sandstone	4.7	58	33	37
BH02	0.3 – 0.5	Silty CLAY	5.0	71	41	50
BH03	4.35 – 4.41	Siltstone	4.8	29	10	20

7.1.1 Point load strength index testing

The results of point load strength index testing ($I_{s(50)}$), carried out at regular intervals on rock cores, are shown on the borehole logs in Appendix C. The $I_{s(50)}$ results range from 0.01 MPa to 2.5 MPa in the underlying bedrock, indicating rock strengths of between very low to high strength.

8. Geotechnical model

The subsurface profile observed during the investigation has been grouped into five geotechnical units (1 to 5). Based on the investigation, the site below existing basement level is generally underlain by shallow fill (likely placed as subbase layer for the slab) over extremely weathered siltstone bedrock (hard clay). Very low to low strength siltstone was then encountered improving to low to medium strength siltstone/sandstone and medium to high strength sandstone with depth in all boreholes. Frequent clay seams and core loss zones (possibly clay/very low strength or highly fractured rock) were encountered to depths of about 7 m to 9 m below the basement slab level. Multiple medium to high strength ironstone bands were encountered within very low to low strength siltstone (Unit 3) in BH03 to depths of about 6.5 m.

As there are no engineering records to indicate otherwise the fill is assessed to be 'uncontrolled'.

Based on the previous investigation undertaken by Douglas in 1983 at the subject site and neighbouring properties (35–51 Nicholson Street), two boreholes (BH1 and BH4) were located within the subject site, and two boreholes (BH2 and BH3) were located in proximity to the site boundary. The subsurface profile below ground surface level (assumed to be approximately at the Pacific Highway or Oxley Street level, as no surface elevations were provided on the logs) was generally underlain by topsoil/fill up to 0.8 m depth over very stiff to hard clay residual soils extending to depths of between 4.2 m and 4.3 m. Very low to low strength shale/sandstone was encountered at depths between 13 m and 16.1 m, and fractured, medium strength sandstone extended to the termination depth of 17.25 m at BH1 only.

The current groundwater levels measured in the monitoring wells indicate that groundwater is present within the Unit 3 to Unit 5 siltstone and sandstone, with no obvious flow direction. Based on the local topography, which slopes towards the west, groundwater flow is anticipated to be generally in a south-westerly direction. It is noted that the measured groundwater level at BH01 (RL 81.8 m AHD) is several metres higher than those recorded at the other monitoring wells, which range from RL 73.6 m to 75.1 m AHD. This could be due to groundwater in BH01 being perched water and/or groundwater in other wells being more influenced by nearby basements. Long term groundwater monitoring is ongoing to assess likely fluctuations.

A geotechnical cross-section on Drawing 2 in Appendix B shows the interpreted geotechnical divisions of underlying soil and rock. The layers are shown as a guide only and variation away from the boreholes should be expected. The interpreted depth and RL's at the top of the various units at each borehole location is shown in Table 5. The geotechnical model does not include the concrete slab. Reference should be made to the borehole logs in Appendix C for more detailed information and descriptions for the soil and rock profile.

Table 5: Summary of geotechnical model

Unit	Material	Depth to Top of Unit (m) [Reduced Level of Top of Unit (m AHD)][1]		
		BH01	BH02	BH03
1	Fill	0.12 [84.3]	0.14 [84.3]	0.15 [84.3]
2	Extremely Weathered Material	0.3 [84.2]	0.2 [84.2]	0.3 [84.1]
3	Very Low to Low Strength Siltstone (Ashfield Shale grading to Mittagong Formation)	0.6 [83.8]	3.9 [80.5]	2.1 [82.3]
4	Low to Medium and Medium Strength Siltstone and Sandstone (Mittagong Formation)	10.3 [74.1]	8.4 [76.0]	9.6 [74.8]
5a	Medium to High Strength Siltstone and Sandstone (Mittagong Formation)	15.0 [69.4]	15.1 [69.3]	17.4 [67.0]
5b	High Strength Sandstone (Hawkesbury Sandstone)	17.9 [66.5]	18.3 [66.1]	17.5 [66.9]
Termination Depth		19.5 [64.9]	19.5 [64.9]	26.7 [57.7]

9. Proposed development

It is understood that the proposed development involves demolition of the existing building and construction of a 38-storey mixed-use development with a four-level basement. Based on the architectural drawings prepared by fjcstudio (dated 23 July 2025), the lowest finished floor level (FFL) of Basement 6 is at RL 69.2 m AHD (Australian Height Datum), and 64.2 m AHD for Basement 7 (inclusive of the lift pit).

Based on the survey drawings provided, it is anticipated that the lowest basement level will require excavation to depths of approximately 16.0 m below existing basement level with additional deepening likely required for the lift core. The provided architectural cross section drawings of the proposed building are included in Appendix E of this report.

10. Comments

10.1 Excavation

10.1.1 Dilapidation surveys

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

10.1.2 Excavation Conditions

Based on the borehole logs, the proposed excavation works are likely to extend through Units 1 to 4 (soil and rock) outlined in Table 5, with the base of the excavation extending to the low to medium and medium strength Unit 4, and medium to high strength Unit 5a rock. Localised deeper excavations for footings and the lift pit/core may extend into Unit 5b high strength rock depending on the final bulk excavation level on the northern portion of the site.

Excavation in fill, weathered rock and very low strength rock (Units 1 to 3) should be readily achievable using conventional earthmoving equipment such as bulldozers and hydraulic excavators with bucket attachments.

Excavation in low to medium strength and stronger rock (Units 4 and 5) will require the use of heavy ripping equipment, hydraulic rock hammers, milling heads and/or rock saws. Medium to high strength ironstone bands were encountered in BH03, which may also require heavy ripping equipment for effective excavation. High strength rock (if encountered) will require large hammers and / or heavy ripping tynes on large (45 tonne plus) excavators and bulldozers, and low productivity can be expected. Potential excavation contractors should make their own assessment of the rock strength and equipment required based on the information contained on the borehole logs as well as an inspection of the rock cores from the current boreholes (stored at Douglas for six months).

10.1.3 Vibration

Noise and vibration will be caused by excavation work in rock, the demolition of the existing structures and by the operation of large excavation equipment, particularly for the removal of medium strength or stronger rock. The level of acceptable vibration is dependent on various factors including the type of building / structure (e.g. reinforced concrete, brick, etc), its structural condition, the frequency range of the vibrations produced by the construction equipment, the natural frequency of the building and the vibration transmitting medium (i.e., rock).

The use of large excavation (and demolition) equipment will cause vibrations which could possibly result in damage to nearby structures. Based on Douglas' experience and with reference to AS/ISO 2631.2-2014, it is suggested that vibrations be provisionally limited to a peak particle velocity (PPVi) of 8 mm/s at the foundation level of the adjacent buildings to protect the architectural features of the buildings and to reduce discomfort for the occupants. Stricter tolerances for vibrations may be imposed by other asset owners such as Sydney Water and Sydney Metro.

The Sydney Metro At-grade and Elevated Sections Corridor Protection Technical Guidelines (Sydney Metro, dated 1 August 2025) outlines that demolition works require a vibration assessment to ensure there are no adverse impacts on Sydney Metro infrastructure. The guidelines also specify that a peak particle velocity (PPV) limit of 10 mm/s should be adopted at the toe level of retaining wall structures.

A site-specific vibration monitoring trial will be required to determine vibration attenuation once excavation plant and methods have been finalised. Rock sawing along the boundaries may be required in stronger rock to reduce vibrations on adjacent sites

10.1.4 **Disposal of excavated material**

All excavated materials to be removed from site will need to be disposed of in accordance with the provisions of the current legislation and guidelines including the Waste Classification Guidelines (NSW EPA, 2014). Reference to Douglas' Preliminary Site Investigation (PSI) with limited sampling report (Douglas report ref. 236315.01.R.001.Rev3 dated June 2026) should be made for further information.

10.2 **Excavation support**

Battering of the sides of the excavation will not be feasible as the excavation is expected to be extended to the boundaries of the site. Both temporary and permanent lateral support will therefore be required for all vertical excavation faces in the overlying fill, weathered rock and very low to low strength siltstone (Unit 1 to Unit 3).

The use of ground anchors adjacent to Pacific Highway may be restricted, or will require review and approval, where anchors encroach upon the 'Second Protection Reserve' of the Metro Station Box and Tunnels. It should be noted that the temporary anchors within the Sydney Metro anchor zone have not been de-stressed. This may limit the feasibility of installing new anchors along the eastern part of the site (Pacific Highway frontage). The adjacent basements could also dictate utilising internal bracings for the shoring design along the shared boundaries with the site. Where anchors are not possible, corner props or other internal propping systems will need to be considered as an alternative option to provide the required lateral support for the shoring system.

Prior to demolition, a review of the existing shoring system should be undertaken to determine the appropriate staging and methodology. The demolition staging and methodology should be reviewed by a geotechnical consultant once prepared by the demolition subcontractor and / or structural engineer.

If records of the existing shoring system are unavailable, an investigation should be carried out to assess its geometry / structural integrity / geotechnical capacity (Douglas can assist with this assessment). Additionally, if the ground slab is to be demolished, appropriate temporary support will be required to provide lateral restraint to the shoring walls.

Given that there are existing buildings on the west and south side of the site, and existing shoring walls, it will be necessary to provide shoring and retaining structures such as bracing and / strut support during construction to limit wall movements and potential settlements of adjacent footings. The effects of any proposed excavation on the serviceability and stability of the adjacent building should be studied in detail.

10.2.1 Retaining walls

Soldier pile walls are often used to provide temporary retaining support in these ground conditions (i.e. clay over siltstone). The soldier piles are usually spaced at approximately 2 m to 2.5 m centres and should preferably be founded at least 1 m or two pile diameters below the lowest excavation level (including detailed excavation). More closely spaced piles may be required to reduce wall movements, or prevent collapse of infill materials, particularly where pavements, structures or services are located in close proximity to the excavation. The rock will break down over time and will require shotcrete protection for the long term.

Details of existing footings near the shoring walls should be confirmed prior to detailed design and shoring wall spacing and design loads selected to control deflections.

At the completion of each 1.5 m to 2.0 m drop in excavation level, reinforced shotcrete infill panels should be constructed. At no stage should progressive vertical excavation proceed beyond 2 m without infill panel support being constructed. Regular inspections by a geotechnical professional should be carried out following each progressive drop in excavation level to confirm that the conditions encountered are consistent with the design assumptions.

The shoring piles should be founded below bulk excavation in rock to eliminate risks associated with adverse joints undermining the piles. It may be possible to terminate some of the shoring piles within Unit 4 medium strength sandstone/siltstone at higher level for piles not supporting structural loads. If shoring piles are founded at higher levels in competent rock, it is imperative that a suitably qualified geotechnical engineer assesses the stability of the rock directly beneath each pile. The toe of the piles which terminate above bulk excavation level will also need to be restrained with rock bolts or anchors.

Suitably powered piling rigs will be required to penetrate the medium or better strength rock, and this should be considered by the piling contractor. Consideration should also be given to the potential for groundwater inflow into the piles which may be heavy where fractured zones and faults are encountered. This may require the use of cleaning buckets and possibly tremmie pouring methods.

10.2.2 Shoring design

It is suggested that the preliminary design of cantilevered shoring systems (or shoring systems with one row of anchors or propping) be based on a triangular earth pressure distribution using the earth pressure coefficients provided in Table 6. 'Active' earth pressure coefficient (K_a) values may be used where some wall movement is acceptable. 'At Rest' earth pressure coefficient (K_o) values should be used where the wall movement needs to be limited. For this site however it is generally expected that multiple rows of anchors or bracing will be required for the shoring system.

Passive resistance for shoring piles founded below the base of the bulk excavation (including allowance for services or footings) may be designed based on the ultimate passive restraint values in Table 6. This ultimate value will need to incorporate a factor of safety to limit the wall movement that is required to mobilise the full passive resistance. The top 0.5 m of the socket should be ignored due to possible disturbance (e.g. over-excavation) and tolerance effects. The passive restraint adopted in the design must not exceed the shear capacity of the pile.

Table 6: Recommended design parameters for retaining walls

Unit	Unit Weight (kN/m^3)	Earth Pressure Coefficient		Ultimate Passive Earth Pressure (kPa)
		Active (K_a)	At Rest (K_o)	
1	19	0.4	0.6	-
2	20	0.35	0.45	200
3	22	0.25	0.35	400
4	22	0.1[1]	0.2[1,2]	2,000[3]
5	24	0[1]	0.1[1, 2]	5,000[3]

Notes: [1]Provided that adverse jointing is not encountered in the rock.
[2]Does not account for stress relief movements.
[3]Subject to geotechnical inspections.

For braced walls or where two or more rows of anchors are used, the shoring can be designed using a trapezoidal earth pressure distribution. For preliminary purposes a trapezoidal earth pressure distribution with a maximum pressure calculated based on 4H kPa where H is equal to the retained height (m) of clay and very low to low strength siltstone (Units 1 to 3) may be assumed. The maximum pressure should be increased to 6H kPa where wall movement needs to be reduced. In each case the maximum pressure generally acts over the central 60% of the wall height, reducing to zero at the top and base.

The design of temporary (and possibly permanent) support will also need to consider the possibility that moderately to steeply dipping joints in the weathered rock and Ashfield Shale and Mittagong Formation will 'daylight' near the base of the excavation leading to wedges of rock requiring support by the temporary (and permanent) shoring/retaining structures. For the temporary case, the required forces are generally provided by temporary 'tie-back' ground anchors and prudent, conservative design of deep excavations in shale generally involves shoring piles extending below the bulk excavation level to provide passive restraint to the shoring / retaining walls. A continuous 45-degree joint daylighting at the base of the Mittagong Formation should be considered in the design, which often governs the shoring/anchor design for deep excavations in jointed shale. This should be assessed by a suitably qualified geotechnical engineer.

Lateral pressures due to surcharge loads from adjacent buildings, sloping ground surfaces, pavements and construction machinery should be included where relevant. Hydrostatic pressure acting on retaining walls should also be included in the design where adequate drainage is not provided behind the full height of the walls. Detailed design of shoring should preferably be carried out using WALLAP, PLAXIS, FLAC or other accepted computer analysis programs, which are capable of modelling progressive excavation and anchoring, and predicting potential lateral movements, stresses and bending moments, particularly for interaction with existing walls if they are to be used.

10.2.3 Ground anchors

It is anticipated that the building will support the shoring wall in the long term and therefore any ground anchors are expected to be temporary only. The use of permanent anchors, if required,

would need careful attention to corrosion protection for which further geotechnical advice should be sought.

It should be noted that permission from adjacent property owners will be required, prior to installing rock bolts/anchors below their land. Due consideration should also be given to buried services and any excavations nearby. TfNSW, Sydney Water, Sydney Metro and other service providers may require assessment on the effects that excavations and rock bolts and anchors may have on their assets.

Based on the provided information by Sydney Metro and Prosper Atrium Pty Ltd, it is understood that the site is not within the Sydney Metro station Second Reserve, except at the north-eastern corner, where it extends approximately 500 mm into the site boundary. The temporary anchors installed within the Second Reserve of the Sydney Metro are typically lengths of 3 m to 20 m at 2.5 m to 2.9 m spacing. Given the existing anchor spacing, lengths and alignment beneath the Pacific Highway, the installation of additional anchors within the Second Reserve is expected to be highly constrained. As the temporary anchors installed within the Sydney Metro Second Reserve have not been de-stressed, the feasibility of installing anchors along the eastern part of the site (Pacific Highway frontage) should therefore be carefully assessed. Approval from Sydney Metro will be required for any anchors proposed within the Sydney Metro Second Reserve.

Pre-stressed ground anchors, rock bolts and dowels (support elements) can be used to laterally support new shoring walls or unstable rock masses. These support elements should preferably be bonded into the stronger rock, inclined as required, but preferably not steeper than 30° below the horizontal.

Shorter support elements (rock bolts and dowels) may be required to support unstable rock wedges, slivers or blocks in the excavation faces between shoring piles. Short dowels and pins may be required to support feather edges where sub-parallel joints intersect the face.

The design of temporary ground anchors / rock bolts / dowels may be carried out using the bond stresses given in Table 7.

Table 7: Recommended bond stresses for rock anchor design

Unit	Allowable Bond Stress (kPa)	Ultimate Bond Stress (kPa)
3	100	200
4	400	800
5	500	1,000

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

After temporary support elements have been installed, it is recommended that they are tested to 125% of their nominal working load. Where stress relief or further unavoidable movement of the shoring is expected, it is recommended that the support elements are locked off between 60% and 80% of their working loads to accommodate the additional movement and subsequent increase in stress in the support elements. Consideration should, however, be given to the

immediate design requirements. The capacity of the anchor may have to be increased if a lower initial lock-off is not feasible. Checks should be carried out to confirm that the load in the support elements has been maintained and that losses due to creep effects or other causes have not occurred.

Care should be exercised to ensure that anchors are installed progressively during excavation and stressed prior to excavation of the next drop to ensure that stability is maintained at all times.

10.3 Ground movement and stress relief

Horizontal movements due to stress relief will occur during the excavation works. Based on published literature and Douglas' experience, the lateral stress relief movements associated with excavation in rock may be in the order of 0.05% to 0.15% of the excavation height in competent rock, which corresponds to approximately 5 mm to 15 mm for 10 m depth of excavation in rock. The predicted deflections would generally be greatest at the centre of the excavated faces and would reduce with distance from the excavation face / boundary.

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

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

10.4 Excavation monitoring adjacent to TfNSW and Sydney Water assets

Reference should be made to the "TfNSW Technical Direction on Excavation adjacent to Transport for NSW Infrastructure guideline (GTD 2020/001 | Version No. 01 – 2 July 2020)" with regards to excavation / shoring adjacent to Pacific Highway. This document outlines requirements for excavations adjacent to TfNSW infrastructure and includes the level of geotechnical investigation required, dilapidation surveying, instrumentation and monitoring during construction, trigger levels and contingency plans.

Instrumentation (e.g. inclinometers) and monitoring is typically required where the excavation exceeds 3 m in height (for cantilevered shoring walls) or 6 m in height (for anchored or propped shoring walls). A geotechnical monitoring plan may be required by TfNSW prior to construction of the development.

In addition, a Specialist Engineering Assessment (SEA) of any Sydney Water assets within the zone of the influence of the excavation will be required with reference to the Sydney Water guidelines.

It is understood that the site is mostly outside the Second Reserve of Sydney Metro except the north-eastern corner, hence details of the protection zones should be obtained from Sydney Metro and considered in the design, followed by review of proposed shoring design by a geotechnical engineer to assess the feasibility of the design within the Sydney Metro Second

Reserve. Given that the site partially encroaches into the Second Reserve of Sydney Metro corridor, it is likely that Sydney Metro will require an impact assessment to be submitted. No works (including anchors) are allowed in the Second Reserve without assessment and approval.

10.5 **Foundations**

Based on the investigation results to date, it is expected that the bulk excavation for the basement will mostly expose Unit 4 (low to medium and medium strength siltstone/sandstone), and Unit 5A (medium to high strength siltstone /sandstone). Unit 5B (high strength sandstone) may be encountered in the deeper parts/core, depending on the final bulk excavation level.

Generally, footings should be supported on foundation strata with similar strength and properties to reduce differential settlements. It is suggested that the new building should be uniformly founded on Unit 5 medium to high strength siltstone/sandstone.

It is noted that Douglas' investigation was tailored for a four-level basement, with two boreholes terminating at RL 64.9 m AHD and one at RL 57.7 m AHD. As such, there is limited data to inform pile design, should piled foundations be adopted to support the building. Subject to the final basement configuration and structural load requirements, additional subsurface investigation is recommended to enable cost-effective design and to reduce design and construction uncertainty. The scope of the recommended supplementary investigation is outlined in Section 11.

Spread footings (e.g. pads) and rock-socketed piles subject to axial compression loading may be designed using the maximum pressures for the various rock strata presented in Table 8.

For bored piles, the same end bearing parameters may be adopted, and shaft adhesion values for uplift (tension) may be taken as being equal to 70% of the values for compression.

Table 8: Recommended parameters for foundation design

Unit	Maximum Allowable Pressure		Maximum Ultimate Pressure		Young's Modulus, E (MPa)
	End Bearing (kPa)	Shaft Adhesion (Compression) (kPa)	End Bearing (kPa)	Shaft Adhesion (Compression) (kPa)	
3	1,000	100	3,000	200	100
4	3,500	350	10,000	600	600
5a	3,500 – 6,000[1]	350 – 600	20,000 – 40,000	800 – 1,500	1,000 – 1,200
5b	8,000 – 10,000[1]	600 – 1,000	60,000 – 80,000	1500 – 2,000	1,500 – 2,000

Note: Shaft adhesion applicable to the design of bored piles, uncased over the rock socket length, where adequate sidewall cleanliness and roughness are achieved.
[1] Higher bearing pressures allowable subject to additional investigation and/or spoon testing as per Table 9.

Higher allowable bearing pressures of about 6,000 kPa (and possibly higher) could be adopted in Unit 5a and Unit 5b provided that additional investigation (either prior to or during construction)

and/or spoon testing is completed. Spoon testing involves drilling a 50 mm diameter hole below the base of the footing, to a depth of 1.5 times the footing width, followed by testing to check for the presence of weak / clay bands. If weak seams are detected, then footings may need to be taken deeper to reach suitable foundation material. This additional investigation would not be required for footings adopting an allowable bearing pressure of 3,500 kPa.

The recommended minimum required investigation and spoon testing depends on the design allowable bearing pressure. The minimum recommended investigation and testing requirements for higher bearing pressures are summarised in Table 9.

Table 9: Recommended minimum investigation requirements for higher bearing pressures

Allowable Bearing Pressure for Unit 5 Medium to High and High Strength Sandstone (kPa)	Minimum Recommended Validation Requirements
6,000	Spoon testing in at least 33% of footings
10,000	Cored bores at max 10m grid or cored bores for 50% of footings, and spoon testing for remainder (i.e., spoon testing or cored bore at **every** footing)

A geotechnical strength reduction factor (ϕ_g) should be applied to the ultimate values provided in Table 8, if the limit-state design process is undertaken to design the footings. Australian Standard AS 2159-2009 "Piling – Design and Installation" provides information on how to determine an appropriate value of ϕ_g which is based on several risk rating factors. The designer will need to confirm a ϕ_g value, however, it is suggested that a preliminary value of 0.40 be adopted at this stage.

Settlement of a footing or pile is dependent on the loads applied and the foundation conditions. Foundations proportioned on the basis of the allowable bearing pressures in Table 8 would be expected to experience total settlements of less than 1% of the footing / pile width under the applied Working load, with differential settlements between adjacent columns expected to be less than half of this value. Serviceability analysis should be undertaken if the ultimate bearing pressures (incorporating a suitable reduction factor) are used to proportion the pads/piles and this should be based on the Young's modulus values in Table 8.

The foundation design parameters assume that the foundation excavations (e.g. for pad footings or bored piles) are clean and free of loose debris and water immediately prior to the placement of concrete.

All foundations should be constructed below the zone of influence of any existing or proposed service trenches, adjacent excavations or buried tanks/pits. The zone of influence can be defined by a plane extending upwards at 45° from the base of the service trench or adjacent excavation.

All shallow footings and bored piles should be inspected by an experienced geotechnical professional during construction to check the adequacy of the foundation material and, in the case of piles, to check the socket cleanliness and roughness.

10.6 **Groundwater**

The groundwater level measured in the monitoring wells ranged from approximately RL 73.3 m to 81.8 m AHD. The lowest proposed basement level (RL 69.2 m AHD) is expected to extend approximately 12.6 m below the highest groundwater level recorded in the well installed at BH01. However, it is considered likely that some of the recorded groundwater levels, particularly the higher level at BH01, may be associated with perched seepage within the weathered rock and may not represent the permanent groundwater table. This is evident from the water level in BH03, which is screened in the deeper rock only, being about 8 m deeper (depth and elevation) than BH01.

Seepage should be expected along the top of the clay and rock (particularly after periods of wet weather) and through the rock mass, joints and bedding planes in the exposed rock face and base. The seepage may vary depending on the climactic variations. The seepage may be relatively minor during dry periods and will increase following and during wet periods.

It is understood that the underground Metro Station has been designed as a tanked basement, which will influence the regional groundwater conditions. It should be noted that groundwater levels are transient and that fluctuations may occur in response to climatic and season conditions.

A drained basement is considered to be technically feasible for the proposed four level basement with inflows manageable with sump and pump methods. This, however, will be subject to further groundwater investigation and analysis and then review and approval by the Natural Resources Access Regulator (NRAR) for SSDA.

Long-term groundwater monitoring over a three-month period was completed in January 2026. The groundwater impact assessment is presented in a separate report (Douglas report reference 236315.00.R.005 Rev1, dated June 2026).

10.7 **Aggressivity**

In accordance with AS2159-2009: Piling-Design and Installation, the results of the soil and rock aggressivity testing indicate that the tested soils are:

- Mildly aggressive to buried concrete; and
- Non-aggressive to buried steel.

It is suggested that an exposure classification of at least ‘mild’ (as per AS2159) is adopted for all buried structural elements.

10.8 **Seismic design**

In accordance with AS1170–2007 “Structural Design Actions, Part 4: Earthquake Actions in Australia”, a hazard factor (Z) of 0.08 and a site subsoil Class C_e (shallow soil site) is considered to be appropriate for the site. Further geotechnical review and analysis could be used to possibly refine the site classification.

11. Additional geotechnical investigation

Following Douglas investigation and original report (23615.00.R.002.Rev0 dated October 2025) the proposed basement has been lowered by a maximum of approximately 6 m AHD (excl. localised excavation required for the lift pit). All three boreholes completed as part of this investigation extend below the proposed Basement 6 level, however, the investigation does not strictly comply with the guidelines imposed by the 'Minimum requirements for building site groundwater investigations and reporting' by Department of Climate Change, Energy, the Environment and Water (DCCEEW). Furthermore, should piled foundations be required to support the proposed development, the boreholes drilled to date unlikely extend to sufficient depths to adequately characterise the material at and below the anticipated pile sockets.

Accordingly, Douglas recommends that three additional cored boreholes be completed prior to construction certificate being issued. The depth of the boreholes would depend on the magnitude and configuration of the column loads. For preliminary purposes, it is suggested that provision be made to extend the boreholes to a depth of approximately 10 m to 15 m below the anticipated bulk excavation level to enable further assessment of the rock quality at and below the anticipated pile sockets. Groundwater monitoring wells should also be installed, with screen intervals targeted at the proposed Basement 5 and Basement 6 levels to better characterise groundwater conditions relevant to the revised basement excavation.

12. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at 402-420 Pacific Hwy, Crows Nest NSW in line with Douglas' proposal dated 11 June 2025 and acceptance received from Natalie Bocock of Prosper Atrium Pty Ltd. The work was carried out under Geotechnical Consultant Agreement, commencement date 27 June 2025. This report is provided for the exclusive use of Prosper Atrium Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

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

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

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical and 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

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

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.

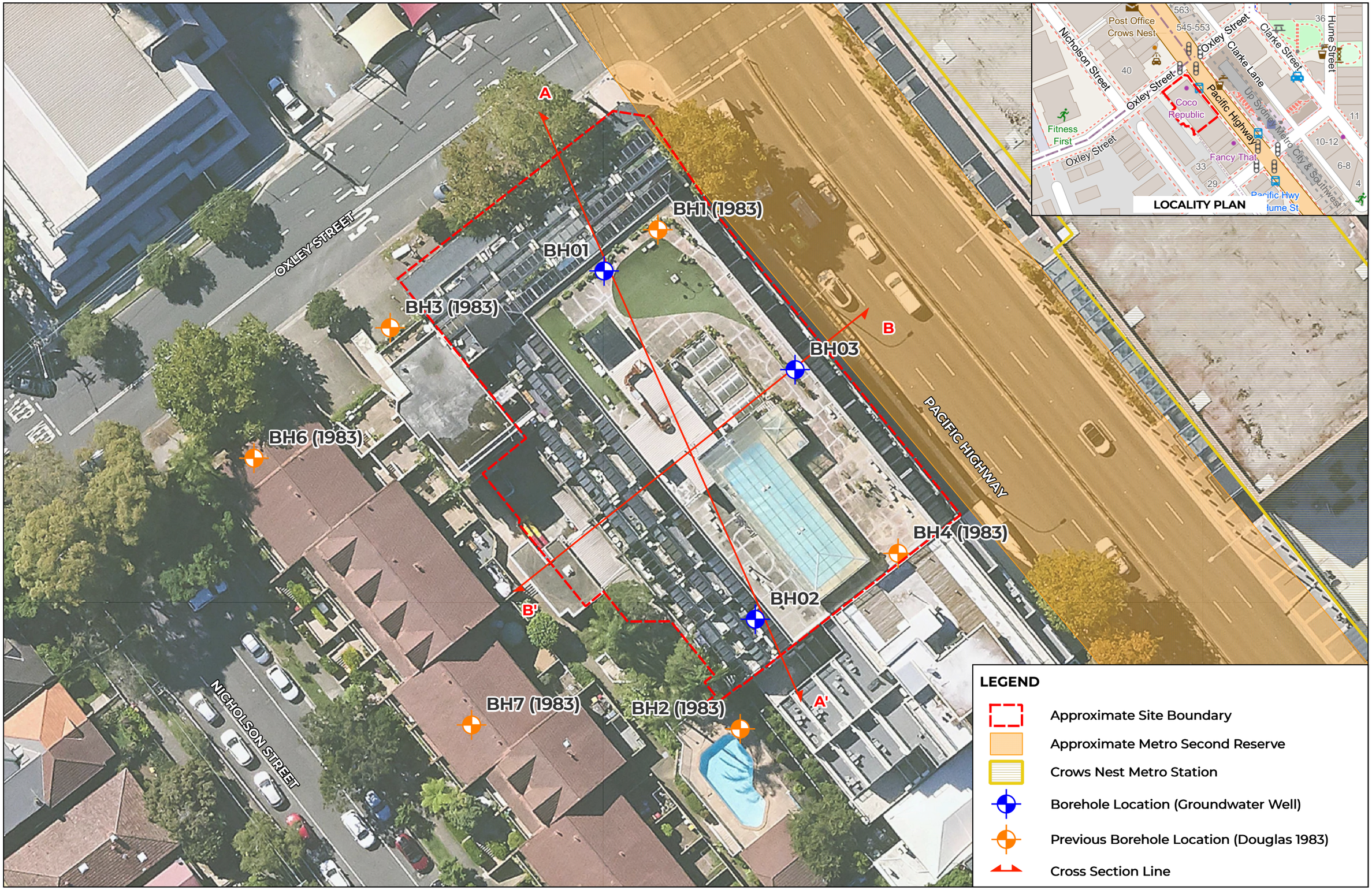
Site Inspection

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.

intentionally blank

Appendix B

Borehole Location Plan



REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	INITIAL	20.10.2025	YG

SCALE: 0 5 10 15 20 m
1:400 @ A3

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

CLIENT: **Prosper Atrium Pty Ltd**

NOTE:
1: Basemap from Metro Map (Dated 4.09.2025)

COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 56

PROJECT NAME: **Proposed Mixed-Use Development**

PROJECT ADRESS: **402-420 Pacific Highway, Crows Nest NSW**

DRAWING TITLE: **TEST LOCATION PLAN**

PROJECT NO: **236315.00**

DRAWING NO: **1**

REVISION: **0**

A

A'

OXLEY STREET

APPROXIMATE SITE BOUNDARY

398 PACIFIC HIGHWAY

APPROXIMATE SITE BOUNDARY

BH01

BH03

BH02

UNIT 1

UNIT 2

UNIT 3

UNIT 4

UNIT 5A

UNIT 5B

PROPOSED BASEMENT LEVEL
RL 69.2m AHD

ADDITIONAL ALLOWANCE FOR STRUCTURAL ZONE
RL 68.2m AHD
(EXCL. LOCALISED DEEPER EXCAVATION FOR LIFT PIT)

ELEVATION (AHD)

UNIT 1: FILL
UNIT 2: EXTREMELY WEATHERED MATERIAL
UNIT 3: VERY LOW TO LOW STRENGTHSILTSTONE
UNIT 4 : LOW TO MEDIUM STRENGTH SILTSTONE / SANDSTONE
UNIT 5A: MEDIUM TO HIGH STRENGTH SILTSTONE / SANDSTONE
UNIT 5B: HIGH STRENGTH SANDSTONE

DISTANCE ALONG PROFILE (m)

LEGEND

- CH - High Plasticity CLAY
- CI-CH - Medium to High Plasticity CLAY
- CONCRETE
- NO CORE
- FILL
- INTERBEDDED SILTSTONE & SANDSTONE
- SANDSTONE
- SILTSTONE

TESTS / OTHER

- N - Standard penetration test value
- — ? — — - Interpreted geotechnical boundary
- - Groundwater Level

ROCK STRENGTH

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

CONSISTENCY (COHESIVE SOILS)

- vs - Very Soft
- s - Soft
- f - Firm
- st - Stiff
- vst - Very Stiff
- h - Hard

RELATIVE DENSITY (NON- COHESIVE SOILS)

- vl - Very Loose
- l - Loose
- md - Medium Dense
- d - Dense
- vd - Very Dense

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	Initial Issue	15.10.2025	MN
1	Updated Basement Levels	30.06.2026	EC

SCALE: 0 4

Horizontal Scale 1:200
Vertical Exaggeration = 1.0

Douglas PARTNERS

OFFICE: SYDNEY

96-98 Hermitage Rd, West Ryde NSW 2114

(02) 9809 0666

CLIENT:

Prosper Atrium Pty Ltd

NOTES

1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Basement level from fjc studion, 4000 section 01 & 02.

PROJECT NAME:

Proposed Mixed-Use Development

PROJECT ADDRESS:

402-420 Pacific Highway, Crows Nest

DRAWING TITLE:

Geological Cross Section A-A'

PROJECT No: **236315.00**

DRAWING No: **2**

REVISION: **1**

\\dgsydfs01\Projects\236315.00 - CROWS NEST, 402-420 Pacific Hwy\7.0 Drawings\7.2 Out\236315.00.D.002-003.Rev1_Section A and B.dwg

B

B'

ELEVATION (AHD)

APPROXIMATE SITE BOUNDARY

PACIFIC HIGHWAY

APPROXIMATE SITE BOUNDARY

UNIT 1

BH03

BH01

BH02

INDICATIVE METRO TUNNEL ANCHORING ZONE**

UNIT 2

UNIT 3

UNIT 4

INDICATIVE EXTENT OF BASEMENT 6 LEVEL RL 69.2m AHD

UNIT 5A

ADDITIONAL ALLOWANCE FOR STRUCTURAL ZONE RL 68.2m AHD (EXCL. LOCALISED DEEPER EXCAVATION FOR LIFT PIT)

UNIT 5B

25,000

METRO TUNNEL FIRST RESERVE

METRO TUNNEL SECOND RESERVE

INDICATIVE CROWS NEST METRO TUNNEL SHAFT

METRO SECOND RESERVE ENCROAHCMENT**

INDICATIVE METRO TUNNEL SECOND RESERVE

UNIT 1: FILL
UNIT 2: EXTREMELY WEATHERED MATERIAL
UNIT 3: VERY LOW TO LOW STRENGTHSILTSTONE
UNIT 4 : LOW TO MEDIUM STRENGTH SILTSTONE / SANDSTONE
UNIT 5A: MEDIUM TO HIGH STRENGTH SILTSTONE / SANDSTONE
UNIT 5B: HIGH STRENGTH SANDSTONE

DISTANCE ALONG PROFILE (m)

LEGEND

- CH - High Plasticity CLAY
- CI-CH - Medium to High Plasticity CLAY
- CONCRETE
- NO CORE
- FILL
- SANDSTONE
- SILTSTONE
- INTERBEDDED SILTSTONE & SANDSTONE

TESTS / OTHER

- N - Standard penetration test value
- — ? — — - Interpreted geotechnical boundary
- ▼ - Groundwater Level

ROCK STRENGTH

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

CONSISTENCY (COHESIVE SOILS)

- vs - Very Soft
- s - Soft
- f - Firm
- st - Stiff
- vst - Very Stiff
- h - Hard

RELATIVE DENSITY (NON- COHESIVE SOILS)

- vl - Very Loose
- l - Loose
- md - Medium Dense
- d - Dense
- vd - Very Dense

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	Initial Issue	20.10.2025	MN
1	Updated Basement Levels	30.06.2026	EC

SCALE: 0 4

Horizontal Scale 1:200
Vertical Exaggeration = 1.0

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

CLIENT: **Prosper Atrium Pty Ltd**

NOTES
1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Base drawing from fjc studion, 1208 indicative section (Metro).

PROJECT NAME: **Proposed Mixed-Use Development**

PROJECT ADDRESS: **402-420 Pacific Highway, Crows Nest**

DRAWING TITLE: **Geological Cross Section B-B'**

PROJECT No: **236315.00**

DRAWING No: **3**

REVISION: **1**

\\dgsydfs01\Projects\236315.00 - CROWS NEST, 402-420 Pacific Hwy\7.0 Drawings\7.2 Out\236315.00.D.002-003.Rev1_Section A and B.dwg

Appendix C

Field Work Results

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.

intentionally blank

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".

intentionally blank

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.

intentionally blank

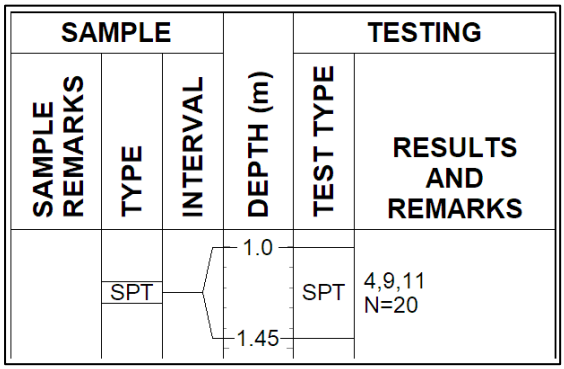
Sampling, Testing and Excavation Methodology

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

BOREHOLE LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333256.6, N:6255744.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH01
PROJECT No: 236315.00
DATE: 11/09/25 - 12/09/25
SHEET: 1 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
		0.12	CONCRETE SLAB.		NA	NA	NA		A/ES		0.12			Concrete	
		0.25	FILL / SAND trace clay trace gravel: pale brown; fine to medium; fine to coarse, igneous and sandstone gravel.		FILL	MC	M				0.20	DCP9/150	5 10 15 R 25/50mm		
	84				XWM	H	w<PL		* ES		0.40			Sand	
		0.60				NA	NA				0.50				
		0.70	Silty CLAY (CI-CH) trace gravel: pale grey mottled red-brown; medium to high plasticity; fine to medium, ironstone gravel.						A		0.70				
		1	SILTSTONE: pale grey; very low strength. Ashfield Shale.								1				
	83		Continued as rock log												
		2									2				
▼ 25/09/25	82														
		3									3			Bentonite	
	81														
		4									4				
	80														
		5									5				
	79													Sand	
		6									6				
	78														
		7									7				
	77														
		8									8			Bentonite	
	76														
		9									9			Sand	
	75														

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

PLANT: Comacchio Geo 205
METHOD: DT to 0.12m, then AD/T to 0.7m, then HQ3 to 19.5m
REMARKS: Replicate Sample *BD20250911 taken from 0.40-0.50m.

OPERATOR: Ground Test (GM)

LOGGED: C. S. Yip
CASING: HWT to 0.7m

Refer to explanatory notes for symbol and abbreviation definitions

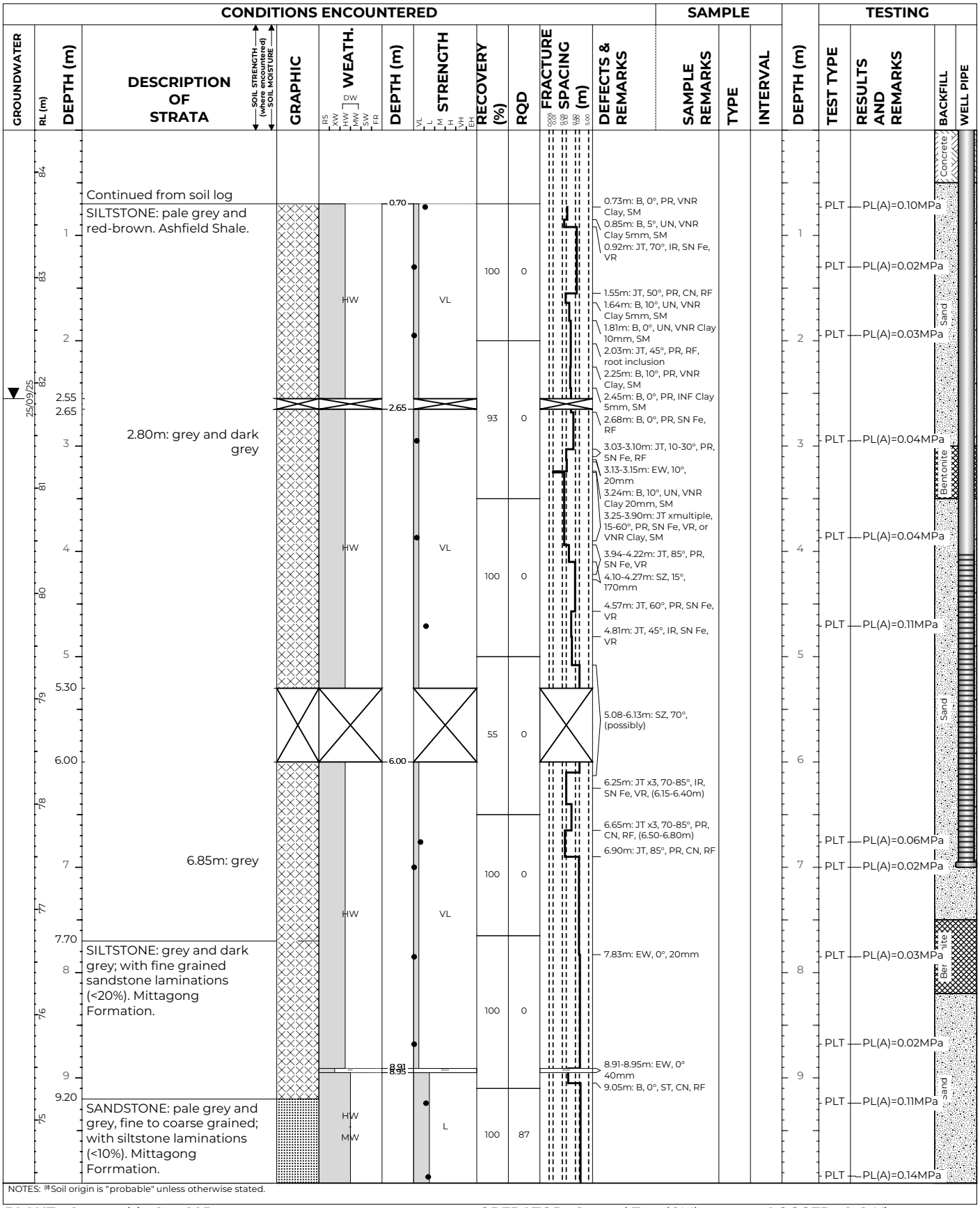
Generated with CORE-GS by Geroc - Split Soil-Rock Log

BOREHOLE LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333256.6, N:6255744.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH01
PROJECT No: 236315.00
DATE: 11/09/25 - 12/09/25
SHEET: 2 of 3



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

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

PLANT: Comacchio Geo 205
METHOD: DT to 0.12m, then AD/T to 0.7m, then HQ3 to 19.5m
REMARKS: Replicate Sample *BD20250911 taken from 0.40-0.50m.

OPERATOR: Ground Test (GM)

LOGGED: C. S. Yip
CASING: HWT to 0.7m

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333256.6, N:6255744.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH01
PROJECT No: 236315.00
DATE: 11/09/25 - 12/09/25
SHEET: 3 of 3

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	74	11	[CONT] SANDSTONE: pale grey and grey, fine to coarse grained; with siltstone laminations (<10%) . Mittagong Forrmation.		HW MW SW	10.30	L	100	87		10.27-10.34m: JT x2, 20-40°, PR, CN, VR 10.68m: JT, 70°, PR, CN, RF				11	PLT	PL(A)=0.24MPa		
	73	12			SW XW SW XW XW	11.16 11.20 11.33 11.40 11.44 11.51	L - M SEAM SEAM M	100	87		11.18m: EW, 0°, 50mm 11.23m: JT, 15°, PR, VNR Clay, SM 11.36m: DS, 10°, 70mm 11.50m: JT, 15°, PR, VNR Clay, RF 11.76-11.82m: SS x3, 10° Clay				12	PLT	PL(A)=0.36MPa		
12.52	72	13	INTERBEDDED SILTSTONE (60%) AND INTERLAMINATED SANDSTONE (40%): grey and dark grey; fine to medium grained sandstone. Mittagong Formation.		SW XW	12.51 12.58	SEAM	100	62		12.54m: EW, 0°, 70mm 13.11m: EW, 0°, 25mm 13.46m: B, 0°, PR, CN, RF				13	PLT	PL(A)=0.63MPa		
13.65 13.75	71	14			SW	13.75 14.60	M L - M	93	45		14.09m: B x2, 0°, PR, CN, RF 14.21-14.50m: B x2, 0-10°, PR, INF Clay 5mm, SM 14.56m: JT, 45°, PR, CN, RF 14.63m: JT, 15°, IR, VNR Clay, SM 14.68m: SS, 15-40°, 35mm				14	PLT	PL(A)=0.21MPa		
15.02	70	15	SILTSTONE: dark grey; with fine grained sandstone laminations (10%-20%). Mittagong Formation.		FR	15.02	M - H	100	96		14.77m: B, 0°, PR, CN 10mm, RF 14.88m: JT, 60°, PR, CN, VR				15	PLT	PL(A)=0.35MPa		
	69	16			XW	16.36 16.41	SEAM				16.38m: DS, 0°, 50mm 16.48-16.58m: JT x2, 50-85°, PR, CN, VR, or VNR Clay, SM				16	PLT	PL(A)=1.3MPa		
	68	17			FR		M - H	100	86		16.85-17.32m: JT x3, 45-85°, IR, HE CA, SM 17.49m: SS, 20°, 30mm				17	PLT	PL(A)=0.63MPa		
17.86	67	18	SANDSTONE: pale grey, medium to coarse grained. Hawkesbury Sandstone.		MW FR	17.66 17.86	L M - H	100	97		17.85m: DS, 0°, 30mm 18.66m: JT, 30°, PR, CN, RF 18.80m: SS, 30°, 20mm				18	PLT	PL(A)=1.1MPa PL(A)=0.98MPa		
	66	19													19	PLT	PL(A)=0.65MPa		
	65		Borehole discontinued at 19.50m depth. Target Depth Reached.																

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

PLANT: Comacchio Geo 205
METHOD: DT to 0.12m, then AD/T to 0.7m, then HQ3 to 19.5m
REMARKS: Replicate Sample *BD20250911 taken from 0.40-0.50m.

OPERATOR: Ground Test (GM)

LOGGED: C. S. Yip
CASING: HWT to 0.7m

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

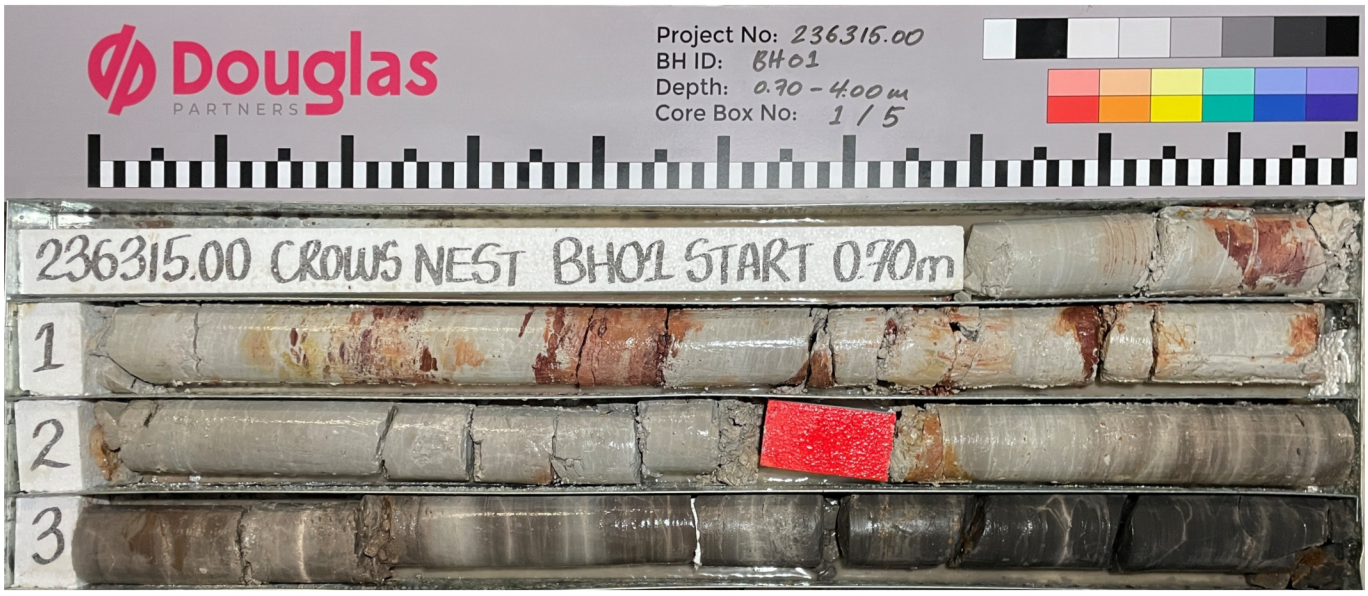
Refer to explanatory notes for symbol and abbreviation definitions

CORE PHOTO LOG

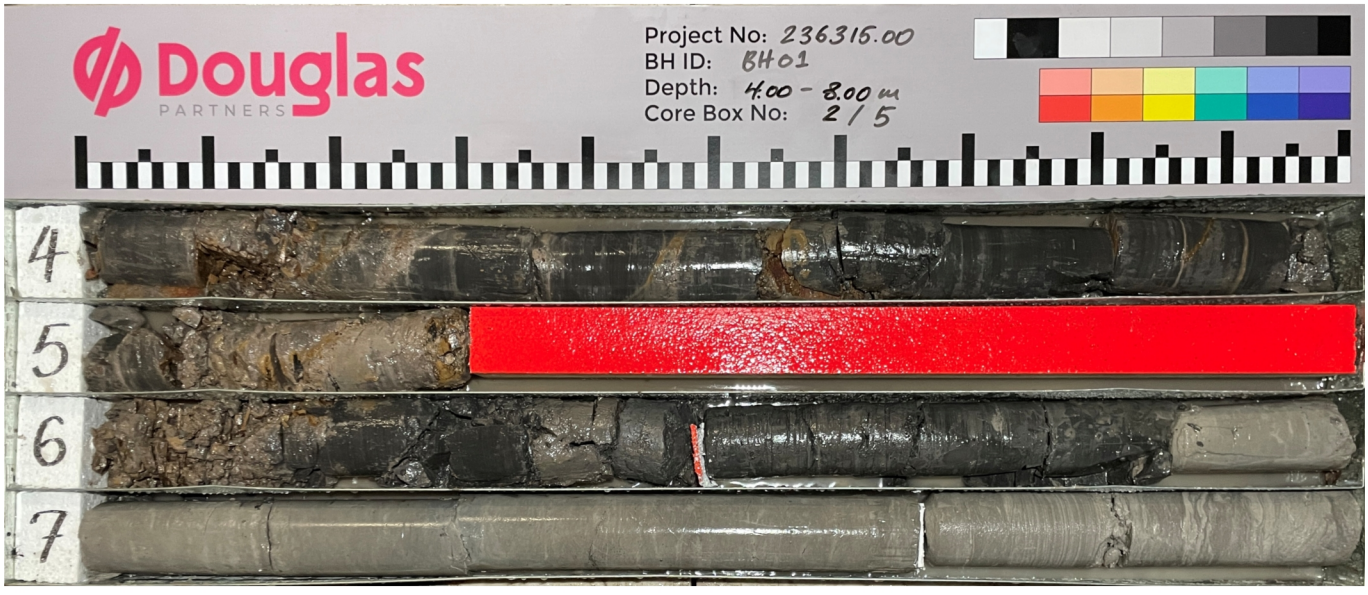
CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333256.6, N:6255744.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH01
PROJECT No: 236315.00
DATE: 11/09/25 - 12/09/25
SHEET: 1 of 3



0.70-4.00 m depth



4.00-8.00 m depth

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

Douglas PARTNERS

CORE PHOTO LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333256.6, N:6255744.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH01
PROJECT No: 236315.00
DATE: 11/09/25 - 12/09/25
SHEET: 2 of 3



8.00-12.00 m depth



12.00-16.00 m depth

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

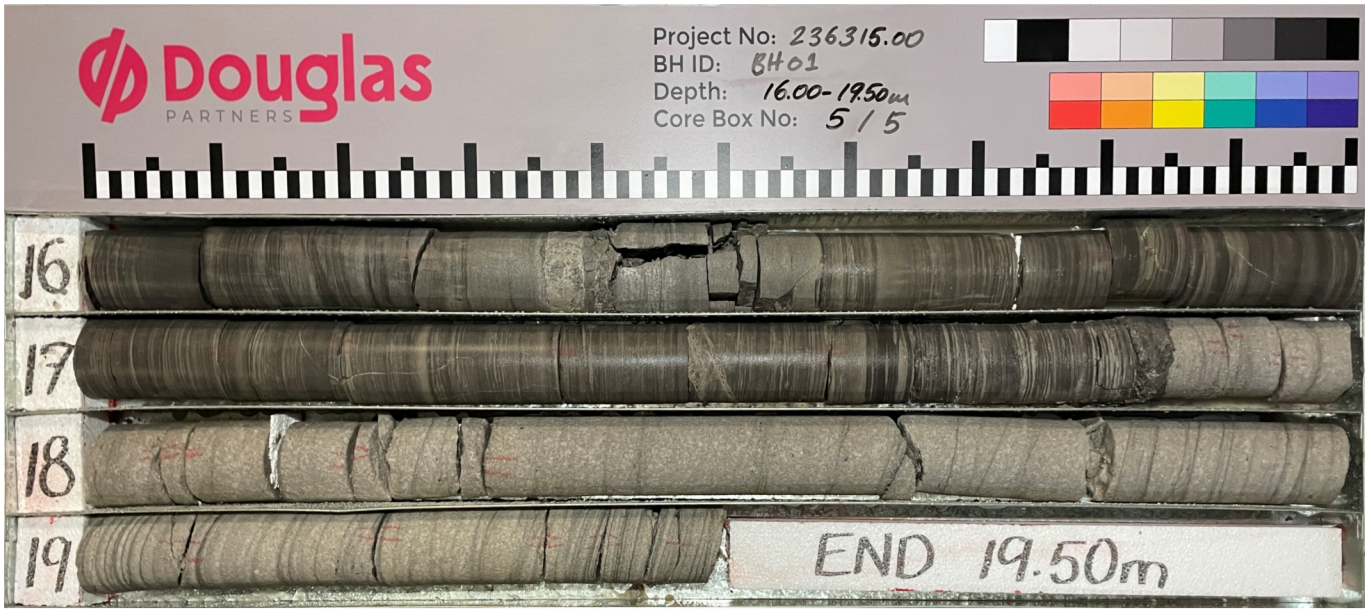
Douglas PARTNERS

CORE PHOTO LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333256.6, N:6255744.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH01
PROJECT No: 236315.00
DATE: 11/09/25 - 12/09/25
SHEET: 3 of 3



16.00-19.50 m depth

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

BOREHOLE LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333273.7, N:6255705.2
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH02
PROJECT No: 236315.00
DATE: 17/09/25 - 18/09/25
SHEET: 1 of 3

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^]	DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	84	0.14	CONCRETE SLAB.		NA	NA		NA		A/ES	0.20	0.14	DCP9/150	5 10 15 30	Concrete	
		0.20	FILL / SAND trace gravel: pale brown; fine to medium; fine to coarse, igneous and sandstone gravel.							A/ES	0.50	0.30				
	83	1	Silty CLAY (CI-CH) trace gravel: pale grey mottled red-brown; medium to high plasticity; fine to medium, ironstone gravel.		XWM	H		w<PL		A/ES	1.00	0.80			Sand	
		1.50	Continued as rock log							A	1.50	1.30			Bentonite	
	82	2										2				
	81	3										3			Sand	
	80	4										4				
	79	5										5				
	78	6										6				
	77	7										7				
	76	8										8				
25/09/25	75	9										9				

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

PLANT: Comacchio Geo 205
METHOD: DT to 0.14m, then AD/T to 1.5m, then HQ3 to 19.52m
REMARKS:

OPERATOR: Ground Test (GM)

LOGGED: C. S. Yip
CASING: HWT to 1.5m

Refer to explanatory notes for symbol and abbreviation definitions

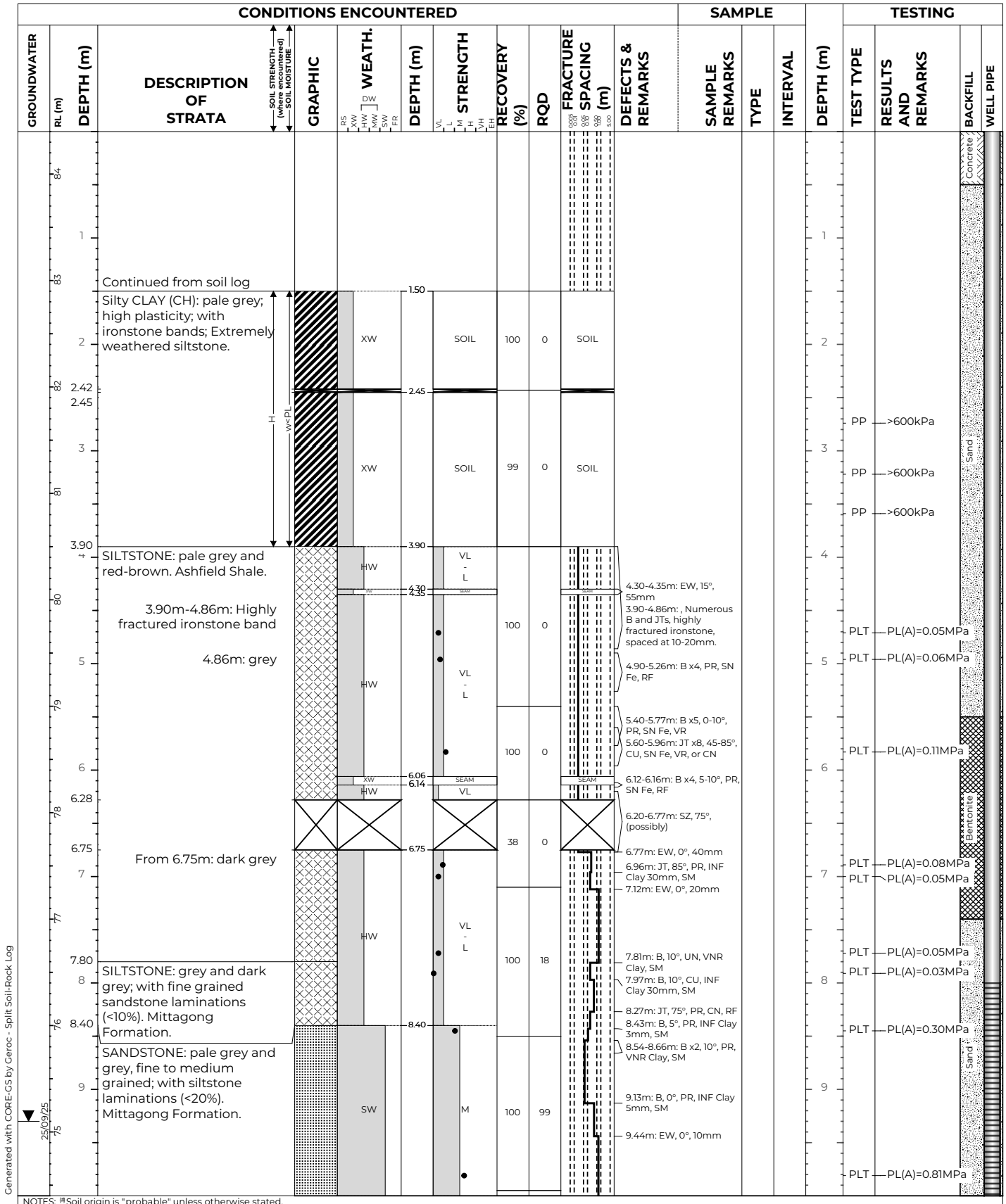
Generated with CORE-GS by Geroc - Split Soil-Rock Log

BOREHOLE LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333273.7, N:6255705.2
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH02
PROJECT No: 236315.00
DATE: 17/09/25 - 18/09/25
SHEET: 2 of 3



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

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

PLANT: Comacchio Geo 205
METHOD: DT to 0.14m, then AD/T to 1.5m, then HQ3 to 19.52m
REMARKS:

OPERATOR: Ground Test (GM)

LOGGED: C. S. Yip
CASING: HWT to 1.5m

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333273.7, N:6255705.2
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH02
PROJECT No: 236315.00
DATE: 17/09/25 - 18/09/25
SHEET: 3 of 3

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

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	SOIL STRENGTH (where encountered) / SOIL MOISTURE	GRAPHIC	WEATH. (PS, XW, DW, HW, MW, SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m) (0.03, 0.06, 0.2, 0.6, 2.0, >2.00)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	74	11	[CONT] SANDSTONE: pale grey and grey, fine to medium grained; with siltstone laminations (<20%). Mittagong Formation.			SW		M				10.10-10.95m: EW x8, 10-15°, 10-35mm				11	PLT	PL(A)=0.06MPa		
						HW	10.74	VL - L	100	94										
							10.95													
	73	11.45										11.26m: EW, 10°, 30mm 11.23-11.45m: B, 5-10°, PR, INF Clay, SM, 2-5mm								
		11.61										11.61-11.77m: B x6, 5-10°, PR, VNR Clay, SM								
	72	12				SW		M	91	83						12	PLT	PL(A)=0.64MPa	Sand	
	71	13										12.90m: EW, 0°, 10mm				13				
		14							100	84		13.70m: B, 5°, PR, VNR Clay, SM 13.74m: CS, 0°, 5mm 13.86m: B, 5°, IR, INF Clay 3mm, SM 14.05m: B, 5°, PR, INF Clay 5mm, SM 14.03-14.30m: EW, 0-5°, 2mm, 10-25mm				14	PLT	PL(A)=0.63MPa		
	70						14.30										PLT	PL(A)=0.08MPa		
		15				HW		VL - L	100	54						15	PLT	PL(A)=1.0MPa	Bentonite	
	69						15.14													
		16														16	PLT	PL(A)=0.73MPa		
	68	16.57							100	100		16.32m: JT, 85°, PR, CN, VR 16.57m: B, 0°, PR, INF Clay 3mm, SM 16.73m: CS, 5°, 3mm								
		17	SILTSTONE: dark grey; with fine grained sandstone laminations (10%-20%). Mittagong Formation.			FR		M - H								17	PLT	PL(A)=1.1MPa	Sand	
	67																			
		18							100	92		17.95m: B, 5°, PR, VNR Clay, SM 18.22-18.29m: EW x2, 10°				18	PLT	PL(A)=0.47MPa		
	66	18.30	SANDSTONE: pale grey, fine to coarse grained. Hawkesbury Sandstone.																	
		19							100	100						19	PLT	PL(A)=1.1MPa		
	65																			
			Borehole discontinued at 19.52m depth. Target Depth Reached.														PLT	PL(A)=1.2MPa		

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

PLANT: Comacchio Geo 205
METHOD: DT to 0.14m, then AD/T to 1.5m, then HQ3 to 19.52m
REMARKS:

OPERATOR: Ground Test (GM)

LOGGED: C. S. Yip
CASING: HWT to 1.5m

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

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

CORE PHOTO LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333273.7, N:6255705.2
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH02
PROJECT No: 236315.00
DATE: 17/09/25 - 18/09/25
SHEET: 1 of 3



1.50-5.00 m depth



5.00-9.00 m depth

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

Douglas PARTNERS

CORE PHOTO LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333273.7, N:6255705.2
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH02
PROJECT No: 236315.00
DATE: 17/09/25 - 18/09/25
SHEET: 2 of 3



9.00-13.00 m depth



13.00-17.00 m depth

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

CORE PHOTO LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333273.7, N:6255705.2
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH02
PROJECT No: 236315.00
DATE: 17/09/25 - 18/09/25
SHEET: 3 of 3



17.00-19.52 m depth

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

BOREHOLE LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333278.2, N:6255733.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH03
PROJECT No: 236315.00
DATE: 15/09/25 - 16/09/25
SHEET: 1 of 4

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
	84	0.15	CONCRETE SLAB.		NA	NA	NA				0.15			Concrete	
		0.30	FILL / SAND trace gravel: pale brown; fine to medium; fine to coarse, igneous and sandstone gravel.		FILL	MC	M		A/ES		0.30				
									A/ES		0.40 0.50				
	1		Silty CLAY (CI-CH) trace gravel: pale grey mottled red-brown; medium to high plasticity; fine to medium, ironstone gravel.		XWM	H	w<PL		A/ES		0.80 1.00	DCP9/150	5 10 15 R 25/80mm		
	83	1.50	Continued as rock log						A		1.30 1.50				
	82	2									2				
		3									3				
	81	4									4				
	80	5									5			Sand	
	79	6									6				
	78	7									7				
	77	8									8				
	76	9									9				
	75													Bentonite	

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

PLANT: Comacchio Geo 205
METHOD: DT to 0.15m, then AD/T to 1.5m, then HQ3 to 26.7m
REMARKS:

OPERATOR: Ground Test (GM)

LOGGED: C. S. Yip
CASING: HWT to 1.35m

Refer to explanatory notes for symbol and abbreviation definitions

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

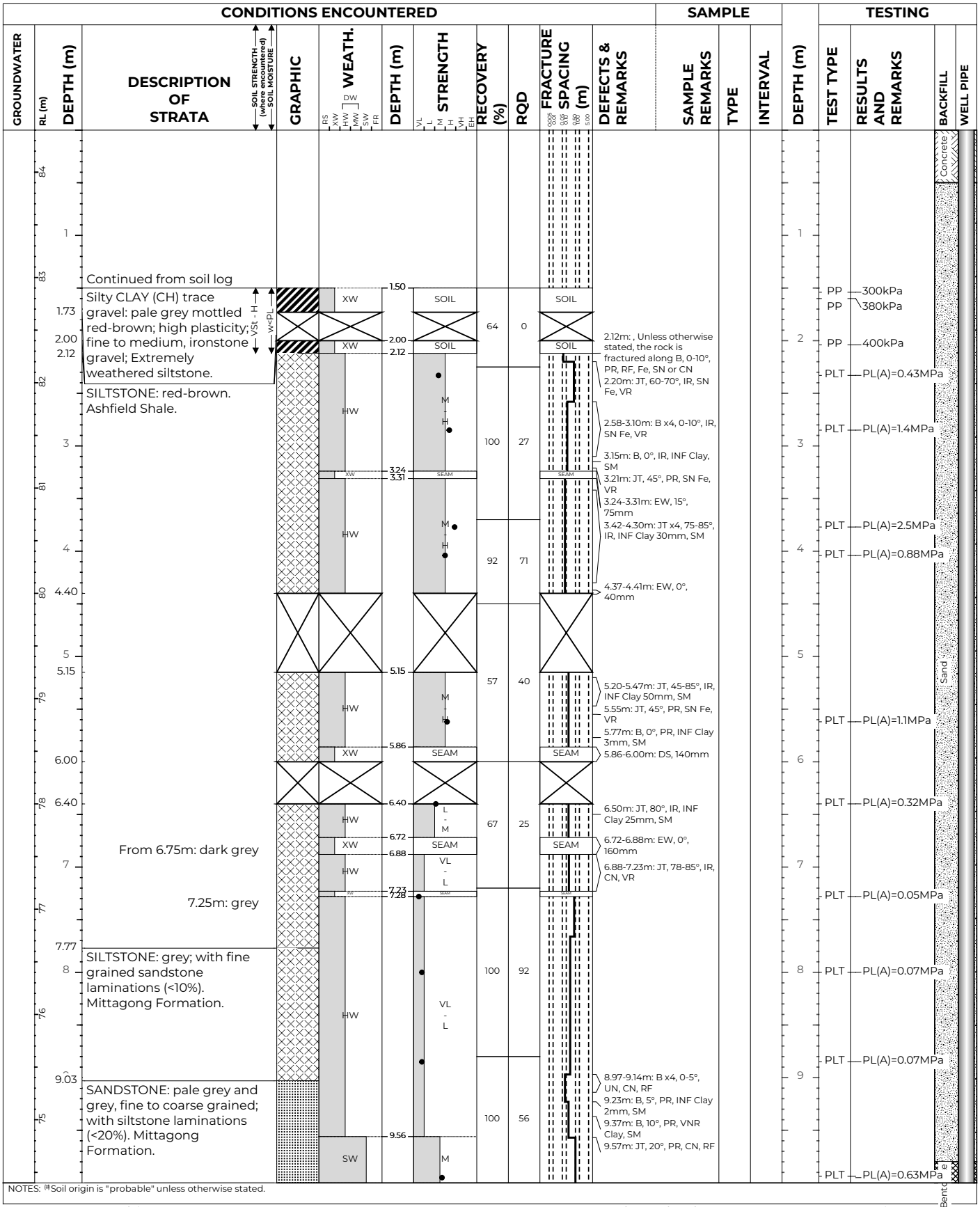
Douglas PARTNERS

BOREHOLE LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333278.2, N:6255733.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH03
PROJECT No: 236315.00
DATE: 15/09/25 - 16/09/25
SHEET: 2 of 4



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

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

PLANT: Comacchio Geo 205
METHOD: DT to 0.15m, then AD/T to 1.5m, then HQ3 to 26.7m
REMARKS:

OPERATOR: Ground Test (GM)

LOGGED: C. S. Yip
CASING: HWT to 1.35m

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333278.2, N:6255733.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH03
PROJECT No: 236315.00
DATE: 15/09/25 - 16/09/25
SHEET: 3 of 4

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

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
25/09/25	74	10	[CONT] SANDSTONE: pale grey and grey, fine to coarse grained; with siltstone laminations (<20%). Mittagong Formation.		SW		M	100	56		10.09m: JT, 70°, PR, CN, RF							Bentonite	
	73	11			HW	10.78	L				10.47m: JT, 40°, PR, CN, RF				11	PLT	PL(A)=0.33MPa		
					SW	10.87	M	100	82		10.55m: EW, 0°, 20mm								
											10.69m: B, 10°, PR, INF Clay, SM								
											10.94-11.04m: JT, 85°, PR, CN, VR					PLT	PL(A)=0.04MPa		
	72	12			HW	11.24	VL - L								12	PLT	PL(A)=0.32MPa		
						11.51													
					SW		M				11.90m: EW, 0°, 40mm								
					XW	12.27	SEAM	100	86	SEAM	12.27-12.41m: EW, 0°, 140mm								
						12.41					12.68m: B, 10°, IR, VR, siltstone clasts inclusions								
											12.89m: B, 10°, PR, INF Clay 2mm, SM				13	PLT	PL(A)=0.46MPa		
	71	13									13.12-13.17m: EW x2, 5-10°, 12-30mm								
											13.40-13.51m: B x2, 5°, PR, CN, VR								
											13.82m: B, 0°, PR, VNR Clay, SM					PLT	PL(A)=0.80MPa		
	70	14					M	100	94						14	PLT	PL(A)=0.88MPa		
					SW													Sand	
																PLT	PL(A)=0.81MPa		
											14.90m: EW, 5°, 20mm								
	69	15						100	95		14.97m: B x2, 0-10°, IR, CN, RF				15				
											15.41m: B, 5°, PR, INF Clay 2mm, SM								
						15.68					15.77m: SS, 10°, 50mm								
							M - H									PLT	PL(A)=0.47MPa		
	68	16									16.19m: JT, 55°, PR, CN, VR				16	PLT	PL(A)=1.1MPa		
																PLT	PL(A)=0.22MPa		
		16.60	INTERBEDDED SILTSTONE (70%) AND INTERLAMINATED SANDSTONE (30%): grey and dark grey; fine to medium grained sandstone. Mittagong Formation.			16.50	L - M									PLT	PL(A)=0.12MPa		
											16.63-16.84m: B x3, 0°, PR, INF Clay, SM, 2-5mm								
					XW	16.95	SEAM	100	52	SEAM	16.74-16.88m: F x2, 25°, 5mm displacement								
	67	17				17.02					16.95-17.02m: EW, 5°, 70mm				17				
					SW		L - M				17.03-17.20m: JT x2, 65-75°, PR, CN, RF								
		17.45				17.41					17.17-17.41m: EW x2, 0°, 20-30mm					PLT	PL(A)=1.2MPa		
			SANDSTONE: pale grey, fine to coarse grained. Hawkesbury Sandstone.			17.45													
	66	18													18				
																		Bentonite	
								100	100										
					FR		H									PLT	PL(A)=1.5MPa		
	65	19									19.15m: B, 0°, PR, VNR Clay, SM				19				
											19.44m: B, 10°, CU, INF Clay, SM, 4mm							Sand	
								100	98							PLT	PL(A)=1.2MPa		

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

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

PLANT: Comacchio Geo 205
METHOD: DT to 0.15m, then AD/T to 1.5m, then HQ3 to 26.7m
REMARKS:

OPERATOR: Ground Test (GM)

LOGGED: C. S. Yip
CASING: HWT to 1.35m

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333278.2, N:6255733.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH03
PROJECT No: 236315.00
DATE: 15/09/25 - 16/09/25
SHEET: 4 of 4

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA (SOIL STRENGTH (where encountered) / SOIL MOISTURE)	GRAPHIC	WEATH. (PS, XW, DW, HW, MW, SW, FR)	DEPTH (m)	STRENGTH (VL, L, M, H, VH, EH)	RECOVERY (%)	RQD	FRACTURE SPACING (m) (0.03, 0.06, 0.20, 0.60, 2.00)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	64	20	[CONT] SANDSTONE: pale grey, fine to coarse grained. Hawkesbury Sandstone.					100	98		20.30m: B, 0°, PR, VNR Clay, SM				20				
	63	21						100	100		21.54m: B, 10°, PR, VNR Clay, SM				21	PLT	PL(A)=1.0MPa		
	62	22													22	PLT	PL(A)=1.6MPa		
	61	23			FR		H	100	100						23	PLT	PL(A)=1.1MPa	Sand	
	60	24									23.74m: B, 5°, PR, VNR Clay, SM				24	PLT	PL(A)=1.0MPa		
	59	25						100	100		24.19m: B, 10°, PR, INF Clay 8mm, SM				25	PLT	PL(A)=1.1MPa		
	58	26						100	100						26	PLT	PL(A)=1.6MPa		
	57	27	Borehole discontinued at 26.70m depth. Target Depth Reached.													PLT	PL(A)=1.2MPa		
	56	28																	
	55	29																	

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

PLANT: Comacchio Geo 205
METHOD: DT to 0.15m, then AD/T to 1.5m, then HQ3 to 26.7m
REMARKS:

OPERATOR: Ground Test (GM)

LOGGED: C. S. Yip
CASING: HWT to 1.35m

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

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

CORE PHOTO LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333278.2, N:6255733.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH03
PROJECT No: 236315.00
DATE: 15/09/25 - 16/09/25
SHEET: 1 of 4



1.50-5.00 m depth



5.00-9.00 m depth

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

CORE PHOTO LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333278.2, N:6255733.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH03
PROJECT No: 236315.00
DATE: 15/09/25 - 16/09/25
SHEET: 2 of 4



9.00-13.00 m depth



13.00-17.00 m depth

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

CORE PHOTO LOG

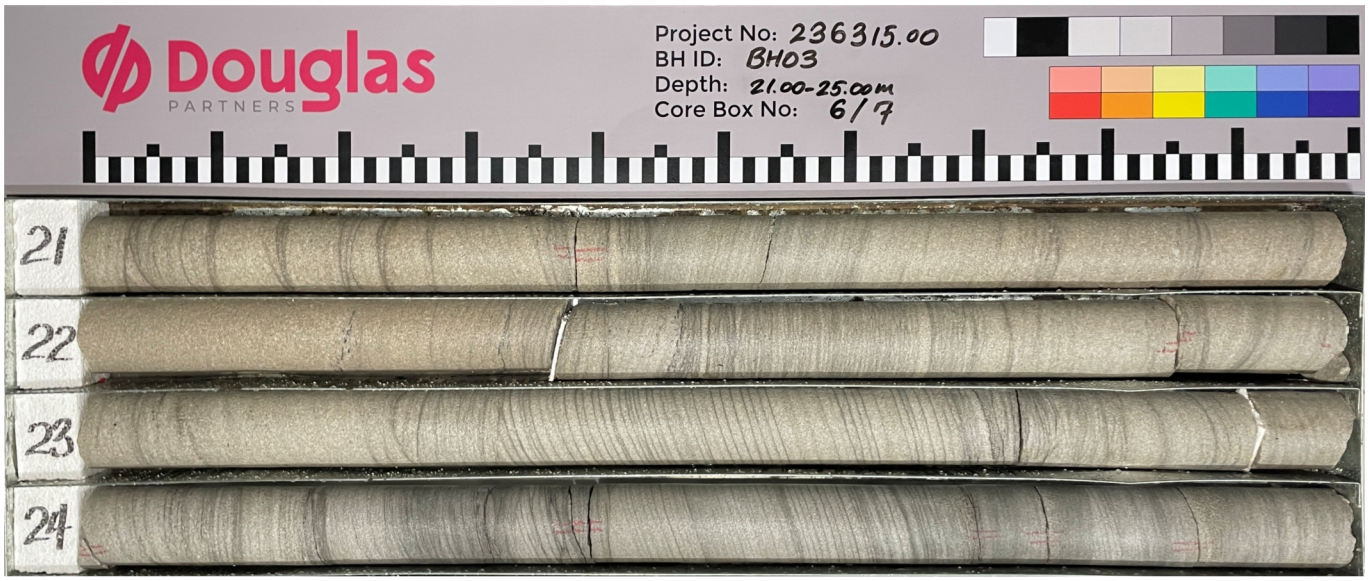
CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333278.2, N:6255733.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH03
PROJECT No: 236315.00
DATE: 15/09/25 - 16/09/25
SHEET: 3 of 4



17.00-21.00 m depth



21.00-25.00 m depth

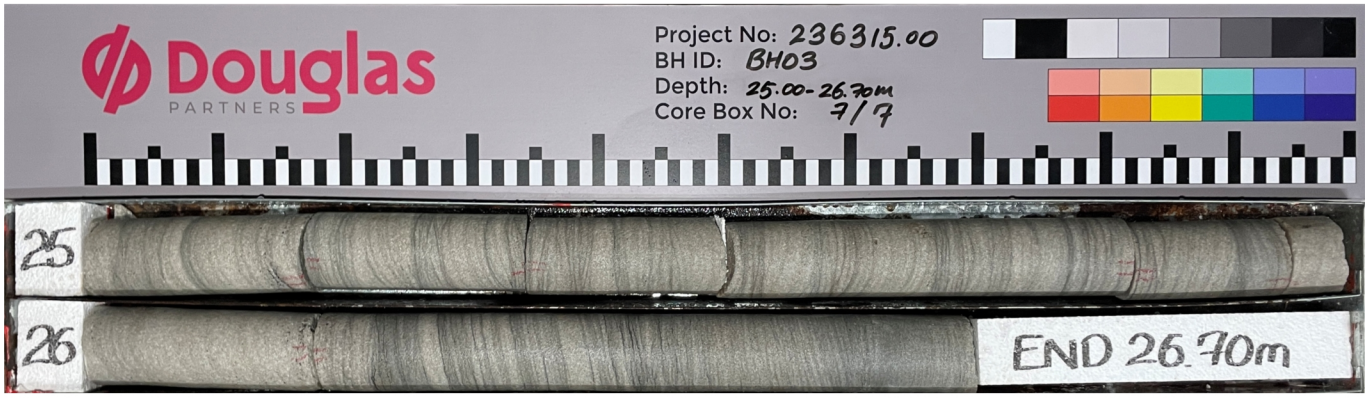
Generated with CORE-GS by Geroc - Split Soil-Rock Log

CORE PHOTO LOG

CLIENT: Prosper Atrium Pty Ltd
PROJECT: Proposed Mixed Use Development
LOCATION: 402-420 Pacific Hwy, Crows Nest, NSW 2065

SURFACE LEVEL: 84.4 AHD
COORDINATE: E:333278.2, N:6255733.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH03
PROJECT No: 236315.00
DATE: 15/09/25 - 16/09/25
SHEET: 4 of 4



25.00-26.70 m depth

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

Appendix D

Laboratory Results

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

CERTIFICATE OF ANALYSIS 391372

Client Details

Client	Douglas Partners Pty Ltd
Attention	Yeongbin Gim
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**236315.00 Crows Nest**
Number of Samples	3 Soil
Date samples received	23/09/2025
Date completed instructions received	23/09/2025

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	30/09/2025
Date of Issue	30/09/2025

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

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

Results Approved By
Priya Samarawickrama, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

Soil Aggressivity				
Our Reference		391372-1	391372-2	391372-3
Your Reference	UNITS	BH01	BH02	BH03
Depth		8.95-9	0.3-0.5	4.35-4.41
Date Sampled		12/09/2025	17/09/2025	15/09/2025
Type of sample		Soil	Soil	Soil
Date prepared	-	25/09/2025	25/09/2025	25/09/2025
Date analysed	-	25/09/2025	25/09/2025	25/09/2025
pH 1:5 soil:water	pH Units	4.7	5.0	4.8
Electrical Conductivity 1:5 soil:water	µS/cm	58	71	29
Chloride, Cl 1:5 soil:water	mg/kg	33	41	10
Sulphate, SO4 1:5 soil:water	mg/kg	37	50	20

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

QUALITY CONTROL: Soil Aggressivity					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			25/09/2025	[NT]	[NT]	[NT]	[NT]	25/09/2025	[NT]
Date analysed	-			25/09/2025	[NT]	[NT]	[NT]	[NT]	25/09/2025	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	84	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	86	[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 are available for most tests upon request.

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

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

Samples received in good order: Holding time exceedance

updated COC: 23/09/2025 2004

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	236315.00	**Suburb:**	Crows Nest	**To:**	Envirolab Services
Project Manager:	YG	**Order Number:**		**Sampler:** CSY	12 Ashley St, Chatswood NSW 2067
Email:	Yeongbin.Gim@douglas.partners.com.au			**Attn:**	Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day				(02) 9910 6200 samplereceipt@envirolab.com.au
Prior Storage:	☐ Fridge ☐ Freezer ☐ Esky ☑ Shelf	**Do samples contain 'potential' HBM?**	☑ No ☐ Yes (If 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 R - rock W - water M - Material	Container Type: G - glass P - plastic	Analytes: Aggressivity (EC, Ph, sulphate & chloride-ion							Notes/ Preservation/ Additional Requirements
1	BH01	8.95	9	12/09/25	R	G	✓							
2	BH02	0.3	0.5	17/09/25	S	G	✓							
3	BH03	4.35	4.41	15/09/25	R	G	✓							

Metals to analyse:			**LAB RECEIPT**
Number of samples in container:	**Transported to laboratory by:**		**Lab Ref. No:** 391372
Send results to:	Douglas Partners Pty Ltd		**Received by:** Da Hyun Lee
Address:	96 Hermitage Road, West Ryde NSW 2114	**Phone:** (02) 9809 0666	**Date & Time:** 23/09/2025 1130
Relinquished by:	**Date:**	**Signed:**	**Signed:**

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	236315.00	**Suburb:**	Crows Nest			**To:**	Envirolab Services
Project Manager:	YG	**Order Number:**		**Sampler:**	CSY		12 Ashley St, Chatswood NSW 2067
Email:	Yeongbin.Gim@douglas.partners.com.au					**Attn:**	Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day						(02) 9910 6200 samplereceipt@envirolab.com.au
Prior Storage:	☐ Fridge ☐ Freezer ☐ Esky ☑ Shelf	**Do samples contain 'potential' HBM?**			☑ No ☐ Yes (If 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 R - rock W - water M - Material	Container Type: G - glass P - plastic	Analytes: Aggressivity (EC, Ph, sulphate & chloride-ion								Notes/ Preservation/ Additional Requirements
1	BH01	8.95	9	30/08/25	R	G	✓								
2	BH02	0.3	0.5	25/08/25	S	G	✓								
3	BH03	4.35	4.41	25/08/25	R	G	✓								

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

Job No: 391372
Date Received: 23/9/25
Time Received: 1130
Received By: DL
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Metals to analyse:			**LAB RECEIPT**
Number of samples in container:	**Transported to laboratory by:**		**Lab Ref. No:** 391372
Send results to:	Douglas Partners Pty Ltd		**Received by:** Da Hyun Lee
Address:	96 Hermitage Road, West Ryde NSW 2114	**Phone:** (02) 9809 0666	**Date & Time:** 23/09/25 1130
Relinquished by:	**Date:**	**Signed:**	**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	Yeongbin Gim

Sample Login Details

Your reference	236315.00 Crows Nest
Envirolab Reference	391372
Date Sample Received	23/09/2025
Date Instructions Received	23/09/2025
Date Results Expected to be Reported	30/09/2025

Sample Condition

Samples received in appropriate condition for analysis	Holding time exceedance
No. of Samples Provided	3 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	18
Cooling Method	None
Sampling Date Provided	YES

Comments

Dates on jars do not match COC: Jar dates IDs (#1 - 11/9, #2 - 18/9, #3 - 15/9)
Used dates listed on COC

Please contact the laboratory within 24 hours if you wish to cancel the aformentioned testing. Otherwise testing will proceed as per the COC and hence invoiced accordingly.

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	Soil Aggressivity
BH01-8.95-9	✓
BH02-0.3-0.5	✓
BH03-4.35-4.41	✓

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

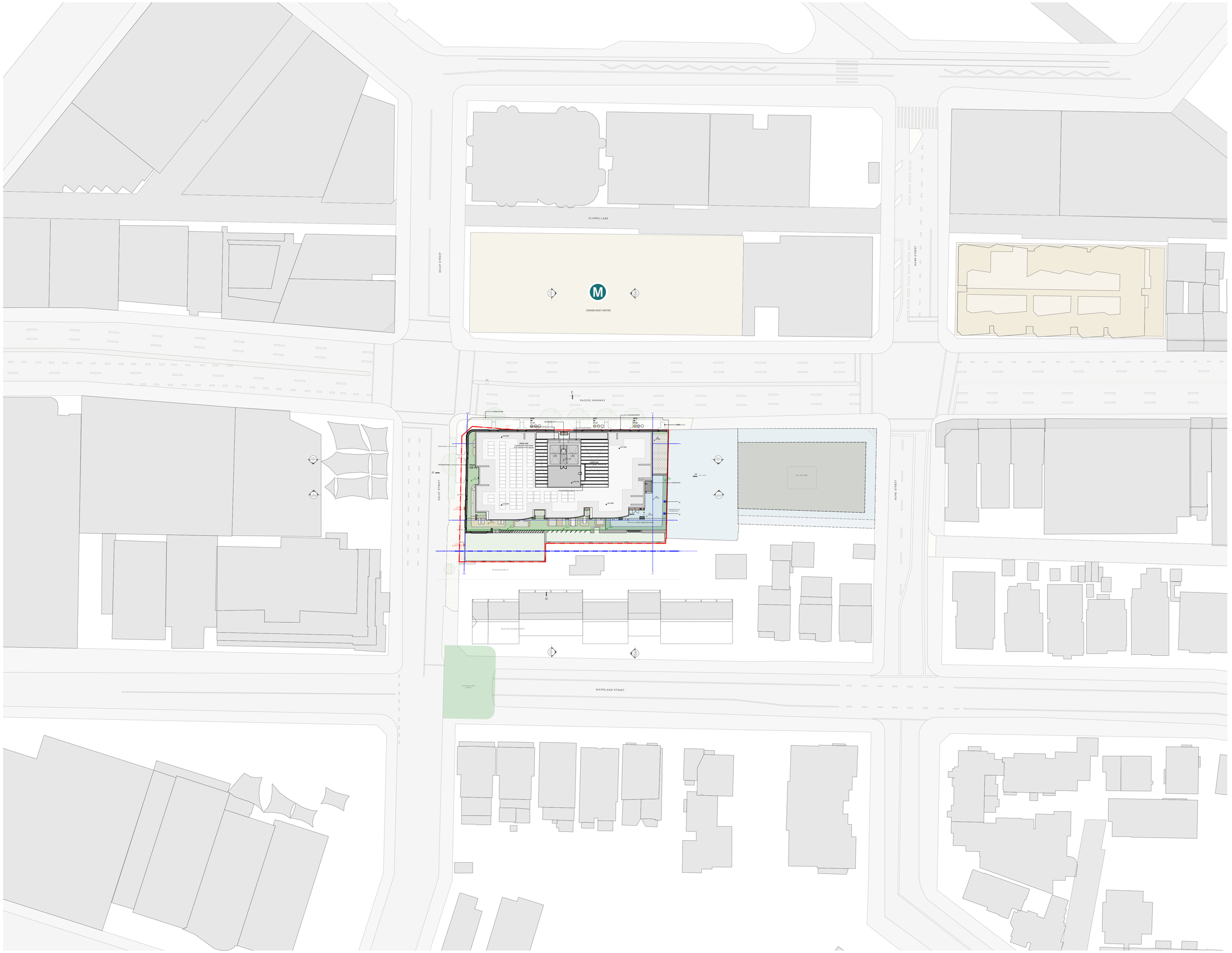
Additional Info

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.

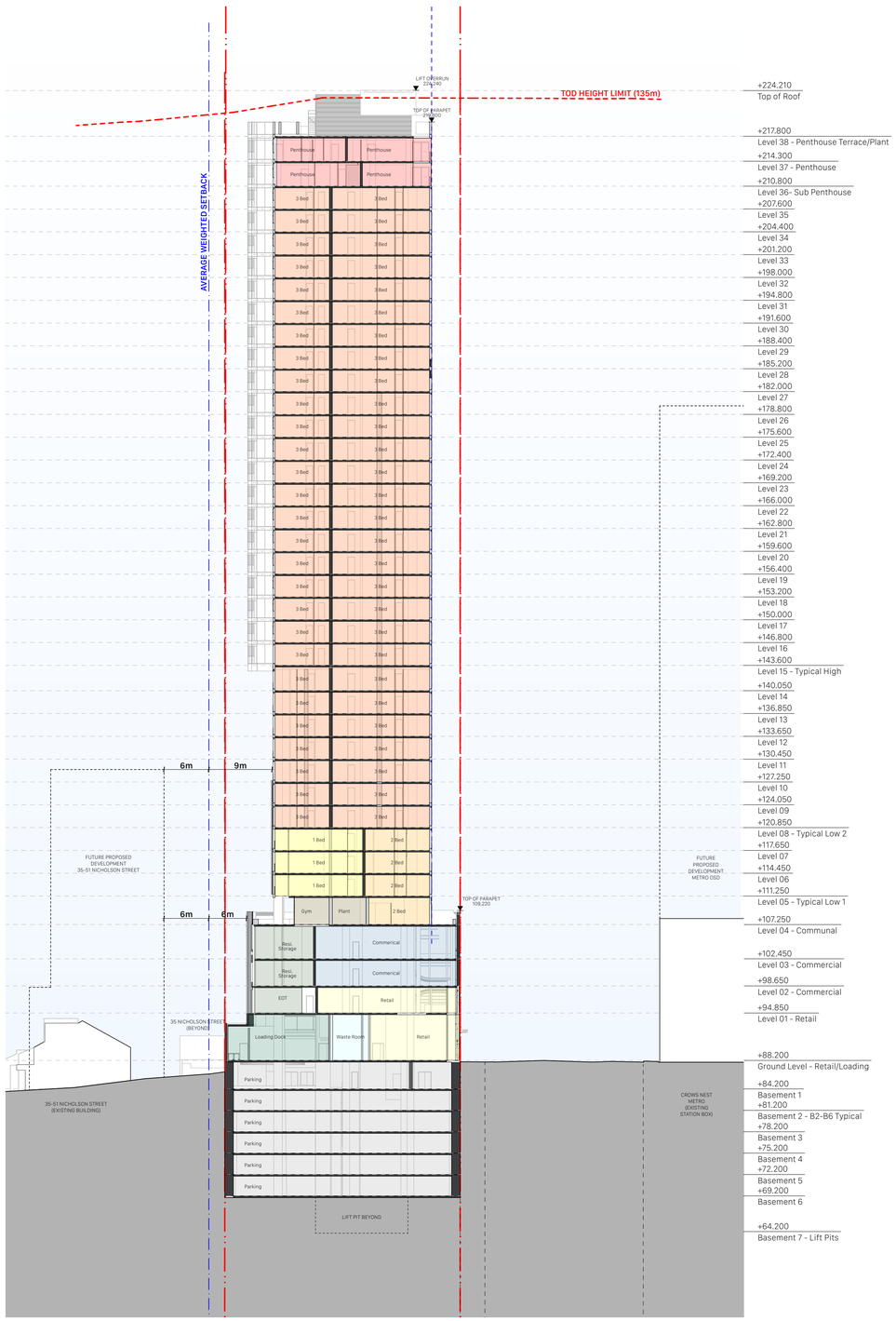
Appendix E

Architectural Drawings

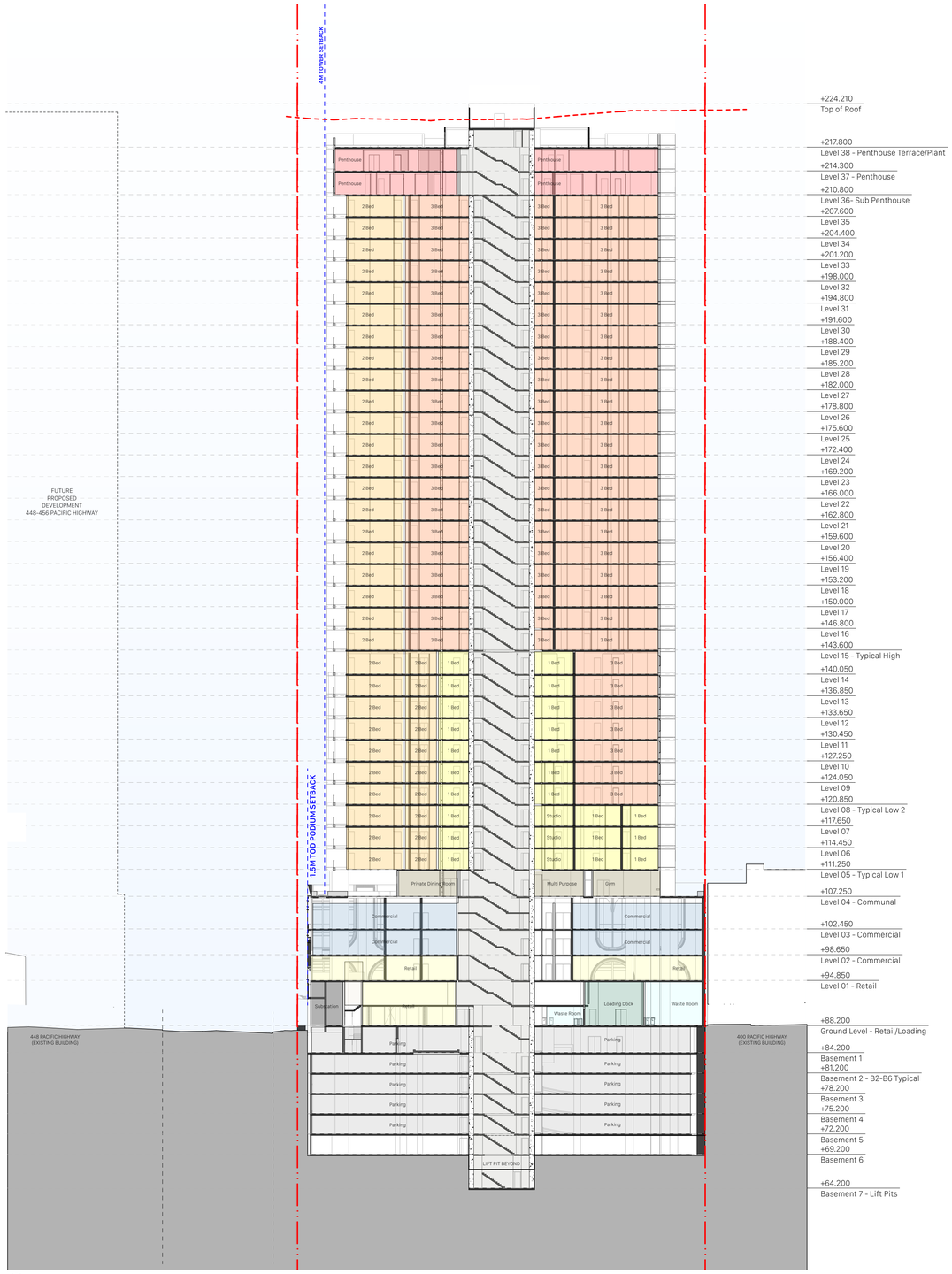
© FRANCIS-JONES CARPENTER PTY LTD 2026 ABN 28 101 197 219 NOMINATED ARCHITECTS: RICHARD FRANCIS-JONES 5301. ELIZABETH CARPENTER 6141.



© FRANCIS-JONES CARPENTER PTY LTD 2026 ABN 28 101 197 219 NOMINATED ARCHITECTS: RICHARD FRANCIS-JONES 5301. ELIZABETH CARPENTER 6141.



EW 01 SECTION Cross-Section
1:400



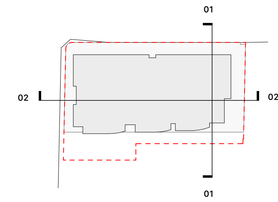
2 SECTION Longitudinal
1:400

fjcstudio

0 4 10 20m

General notes
- All dimensions and existing conditions shall be checked and verified by the contractor before proceeding with the work.
- All levels relative to 'Australian Height Datum'.
- Do not scale drawings.
- Use figured dimensions only.

Legend



LEGEND

- 1bed
- 2bed
- 3bed
- Pent
- Communal
- Resi Storage
- Corridor
- Retail
- Commercial
- Plant
- Parking
- Loading
- Waste Room

Work in Progress

Rev	Date	Description	By	Chk
B - WIP	Work in Progress			RN

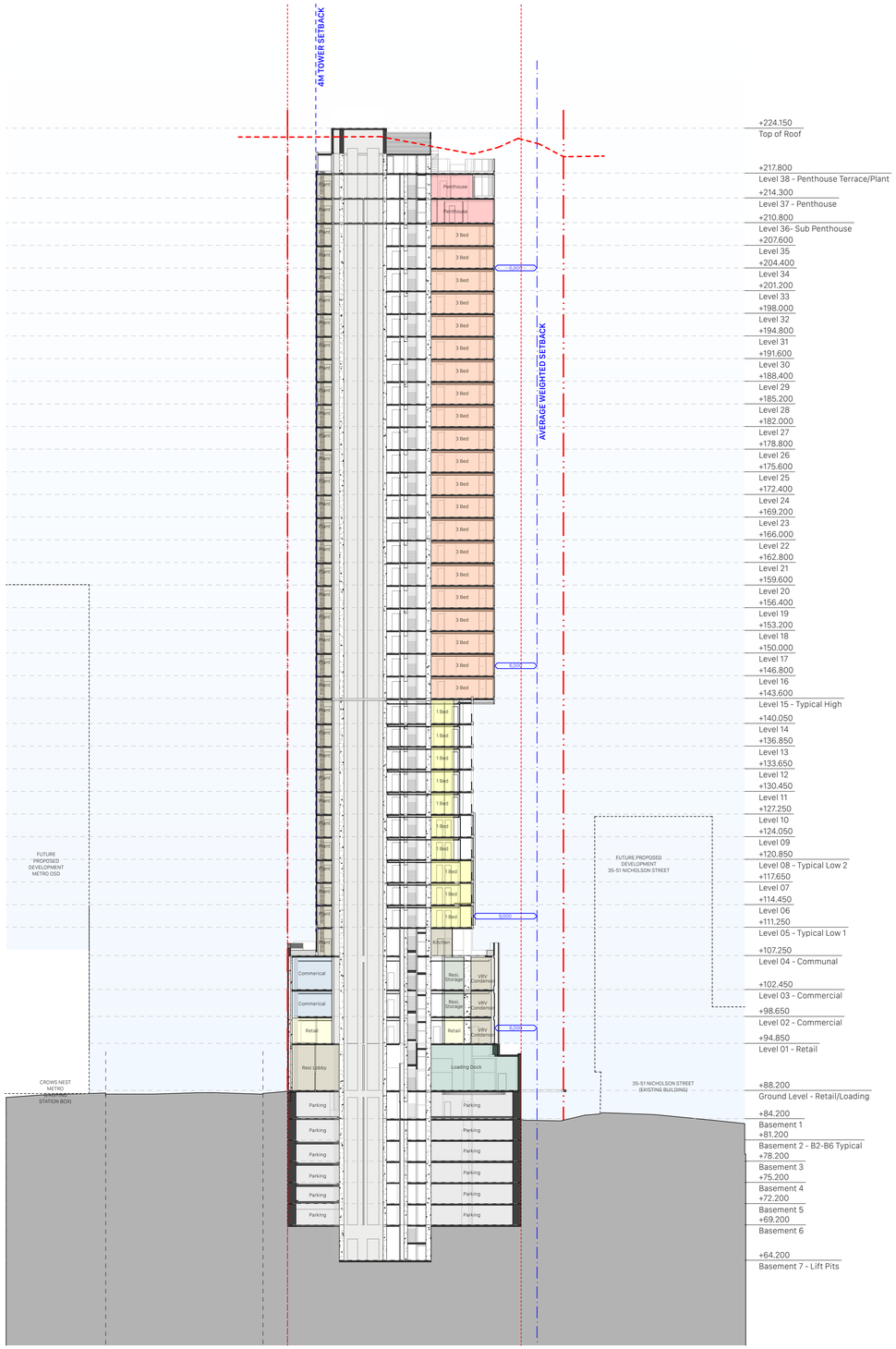
402-420 Pacific Highway, Crows Nest
Australia
402-420 Pacific Highway
Sydney NSW 2065

Sections Section 01 & 02
Scale 1:400 @ A1

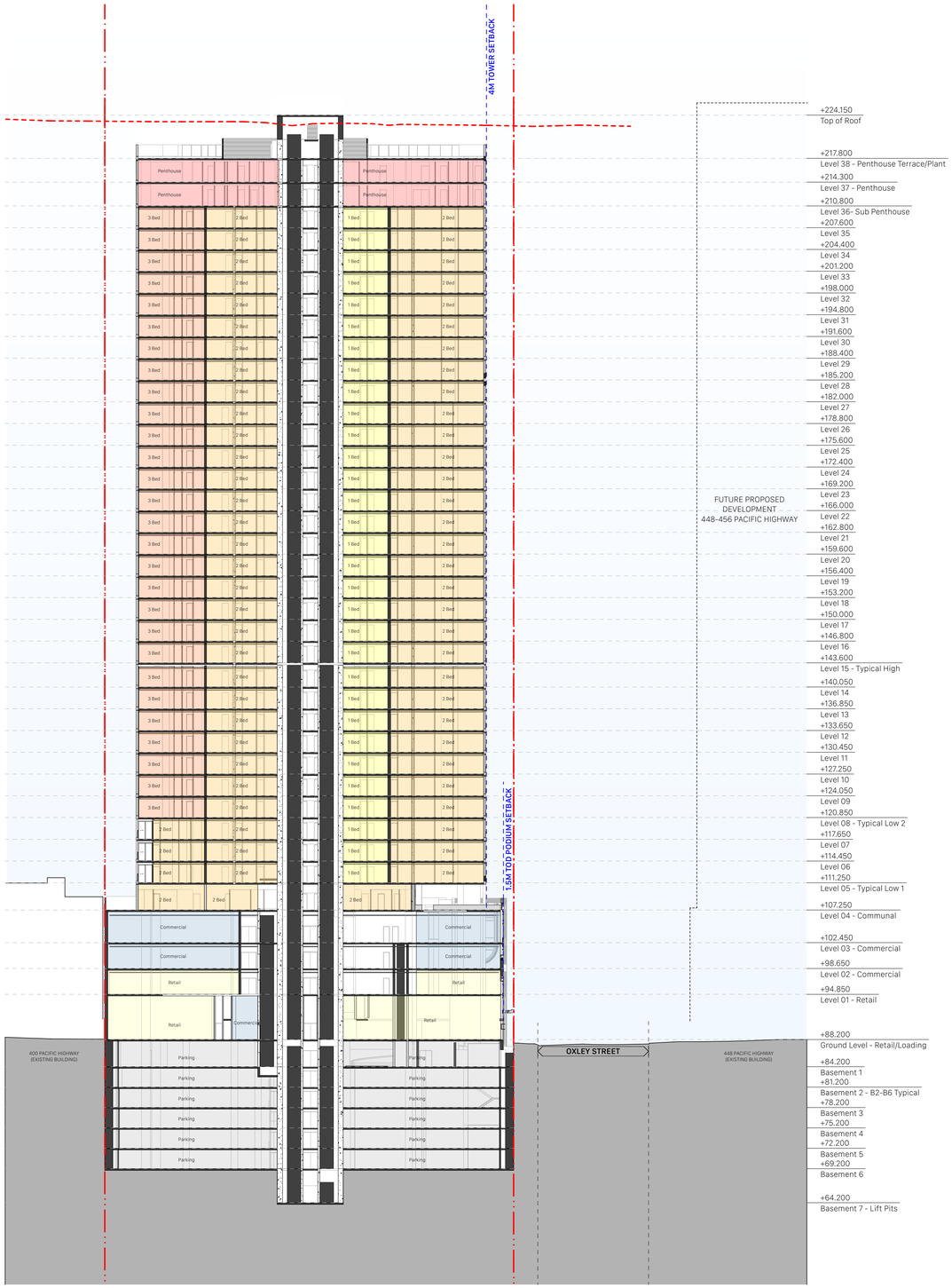
Project Code GBPH
First Issued Work in Progress

Sheet No. 4000
Rev B - WIP

© FRANCIS-JONES CARPENTER PTY LTD 2026 ABN 28 101 197 219 NOMINATED ARCHITECTS: RICHARD FRANCIS-JONES 5301. ELIZABETH CARPENTER 6141.



1 SECTION Cross-Section
1:400



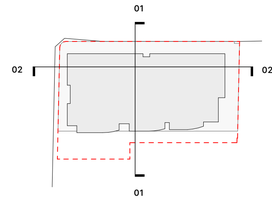
02 SECTION Longitudinal
1:400

fjcstudio

0 4 10 20m

General notes
- All dimensions and existing conditions shall be checked and verified by the contractor before proceeding with the work.
- All levels relative to 'Australian Height Datum'.
- Do not scale drawings.
- Use figured dimensions only.

Legend



LEGEND

- 1bed
- 2bed
- 3bed
- Pent
- Communal
- Resi Storage
- Corridor
- Retail
- Commercial
- Plant
- Parking
- Loading
- Waste Room

Rev	Date	Description	By	Chk

402-420 Pacific Highway, Crows Nest
Australia
402-420 Pacific Highway
Sydney NSW 2065

Sections
Section 03 & 04

Scale
1:400 @ A1

Project Code
GBPH

First Issued
DD/MM/YYYY

Sheet No.
4001

Rev