GeoAust
Geotechnical
Engineers Pty Ltd

GEOTECHNICAL INVESTIGATION REPORT

PROPOSED STUDENT ACCOMMODATION DEVELOPMENT

253-259 BRUNSWICK ROAD
BRUNSWICK VIC

PREPARED FOR
TF 253 BRUNSWICK PTY LTD

JOB NO: 8257-2-R
26 MARCH 2025

DISTRIBUTION:
TF 253 BRUNSWICK PTY LTD
C/- BENSONS PROPERTY GROUP PTY LTD

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1 INTRODUCTION

1.1 COMMISSION

The geotechnical investigation was commissioned by Mr Mike Foo of Bensons Property Group on behalf of TF 253 Brunswick Pty Ltd by signed Authorisation of Engagement dated 10 February 2025. The scope of works for the geotechnical investigation was in accordance with our fee proposal with reference 8257-1-Q (Revision 1), dated 10 February 2025 and the updated fee table supplied in electronic mail correspondence dated 13 February 2025.

1.2 PROPOSED DEVELOPMENT

Based on the town planning drawings provided to GeoAust, which were prepared by Hayball Architects (Reference No. 2732, dated 3 February 2025), it was understood that the proposed development comprises construction of two new two (2) and six (6) level buildings inside the existing heritage listed building at 253 – 259 Brunswick Road, Brunswick, which is to be retained. The proposed development will not include any basement levels.

Extracts of drawings, which are of relevance to the geotechnical investigation are provided in Appendix A.

In the absence of any detailed architectural and structural information regarding the proposed development, the following has been assumed about the proposed development:

- Localised excavation for the lift core base is likely to extend approximately 2.5 metres below the existing ground surface.
- Construction will be typical of low-rise reinforced concrete framed structures.
- No unusual performance criteria apply to the proposed structure.

1.3 INVESTIGATION OBJECTIVES

Based on our experience of geotechnical conditions in the general area of the subject site, in conjunction with our understanding of the proposed development, the objectives of the geotechnical investigation were as follows:

- Investigate the subsurface soil and rock conditions at the subject site, relevant to the proposed development.
- Investigate the ground water conditions at the subject site, relevant to the proposed development.

- Provide a sub-soil class and a hazard factor applicable to the site for earthquake design of the proposed structure in accordance with Australian Standard AS 1170.4 – 2007, 'Structural Design Actions, Part 4: Earthquake Actions in Australia'.
- Provide recommendations for alternative footing systems relevant to the proposed development, including design parameters and estimates of settlements for each of the footing systems.
- Provide recommendations for the design and construction of floor slabs and pavements relevant to the proposed development.
- Provide advice on construction issues relevant to the footings and pavements for the proposed development.

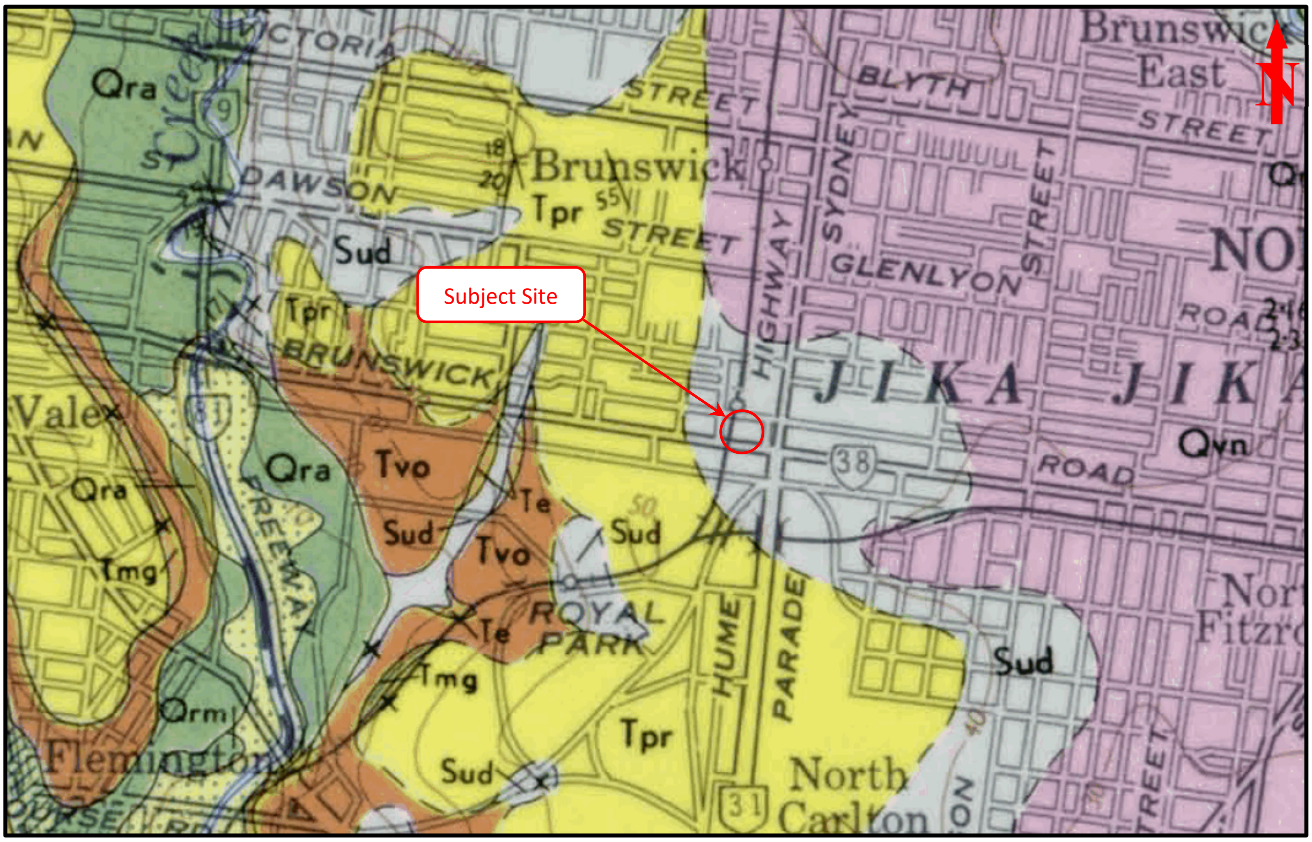
1.4 GEOLOGY

Reference to the Geological Survey of Victoria, 1:63,360 series, Melbourne sheet indicates the site to be underlain by sedimentary deposits of the Silurian age, which are locally referred to as the 'Dargile Formation'. The Dargile Formation comprises current bedded sandstone and massive siltstone and shale. The clays derived from the weathering of the siltstone and sandstone are typically moderately to highly reactive and rock strengths typically range from very low to high within the siltstone and sandstone.

The Geological Survey of Victoria also indicates the presence of Tertiary age sedimentary deposits within close proximity to the subject site, which are locally referred to as the 'Brighton Group Formation'. The Brighton Group Formation is characterised by stiff to hard clays and medium dense to very dense sands.

The Brighton Group Formation is underlain at depth by the Dargile Formation. The Dargile Formation extends to depths significantly in excess of those likely to be influenced by the proposed development.

An extract from the Geological Survey of Victoria, 1:63,360 series, Melbourne sheet is provided in Figure 1.4.1.



Legend (in the order of age)

Qra: Quaternary age low level alluvial deposits: Silt, sandy silt, minor sand and gravel.

Qri: "Coode Island Silt" Quaternary age sedimentary deposits: Silt, silty and sandy clay, minor peat and shell beds.

Qvn: "Newer Volcanics" Quaternary age olivine basalt: Vesicular, minor interbedded silty sand and baked soils.

Qpd: Quaternary age sand ridges.

Tpr: "Brighton Group" Tertiary age sedimentary deposits: Silty sand, minor gravels, sometimes including clay balls.

Tmg: "Green Gully Member" Tertiary age sedimentary deposits: Silt, sand and minor gravel.

Tvo: "Older Volcanics" Tertiary age olivine and titanaugide basalt: Dense, deeply weathered.

Te: "Sub-Older Volcanics" Tertiary age sedimentary deposits: Silt and silty clay.

Sud: "Dargile Formation" Silurian age marine sedimentary deposits: Sandstone, siltstone and minor shaley siltstone.

FIGURE 1.4.1: Extract from the Geological Survey of Victoria, 1:63,360 Series, Melbourne Sheet

1.5 GROUND WATER TABLE

Reference to Visualising Victoria's Groundwater website (www.vvg.org.au) indicates the depth of the ground water table to be less than 5 metres below the ground surface at the subject site.

A screenshot of the plan extracted from the Visualising Victoria's Groundwater website superimposed over an ESRI image of the subject site and immediate surrounds, showing the estimated depth of the ground water table, is provided in Figure 1.5.1.

FIGURE 1.5.1: Screenshot from the Visualising Victoria's Groundwater Website

In considering the ground water information provided on the Visualising Victoria's Groundwater website, it must be noted that the ground water depths are very approximate only.

2 INVESTIGATION METHODS

2.1 FIELD INVESTIGATION

Field investigation was completed under the direct supervision of Geotechnical Engineers from GeoAust in the period between 20 February and 18 March 2025 and included the following:

2.1.1 Boreholes

The details of the boreholes drilled at the subject site are provided in Table 2.1.1.1. The approximate locations of the boreholes are indicated in the attached Figure 1.

TABLE 2.1.1.1: Details of Boreholes

Borehole	Reduced Level of Borehole Collar (metre AHD)	Total Depth (metre)	Depth Interval of Drilling Methods (metre)		
			Auger Drilling	Rotary Wash Boring	N.M.L.C Diamond Core Drilling
1	RL 46.34	22.32	0.0 – 7.55	-	7.55 – 22.32
2	RL 46.40	22.42	0.0 – 3.45	3.45 – 8.68	8.68 – 22.42
3	RL 46.37	21.66	0.0 – 4.95	4.95 – 7.2	7.2 – 21.66
4	RL 46.37	4.5	0.0 – 4.5	-	-
5	RL 46.38	1.8	0.0 – 1.8	-	-
6	RL 46.38	1.8	0.0 – 1.8	-	-
7	RL 46.38	0.7	0.0 – 0.7	-	-
8	RL 46.37	0.45	0.0 – 0.45	-	-

The boreholes were drilled using a track mounted CE180 tight access drilling rig.

The logs of the boreholes were prepared in accordance with Australian Standard AS 1726 ‘Geotechnical Site Investigations’. Definitions of the logging terms and symbols used are provided in Appendix B and the logs of the boreholes are provided in Appendix C.

The approximate reduced levels of the existing ground surface at each of the bore locations were interpolated from the ‘Title Re-establishment, Feature and Level Survey’ plan prepared by Terrain Consulting Group with Reference No. 24102D01s Version 3 dated 11 December 2024. A copy of the plan prepared by Terrain Consulting Group is provided in Appendix A. The approximate reduced levels of the existing ground surface at each of the borehole locations are provided on the logs of the boreholes in Appendix C and in Table 2.1.1.1.

Photographs of the rock core recovered from the boreholes are provided in Appendix D.

2.1.2 In-situ Testing

Testing was carried out in accordance with the relevant test procedures in Australian Standard AS 1289, 'Methods of Testing Soils for Engineering Purposes' and included the following:

- Vane shear strength testing of cohesive soils.
- Standard penetration testing.

Test results are included on the logs of the boreholes in Appendix C.

2.1.3 Ground Water Monitoring Standpipes

Three (3) ground water monitoring standpipes with a diameter of 50 millimetres were installed in Boreholes 1 – 3 upon completion of drilling. The details of the standpipe construction are provided in Table 2.1.3.1.

TABLE 2.1.3.1: Details of Ground Water Monitoring Standpipes Installed in Boreholes 1 – 3

Test Location	Depth of Standpipe (metre)	Standpipe Type	Depth Interval of Screen (metre)	Depth Interval of Filter Pack (metre)	Depth Interval of Bentonite Seal (metre)
Borehole 1	13.2	50mm diameter PVC Pipe	7.2 – 13.2	1.2 – 13.2	0.0 – 1.2
Borehole 2	13.0	50mm diameter PVC Pipe	7.0 – 13.0	6.5 – 13.0	0.0 – 6.5
Borehole 3	12.5	50mm diameter PVC Pipe	6.5 – 12.5	6.5 – 12.5	0.0 – 6.5

The standing water levels gauged within the standpipes are provided on the logs of the boreholes in Appendix C and in Section 3.3.

2.2 LABORATORY TESTING

Point load strength index testing was carried out by GeoAust on the core samples of rock recovered from the boreholes in accordance with the test procedure in Australian Standard AS 4133.4.1 – 2007, 'Methods of Testing Rocks for Engineering Purposes, Rock Strength Test – Determination of Point Load Strength Index'. The results of the point load strength index testing are provided in Appendix E.

3 RESULTS OF INVESTIGATION

3.1 SITE DESCRIPTION

The following site features were noted at the time of the field investigation:

- The site was situated within slightly sloping local topography.
- The site, which was L-shaped in plan, fronted Brunswick Road to the south and Black Street to the east.
- The neighbouring properties to the west, north and north east of the subject site were occupied by single level commercial buildings of masonry construction. Each of the adjacent structures abutted the common property boundaries.
- The site was extensively occupied by an existing single level commercial building of masonry construction with a steel truss roof structure. It was understood that the existing building was a former Tramway Engine House and included a number of underground pits, which were up to approximately 4.5 metres in depth. An extract from a detailed plan taken from Melbourne and Metropolitan Board of Works showing the locations and depths of underground pits is provided in Figure 3.1.1.

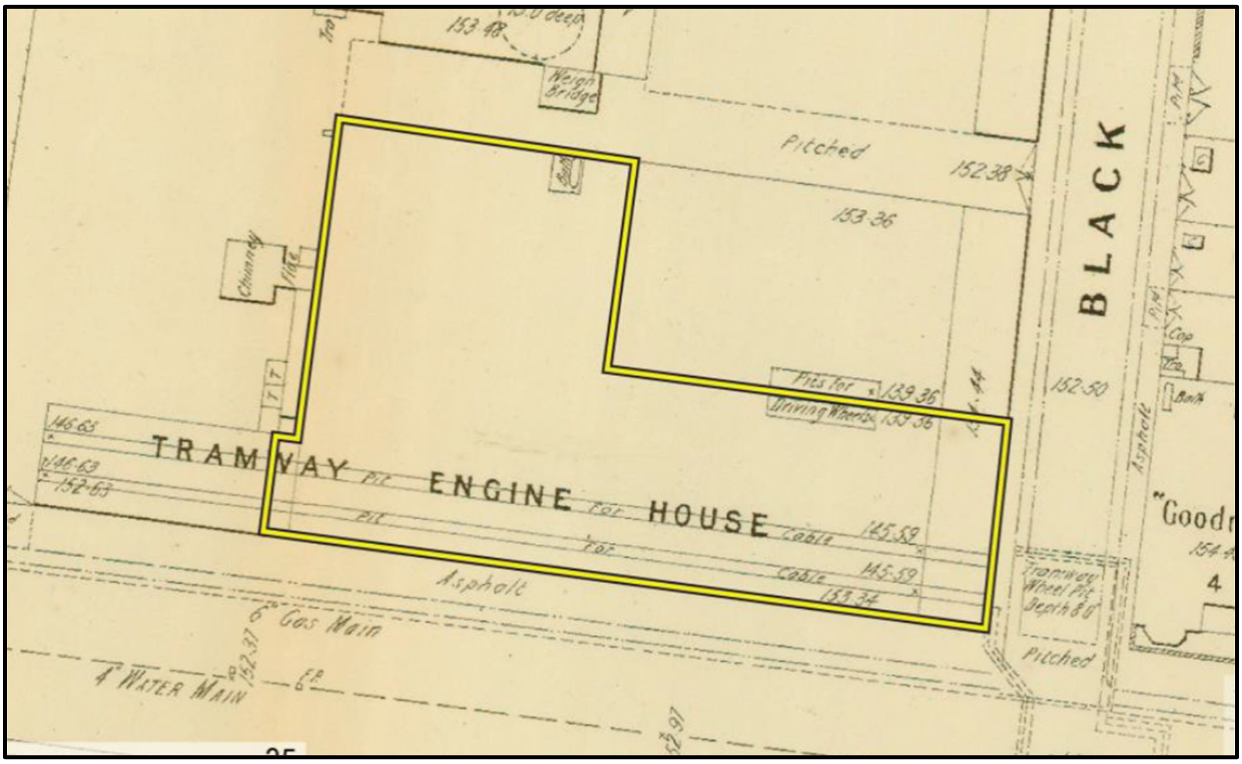


FIGURE 3.1.1: Extract from Melbourne & Metropolitan Board of Works Detail Plan

3.2 SUBSURFACE CONDITIONS

The logs of the boreholes are provided in Appendix C. The subsurface conditions encountered within the boreholes are summarised in Table 3.2.1.

TABLE 3.2.1: Summary of Soil and Rock Profile Encountered in Boreholes 1 – 8

Inferred Geological Unit		**Fill**		**Brighton Group Formation**				**Dargile Formation**		
Soil and Rock Description		**Existing Floor Slab and Subfloor Concrete and Brickwork**	**Clay, Silt and Silty Sand**	**Silt Topsoil**	**Clay**		**Silty Sand**	**Clayey Silt**	**Extremely Weathered Siltstone**	**Distinctly Weathered Siltstone**
Consistency / Relative Density / Rock Strength		-	Stiff to Very Stiff Consistency	Stiff Consistency	Stiff Consistency	Very Stiff to Hard Consistency	Dense to Very Dense	Hard Consistency	Extremely Low to Very Low Rock Strength	Low to Medium Rock Strength
BH	**Reduced Level of Borehole Collar (metre AHD)**	**Approximate Depth Intervals (metre)**								
1	RL 46.34	0.0 – 0.42	0.42 – 0.85	NP	0.85 – 1.0	1.0 – 4.3	4.3 – 7.0	NP	7.0 – 16.0	16.0 – 22.32+
2	RL 46.40	0.0 – 0.45	NP	0.45 – 0.6	0.6 – 1.0	1.0 – 2.5	2.5 – 6.7	6.7 – 8.0	8.0 – 15.75	15.75 – 22.42+
3	RL 46.37	0.0 – 0.23	0.23 – 1.8	NP	NP	NP	1.8 – 6.9	NP	8.25 – 16.6	6.9 – 8.25 & 16.6 – 21.66+
4	RL 46.37	0.0 – 0.3	0.3 – 3.3	NP	NP	NP	3.3 – 4.5+	NE	NE	NE
5	RL 46.38	0.0 – 0.3	0.3 – 1.8+	NE	NE	NE	NE	NE	NE	NE
6	RL 46.38	0.0 – 0.3	0.3 – 1.8+	NE	NE	NE	NE	NE	NE	NE
7	RL 46.38	0.0 – 0.7+	NE	NE	NE	NE	NE	NE	NE	NE
8	RL 46.37	0.0 – 0.45+	NE	NE	NE	NE	NE	NE	NE	NE

Legend

NP: Nil Present

NE: Not Encountered

A brief description of the soil and rock layers encountered within the boreholes is given below:

EXISTING FLOOR SLAB: The existing slab comprised an 80 – 110 millimetre thick layer of concrete underlain by a 10 – 20 millimetre thick bituminous seal over medium to coarse grained gravel.

At the location of Borehole 1, the gravel layer was underlain by a 150 millimetre thick layer of bricks, which in turn was underlain by a second layer of concrete, which was 120 millimetres in thickness.

In Borehole 7, the gravel layer was underlain by concrete, which persisted to depths in excess of the termination depth of 0.7 metres below the existing floor slab surface.

In Borehole 8, the gravel layer was underlain by brickwork, which persisted to depths in excess of the termination depth of 0.45 metres below the existing floor slab surface.

FILL: The fill comprised a mixture of materials including medium plasticity clay, low plasticity silt and fine to coarse grained silty sand, which contained trace quantities of fine to coarse grained gravel and cobbles.

The depth of the fill varied generally between 0.45 and 3.3 metres below the existing concrete slab within Boreholes 1 – 4. Borehole 5 – 8 were terminated within the fill at depths ranging between 0.45 and 1.8 metres below the existing floor slab surface.

The variable depths of fill across the site are likely to be associated with backfilling of underground pits associated with the tramway engine house that was formerly operated at the subject site. It appeared that the fill had been placed in an uncontrolled manner.

SILT TOPSOIL: The sandy silt encountered immediately underlying the fill in Borehole 2 was part of the original topsoil layer at the site. The silt was of low plasticity and stiff consistency.

The silt was assessed to be of extremely poor quality from an engineering perspective, in that it is prone to significant loss of strength upon moisture ingress. The silt will be completely unworkable upon saturation.

CLAY: The clay was of medium plasticity, meaning that it will be subject to moderate changes in volume upon changes in moisture content. Upon moisture ingress, the clay will swell and conversely, upon drying out, the clay will shrink.

The clay contained varying quantities of silt and sand. In Borehole 1, the silt content of the clay increased with depth and the clay graded to clayey silt at depths in excess of approximately 2.5 metres below the existing floor slab surface. The clayey silt was of low plasticity and hard consistency.

SILTY SAND: Typically, the sand was silty and fine to coarse grained and contained trace quantities of fine to coarse grained quartzose gravel and seams of clay, clayey silt and clayey sand.

Based on the results of the standard penetration tests, the sand was of dense to very dense relative density.

Whilst not encountered at the locations of Boreholes 1 – 3, the possible presence of seams and bands of ferricrete rock within the Brighton Group Formation must be noted. The thickness and strength of the bands of ferricrete rock tend to vary significantly, often over short lateral distances. In some areas of the site, the ferricrete may be very thin or possibly even absent from the soil profile, while in other areas of the site the bands of ferricrete may be very thick and of high to very high rock strength.

CLAYEY SILT: The inferred residual Silurian clayey silt was of low to medium plasticity and hard consistency.

SILTSTONE: The depth to the siltstone bedrock varied between 6.9 and 8.25 metres below the existing floor slab surface within Boreholes 1 – 3.

Generally, the siltstone, upon first contact, was extremely weathered and of extremely low to very low rock strength. At depths in excess of approximately 15.75 – 16.6 metres below the existing floor slab surface, the siltstone was distinctly weathered and predominantly of low to medium rock strength.

In Borehole 3, a 1.35 metre thick layer of fine grained sandstone was encountered at a depth of approximately 6.9 metres below the existing floor slab surface. The sandstone was distinctly weathered and of medium rock strength.

The bedding of the weathered siltstone was measured to be dipping approximately 45 – 70 degrees below horizontal. The strike and dip direction of the bedding were not able to be determined from the core samples recovered from the boreholes.

The siltstone was fractured. The fractures within the siltstone were generally planar and smooth to rough. The majority of the fractures were either clean or stained by iron oxide. However, a number of the fractures were infilled with a clay or extremely weathered veneer or clay seams up to 24 millimetres in thickness, as noted on the logs of the boreholes.

Defect spacings were variable within the siltstone with rock quality designations (RQD) varying between 0 and 79%. A summary of RQD values for siltstone in individual boreholes is provided in Table 3.2.2.

TABLE 3.2.2: Summary of Rock Quality Designation Values for Siltstone in Boreholes 1 – 3

Test Location	Minimum RQD Value (%)	Maximum RQD Value (%)	Average RQD Value (%)
Borehole 1	0	79	46
Borehole 2	0	73	41
Borehole 3	0	79	30

A number of core losses occurred within the siltstone during drilling. The losses are likely to have occurred within zones of extremely weathered siltstone, which was of extremely low rock strength and/or residual Silurian clay.

Whilst there was no evidence of any dykes within the Dargile Formation at the locations of Boreholes 1 – 3, it is noted that quartz and feldspar porphyry or lamprophyre dykes and sills are common in the Dargile Formation. These igneous intrusives can vary greatly in their properties. The dykes are often near vertical and are generally orientated in an approximate north-south direction. It is common for these dykes to deviate along relatively steep bedding. The dykes can be encountered in swarms within the Dargile Formation.

3.3 GROUND WATER

Ground water seepage was not intersected during auger drilling of Boreholes 1 – 3 and 5 – 8 or observed a short time after completion of auger drilling. By contrast, slight flows of perched seepage water were intercepted during auger drilling of Borehole 4. The depths at which the perched seepage water flows were intercepted are provided in Table 3.3.1.

TABLE 3.3.1: Observed Depth Intervals of Perched Seepage Water Flows in Borehole 4

Borehole	Observed Depth Interval of Perched Seepage Water Flows (metre)	Rate of Inflow	Soil Type in which the Perched Seepage Water Flow was Encountered
4	2.5 – 3.0	Slight	Fill

The flows of perched seepage water intersected by Borehole 4 are likely to be associated with the poor stormwater drainage and/or leaking underground pipes at, and adjacent to, the site.

It should be noted that increased flows of perched seepage water may develop within the fill and silt topsoil immediately overlying the less permeable clay following periods of wet weather, particularly during the winter and spring months when rainfall levels are typically high, and evaporation levels are typically low. The uncontrolled fill and silt topsoil are anticipated to be unstable and completely unworkable when saturated.

Auger drilling within Boreholes 1 – 3 extended to a maximum depth of 7.55 metres below the existing floor slab surface. The introduction of water for rotary wash boring and NMLC diamond core drilling negated any further meaningful observation of ground water seepage during drilling below the augered depths.

Three (3) ground water monitoring standpipes with a diameter of 50 millimetres were installed in Boreholes 1 – 3 upon completion of drilling. The construction details of the ground water monitoring standpipes are provided in Section 2.1.3.

The standing ground water levels gauged within the ground water monitoring standpipes installed in Boreholes 1 – 3 are provided in Table 3.3.2.

TABLE 3.3.2: Standing Water Levels Gauged Within the Standpipes Installed in Boreholes 1 and 3 – 7

Borehole	Reduced Level of Borehole Collar (metre AHD)	Date of Reading	Depth of Standing Water Level Below Existing Floor Slab Surface (metre)	Reduced Level of Standing Water Level (metre AHD)
1	RL 46.38	24 March 2025	7.10	RL 39.28
2	RL 46.39		7.12	RL 39.27
3	RL 46.37		7.02	RL 39.35

Based on our experience of ground water levels in the general area, the standing water levels gauged within the standpipes installed in Boreholes 1 – 3 are likely to represent the regional ground water table level at the subject site.

3.4 LABORATORY TEST RESULTS

The results of the point load strength index tests conducted by GeoAust on the core samples of rock recovered from the boreholes are provided in Appendix E.

The results of the point load strength index tests indicated the rock strength of the siltstone at shallow depths to range from extremely low to very low. At depths in excess of approximately 16.0 – 17.0 metres below the existing floor slab surface, the results of the point load strength index tests indicated the rock strength of the siltstone to be of low to medium rock strength.

4 COMMENTS AND RECOMMENDATIONS

The following comments and recommendations have been based on site testing that has been conducted at the subject site for the proposed development detailed in Section 1.2 of this report. Should the design of the proposed development be altered from those indicated in Section 1.2, GeoAust must be consulted to ensure that the comments and recommendations of this report remain applicable.

It has been assumed that no unusual performance criteria apply to the proposed structure. Should any unusual performance criteria apply to the proposed structure that are not apparent from the information provided, GeoAust must be notified such that the comments and recommendations of this report can be revised, as required.

4.1 EARTHQUAKE SITE CLASSIFICATION

Australian Standard AS 1170.4 – 2007 (R2018), 'Structural Design Actions, Part 4: 'Earthquake Actions in Australia' outlines the methods for assigning the site's sub-soil class.

Based on the subsurface conditions encountered at the subject site, and the requirements of Australian Standard AS 1170.4 – 2007 (R2018), the following Hazard Design Factor and Sub-Soil Class are recommended:

Sub-Soil Class:	Class C_e – Shallow Soil Site
Hazard Design Factor (Z):	0.08

4.2 FOOTINGS

Given the presence of variable depths of fill associated with backfilling of the former pits underlying the subject site, the use of a conventional shallow spread footing arrangement is not recommended for the support of the proposed two (2) and six (6) level structures.

It will be necessary to fully suspend the proposed structures, including the ground floor level slabs, on a piled footing arrangement. Lightly loaded piles supporting the proposed two (2) level structure may able to be founded within native silty sand of dense to very dense relative density. Higher capacity piles, particularly for those supporting the proposed six (6) level structure will need to be socketed into the distinctly weathered siltstone of low to medium rock strength, as encountered in Boreholes 1 – 3 at depths in excess of approximately 15.75 – 16.6 metres below the existing floor slab surface.

It must be noted that a similar founding stratum and founding depth must be adopted for the bored piles providing support to each of the two portions of the proposed structure, that is, if proposed two (2) level structure is proposed to be supported on piles founded within native silty sand of dense to very dense relative density, it is essential that all piles for this portion of the structure are founded into native silty sand of dense to very dense relative density. Similarly, if the proposed six (6) level structure is proposed to be supported on piles socketed into the distinctly weathered siltstone of low to medium rock strength, it is essential that all piles for this portion of the structure are founded into weathered siltstone.

It must also be noted that if the two (2) level structure is proposed to be supported on piles founded within native silty sand of dense to very dense relative density and the six (6) level structure is proposed to be supported on piles socketed into the distinctly weathered siltstone, it is essential that a full construction joint is provided between the two portions of the proposed structure.

4.2.1 Bored Piles

Bored piles must be founded into native silty sand of dense to very dense relative density or socketed into the underlying weathered siltstone, subject to each of the following minimum founding conditions being satisfied:

- The length of pile embedment must not be less than 2.5 metres below the existing floor slab surface.
- The embedded length of pile must exceed 5.0 times the pile diameter.
- The pile must extend at least 2.0 pile diameters into the required founding stratum.
- Pile spacings should exceed 2.5 pile diameters to ensure that full side resistance is available for the pile sockets and also group effects do not lead to excessive settlements of the piles.
- At least 60% of the pile load should be provided by side resistance in order to ensure that pile settlements are maintained within acceptable limits.
- Given the presence of clayey silt with a lower base resistance underlying the sand, it must be ensured that the toe of piles founded in dense to very dense sand with a maximum diameter of 600 millimetre do not extend to depths in excess of approximately 5.0 metres below the existing floor slab surface (approximately RL 41.0 metres AHD). The recommended base resistance for dense to very dense sand will be need to be reduced for any piles that are founded in dense to very dense sand below RL 41.0 metres AHD.

Piles socketed into the weathered siltstone will derive capacity from a combination of socket shear and base resistance. The minimum required socket length for a given load at a particular pile location will be dependent on the profile of rock quality at each pile location, roughness of the walls of the socket excavation and cleanliness of the base of the socket.

Socket roughness and cleanliness are influenced by pile construction and cleaning methodology. Additional roughening and cleaning of the pile socket may be required after drilling. Once pile loads, sizes and construction methodology are determined, individual sockets may be designed.

The rock profile at each pile location must be logged by a suitably experienced engineer at the time of drilling to ensure that variations in rock strength and the roughness of the socket be carefully monitored to ensure that an adequate socket length is provided.

The design ultimate geotechnical strength ($R_{d,ug}$) of bored piles in accordance with the above minimum requirements can be calculated using the base resistance and socket shear provided in Table 4.2.1.1.

TABLE 4.2.1.1: Design Ultimate Geotechnical Strength for Bored Piles

Founding Material	**Design Ultimate Geotechnical Strength ($R_{d,ug}$)**	
	Base Resistance (kPa)	Socket Shear (kPa)
Clay (Very Stiff to Hard Consistency)	N/A	50*
Sand (Dense to Very Dense Relative Density)	6,000	50
Clayey Silt (Hard Consistency)	2,000	50
Extremely Weathered Siltstone (Extremely Low to Very Low Rock Strength)	3,000	250
Distinctly or Less Weathered Siltstone (Low to Medium Rock Strength)	9,000	600

Legend

N/A: Not Applicable

* Only applicable in native clay of very stiff to hard consistency at depths in excess of 1.5 metres below the existing floor slab surface

The design geotechnical strength ($R_{d,g}$) and working strength of a pile must be determined in accordance with Section 4 of Australian Standard AS 2159 – 2009, 'Piling – Design and Installation' on the basis of the design ultimate geotechnical strength ($R_{d,ug}$) provided in Table 4.2.1.1.

In accordance with Australian Standard AS 2159 – 2009 'Piling Design and Installation' the geotechnical strength reduction factor (ϕ_g) is influenced by the scope of geotechnical investigation and means of determining/selecting geotechnical design parameters, the design methodology, construction controls and the method and extent of pile testing.

Based on the geotechnical investigation completed at the subject site, the individual risk ratings for Site and Design risk factors are provided in Table 4.2.1.2 as per Table 4.3.2(A) of Australian Standard AS 2159 – 2009. Other individual risk ratings for Installation risk factors will need to be determined by the piling contractor.

TABLE 4.2.1.2: Weighting Factors and Individual Risk Ratings for Risk Factors

Risk factor	Weighting factor *(w_i)*	Typical description of risk circumstances for individual risk rating (IRR)			Recommended risk rating (IRR)
		1 (Very Low Risk)	**3 (Moderate Risk)**	**5 (Very High Risk)**	
Site					
Geological complexity of site	2	Horizontal strata, well-defined soil and rock characteristics	Some variability over site, but without abrupt changes in stratigraphy	Highly variable profile or presence of karstic features or steeply dipping rock levels or faults present on site, or combinations of these	3
Extent of ground investigation	2	Extensive drilling investigation covering whole site to an adequate depth	Some boreholes extending at least 5 pile diameters below the base of the proposed pile foundation level	Very limited investigation with few shallow boreholes	3
Amount and quality of geotechnical data	2	Detailed information on strength compressibility of the main strata	CPT probes over full depth of proposed piles or boreholes confirming rock as proposed founding level for piles	Limited amount of simple in situ testing (e.g., SPT) or index tests only	3
Design					
Experience with similar foundations in similar geological conditions	1	Extensive	Limited	None	1
Method of assessment of geotechnical parameters for design	2	Based on appropriate laboratory or in situ tests or relevant existing pile load test data	Based on site-specific correlations or on conventional laboratory or in situ testing	Based on non-site-specific correlations with (for example) SPT data	5
Design method adopted	1	Well-established and soundly based method or methods	Simplified methods with well-established basis	Simple empirical methods or sophisticated methods that are not well established	3
Method of utilizing results of in situ test data and installation data	2	Design values based on minimum measures values on piles loaded to failure	Design methods based on average values	Design values based on maximum measured values on test piles loaded up only to working load, or indirect measurements used during installation, and not calibrated to static loading tests	3
Installation					
Level of construction control	2	Detailed with professional geotechnical supervision, construction processes that are well established and relatively straightforward	Limited degree of professional geotechnical involvement in supervision, conventional construction procedures	Very limited or no involvement by designer, construction processes that are not well established or complex	*TO BE DETERMINED BY PILING CONTRACTOR*
Level of performance monitoring of the supported structure during and after construction	0.5	Detailed measurements of movements and pile loads	Correlation of installed parameters with on-site static load tests carried out in accordance with this Standard	No monitoring	*TO BE DETERMINED BY PILING CONTRACTOR*

Piling contractors will then need to make an assessment of a suitable geotechnical strength reduction factor for pile design once all the weighting factors and individual risk factors in Table 4.3.2(A) of Australian Standard AS 2159 – 2009 have been taken into consideration, together with any increase in the geotechnical strength reduction factor associated with any testing of the piles that is proposed.

Adopting a geotechnical strength reduction factor (ϕ_g) of 0.56 for preliminary design of bored piles and applying a load factor of 1.35, the design geotechnical strength ($R_{d,g}$) and working strength for bored piles can be calculated using the base resistance and socket shear provided in Table 4.2.1.3.

TABLE 4.2.1.3: Design Geotechnical Strength and Working Strength for Bored Piles Socketed into Siltstone

Founding Material	Design Geotechnical Strength ($R_{d,g}$)		Working Strength (0.74 x $R_{d,g}$)	
	Base Resistance (kPa)	Socket Shear (kPa)	Base Resistance (kPa)	Socket Shear (kPa)
Clay (Very Stiff to Hard Consistency)	N/A	28	N/A	20
Sand (Dense to Very Dense Relative Density)	3,400	28	2,500	20
Clayey Silt (Completely Weathered Siltstone) (Hard Consistency)	1,100	28	830	20
Extremely Weathered Siltstone (Extremely Low to Very Low Rock Strength)	1,700	140	1,250	100
Distinctly or Less Weathered Siltstone (Low to Medium Rock Strength)	5,000	340	3,700	250

Legend

N/A: Not Applicable

***** Only applicable in native clay of very stiff to hard consistency at depths in excess of 1.5 metres below the existing floor slab surface

The settlement at the top of the pile socket under the working load is estimated to be approximately 1% of the pile diameter subject to the following conditions:

- A structural load factor of 1.35 is applicable to the proposed structures.
- The pile bases are thoroughly cleaned to remove all loose material prior to pouring concrete.
- The pile sockets are properly roughened (grooves or undulations > 10 millimetres deep, > 10 millimetres wide and spaced 50 – 200 millimetres apart).
- Elastic shortening of the pile above the top of the pile socket must be added to this settlement.

Differential settlements between adjacent piles are expected to be approximately half of the total settlement value. The estimated total and differential settlement estimates will be exceeded where the bases of the pile excavations are not suitably clean. If cleaning of the pile bases proves problematic, it may be necessary to reduce the contribution of the pile base to total pile capacity.

Groups of piles providing support to a single column will experience greater settlements than individual piles. An assessment of the settlement characteristics of pile groups can only be provided once final piling details are known. Differential settlements between adjacent pile groups are expected to be approximately half of the total settlement value of the pile groups.

For piles subjected to tensile loads, the working capacity in tension shall be the lesser of:

- 75% of the working socket shear specified in Table 4.2.1.3.
- The weight of the 45° cone of siltstone extending from the toe of the pile to the top of the pile socket plus the weight of the cylinder of soil extending from the top of the 45° failure cone to the ground surface level. Saturated unit weights of 24 kN/m^3 and 18 kN/m^3 should be used for the siltstone and residual soils, respectively, in calculating the tensile capacity of the piles for transient loads. Buoyant unit weights must be used in calculating the tensile capacity of the piles for sustained loads.

4.2.2 Construction of Bored Piles

Construction of bored piles will need to take into account the following:

- The presence of flows of ground water seepage at depths below approximately RL 39.3 metres AHD.
- The presence of medium strength siltstone, which depending upon the capacity of the piling rig will necessitate the use of a rock coring bucket to drill.
- The possible presence of bands of ferricrete within the Brighton Group Formation. These bands, which can be randomly present and can vary in thickness often over short lateral distances, may comprise high to very high strength rock.

Socket roughness and cleanliness will significantly influence the load carrying capacity and settlement characteristics of the piles. Both socket roughness and cleanliness are influenced by pile construction and cleaning methodology. Additional roughening and cleaning of the pile sockets is likely to be required upon completion of drilling to ensure the following is achieved:

- The depth of grooves or undulations > 10 millimetres.
- The width of the grooves or undulations > 10 millimetres.
- The grooves or undulations are spaced 50 – 200 millimetres apart.

If the pile sockets cannot be adequately roughened and cleaned, it may be necessary to reduce the side resistance component of the piles in the assessment of the pile capacities.

The pile bases must be cleaned of all loose material using a suitable cleaning bucket. The use of a rock coring bucket or toothed auger is completely unacceptable for cleaning pile bases. For bored piles extending below the ground water table level, cleaning of the pile bases may be difficult. If the bases of the piles cannot be thoroughly cleaned it may be necessary to reduce the base resistance component of the piles in the assessment of the pile capacities.

The pile excavations must be completely dewatered prior to pouring concrete. If ground water seepage cannot be adequately controlled, it will be necessary to use a suitable concrete mix, which can be placed below water after the pile sockets have been adequately roughened and cleaned. The concrete will need to be poured using a tremie pipe and a minimum 2.0 metre depth of concrete maintained above the tremie outlet throughout the pour to maintain plug flow. The finished level of concrete placed should be higher than the design level to allow removal of the anticipated thick layer of laitance, which forms on the rising surface of concrete poured below the ground water table using tremie methods.

Drilling of piles, roughening of the pile socket, socket and base cleaning and placement of concrete should be completed as a continuous operation without delay.

All bored pile excavations must be inspected by a qualified engineer prior to the placement of concrete to ensure that the founding conditions are consistent with the above recommendations. If conditions are not consistent with the above recommendations it may be necessary to either increase the founding depth and/or diameter of the bored piles.

The rock profile at each pile location will need to be logged by a suitably experienced engineer at the time of drilling to ensure that variations in rock strength and the roughness of the socket be carefully monitored to ensure that an adequate socket length is provided.

4.2.3 Pile Testing

It is recommended that at least 3% of all load bearing piles installed be subjected to dynamic testing and CAPWAP analysis to confirm that design loads have been achieved. The testing of piles must be carried out by a suitably qualified person in accordance with the requirements of Section 8 of Australian Standard AS 2159 – 2009, ‘Piling Design and Installation’. It should be noted that testing of piles will allow the geotechnical strength reduction factor (ϕ_g) of 0.56 adopted in Section 4.2.1 to be increased to approximately 0.65.

4.3 REPORT LIMITATIONS

This report is for the use of the party to whom it is addressed only and has been produced for the proposed development as described in Section 1.2 of this report and for no other purpose. Should the design of the proposed development be altered from that indicated in Section 1.2, GeoAust must be consulted to ensure that the comments and recommendations of this report remain applicable.

It has been assumed that the conditions encountered by the limited number of boreholes are representative of the site in general. Some variation from the conditions encountered by the boreholes is expected over the site. Should any areas be identified that vary from the reported conditions, this office must be immediately notified, so that appropriate recommendations can be made.

It is beyond the scope of this report to comment on any possible contamination of soil and ground water at the subject site.

Contractors should be provided access to this report. This report should only be reproduced in full.

If you require any further information, please do not hesitate to contact the undersigned.

For and on behalf of
GEOAUST GEOTECHNICAL ENGINEERS PTY LTD

R. Nobakht

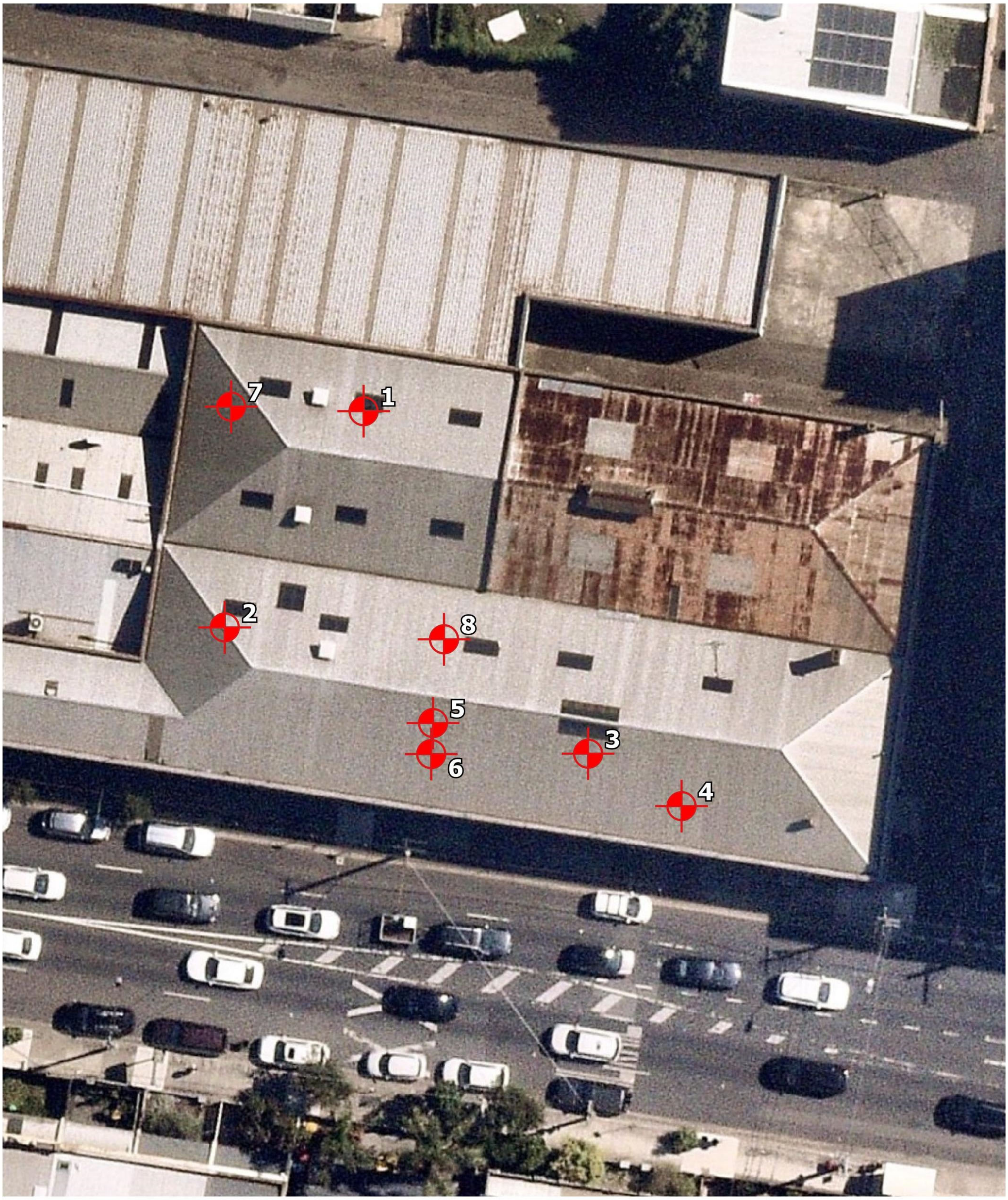
Reza Nobakht
MEng MIEAust CPEng NER PE-0005127

Stephen Mayer
BEng MIEAust CPEng NER PE-0000261

GeoAust
Geotechnical
Engineers Pty Ltd

TEST LOCATION PLAN

JOB No: 8257
PROJECT: Proposed Student Accommodation Development
LOCATION: 253-259 Brunswick Road BRUNSWICK



0 5 10 15 m

SCALE

LEGEND

⊕ Denotes approximate borehole location

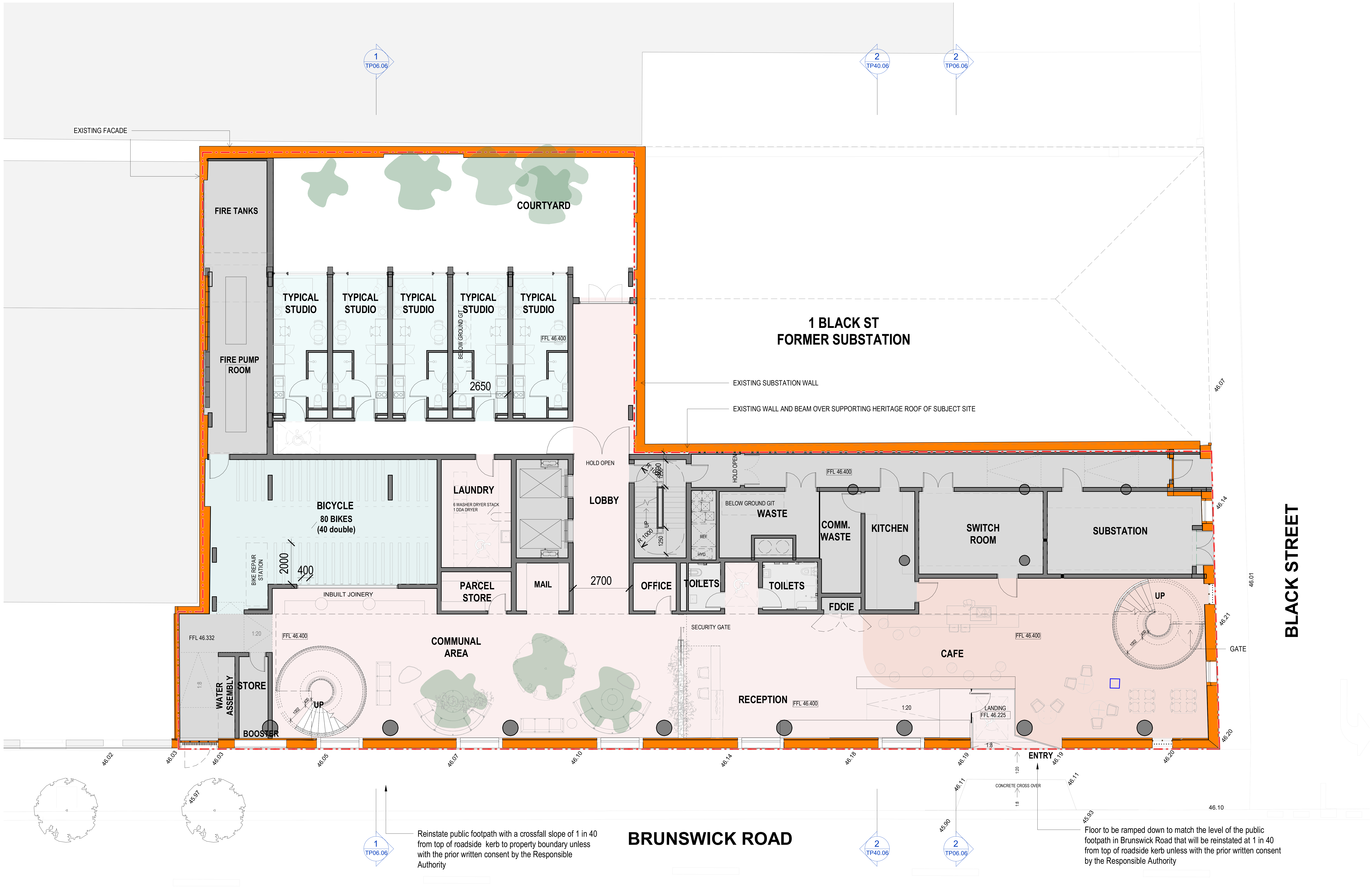
Image Source
nearmap

N

Figure 1

APPENDIX A

Plan Extracts



Reinstate public footpath with a crossfall slope of 1 in 40 from top of roadside kerb to property boundary unless with the prior written consent by the Responsible Authority

Floor to be ramped down to match the level of the public footpath in Brunswick Road that will be reinstated at 1 in 40 from top of roadside kerb unless with the prior written consent by the Responsible Authority

AREA LEGEND

🟥	AMENITY	▢	TYPICAL STUDIO	▨	DDA STUDIO
▨	SERVICES	▨	STUDIO TYPE B	▨	TWIN

Project Title
Cable Tram Engine House
253-259 Brunswick Road, Brunswick

hayball

Melbourne
Level 1
250 Flinders Lane
Melbourne VIC 3000
T +61 3 9699 3644

Sydney
Ground Floor
11-17 Buckingham Street
Surry Hills NSW 2010
T +61 2 9660 9329

Brisbane
Level 5,
293 Queen Street,
Brisbane Qld 4000
T +61 7 3211 9821

Canberra
Level 1,
33 Allara Street,
Canberra ACT 2601
T +61 2 9660 9329

ABN: 84006394261 NSW Nominated Architects:Tom Jordan 7521,Richard Leonard 7522,
David Tordoff 8028, Fiona Young 7014

Drawn By Author
Checked By Checker
Date Printed 11/02/2025 5:09:31 PM
Scale 1 : 100@ A1

0 1 2 3 5
m

Rev **Date** **Description**

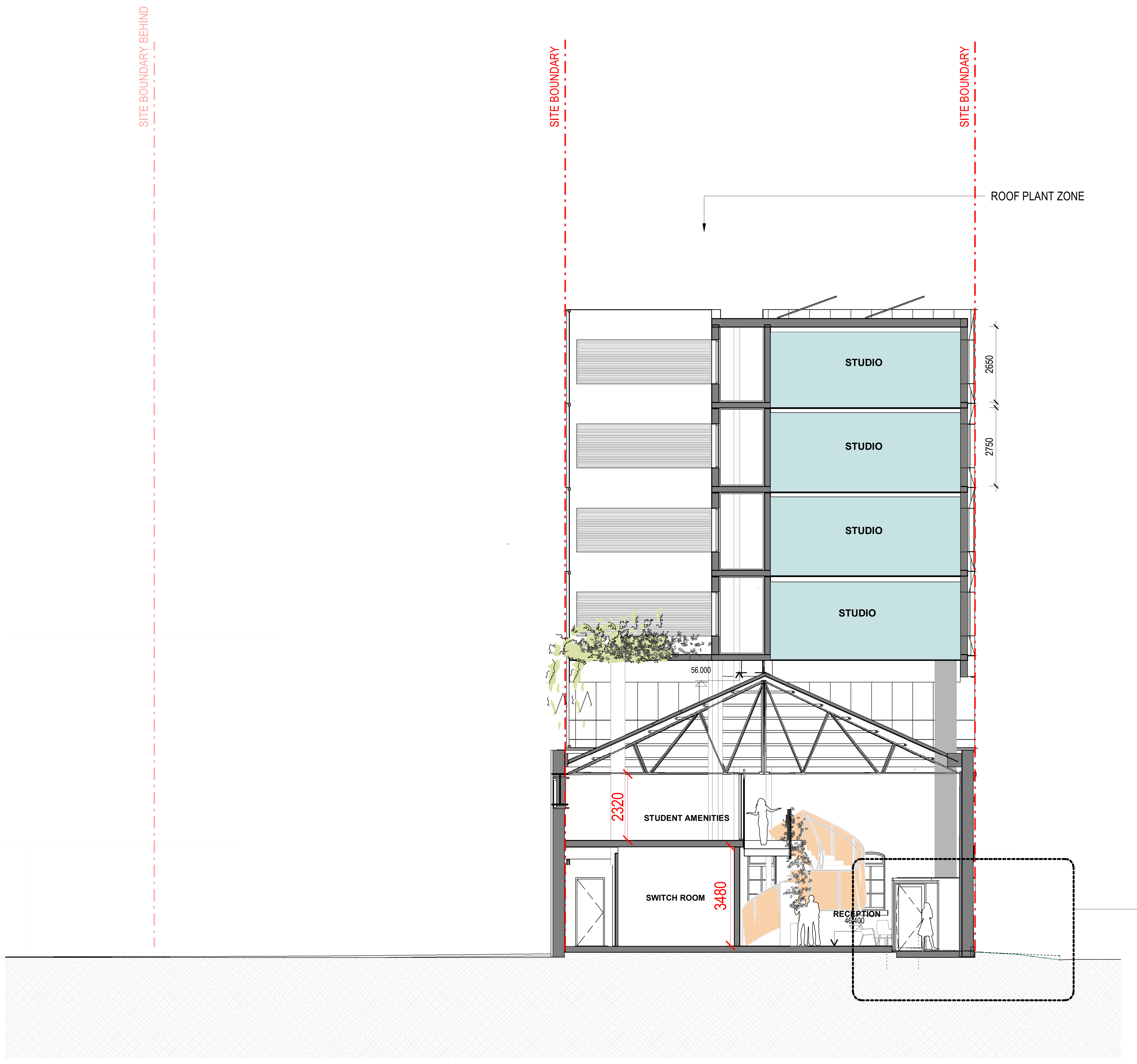
Drawing Title
GROUND FLOOR

Status
TOWN PLANNING

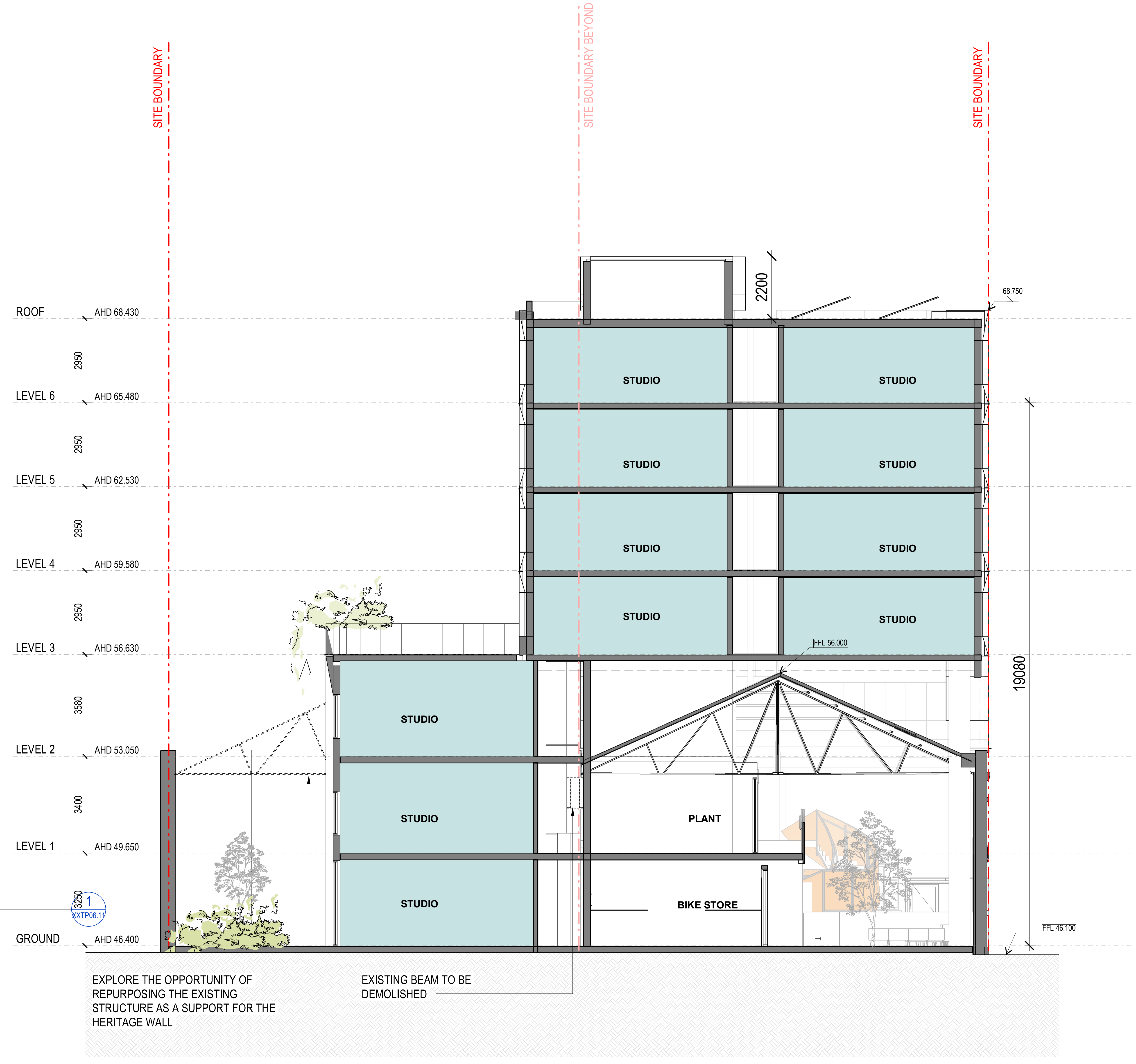
Project No
2732

Drawing No
TP02.01

Revision



Section 1



Section 2

WARNING

WHERE OCCUPATION INCLUDING FENCES AND BUILDINGS AROUND THE PERIMETER OF THE PROPERTY ENCROACH INTO THE SUBJECT SITE, THE LAND BEYOND THE OCCUPATION MAY NOT BE RECOVERABLE, AS RIGHTS OF POSSESSION MAY HAVE PASSED TO ADJOINING OWNERS. UNTIL ANY SUCH ISSUES HAVE BEEN RESOLVED, FULL TITLE DIMENSIONS SHOULD NOT BE ASSUMED FOR DESIGN PURPOSES AND ANY PROPOSED DESIGN SHOULD THEREFORE BE LIMITED TO ENCROACHING OCCUPATION.

NOTES:

- LEVELS SHOWN THUS + 46.10 ARE IN METRES TO AUSTRALIAN HEIGHT DATUM (AHD) LEVEL DATUM VIDE JIKA JIKA PM 371, RL:45.354.
- CONTOURS SHOWN ACROSS SUBJECT LAND ARE AT 0.10m INTERVALS TO AHD AND HAVE BEEN DERIVED FROM SURVEY.
- CONTOURS SHOWN THROUGH EXISTING BUILDINGS ARE INDICATIVE ONLY AND ARE BASED ON LEVELS OBSERVED OUTSIDE SUCH BUILDINGS.
- THIS SURVEY HAS RE-ESTABLISHED TITLE BOUNDARIES, WHICH ARE SHOWN ON THIS PLAN IN RELATION TO EXISTING FENCES AND / OR BUILDING WALLS THAT DEFINE THE EXTENT OF THE LAND OCCUPIED BY THE SUBJECT PROPERTY.
- THIS SURVEY HAS NOT MARKED PROPERTY TITLE BOUNDARIES.
- SPOT LEVELS FOR UNDERSIDE OF ROOF LININGS (US-R) & TRUSSES (US-T) ARE IN A FROZEN LAYER FOR CLARITY WHEN READING THE PLAN.
- DETAIL SHOWN IN LAYER "VIC PARCEL LINE" HAS BEEN SHOWN FOR ORIENTATION PURPOSES ONLY AND IS POSITIONED APPROXIMATELY ONLY. THIS DETAIL DOES NOT DEFINE THE CADASTRAL BOUNDARY.

Terrain
Consulting Group
418 High Street Kew 3101 Ph: 03 9853 3352 Fax: 03 9853 8907
P.O. Box 3018 Cotham VIC 3101 Email: admin@terrainconsulting.com.au

INCORPORATING THE PRACTICE OF
BARKER MONAHAN
SURVEYORS, DEVELOPMENT AND
LOCAL GOVERNMENT CONSULTANTS

CERTIFICATION BY SURVEYOR

I, Andrew Clinton Smith of Terrain Consulting Group Pty. Ltd a surveyor licensed under the Surveying Act 2004, certify that this plan correctly represents the information obtained by me from such sources as indicated hereon.

Dated 13th March 2024

....Signature

TITLE PARTICULARS:	SCALE: 1:125
C/T Volume 10250 Folio 570	ORIGINAL SHEET: A1
Lot 2 on PS346478N	DATE OF SURVEY: 07 March 2024
Area of Title: -	PARTY LEADER: J.R DRAWN: J.R
SOURCE OF INFORMATION: LAND USE VIC.	LEVEL DATUM: Aust Height Datum

PLAN:	TITLE RE-ESTABLISHMENT, FEATURE & LEVEL SURVEY
ADDRESS:	253-259 BRUNSWICK ROAD, BRUNSWICK
MUNICIPALITY:	CITY OF MERRI-BEK
PROJECT:	PROPOSED DEVELOPMENT
MELWAY REF:	29 G10

SHEET 1 OF 1
DRAWING No.
24102D01s
VERSION No: 3
REVISION DATE: 11/12/2024

APPENDIX B

Definitions of Logging Terms and Symbols

GeoAust
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Engineers Pty Ltd

EXPLANATION NOTES FOR BOREHOLE AND TEST PIT LOGS

SOIL CLASSIFICATION AND LOG SYMBOLS

SOIL CLASSIFICATION CHART

	MAJOR DIVISIONS		SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL SMALLER THAN 63MM IS LARGER THAN 0.075MM	**GRAVEL AND GRAVELLY SOILS** MORE THAN 50% OF COARSE FRACTION IS LARGER THAN 2.0MM	**CLEAN GRAVELS** (LITTLE OR NO FINES)	⁂	**GW**	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
			⁂	**GP**	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	⁂	**GM**	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
			▨	**GC**	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION IS SMALLER THAN 2.0MM	**CLEAN SANDS** (LITTLE OR NO FINES)	░	**SW**	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			▒	**SP**	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	░	**SM**	SILTY SANDS, SAND - SILT MIXTURES
			▨	**SC**	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL SMALLER THAN 63MM IS SMALLER THAN 0.075MM	**SILTS AND CLAYS**	LIQUID LIMIT LESS THAN 50	▤	**ML**	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR
			▤	**CL**	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY
			▤	**OL**	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	▥	**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			▥	**CH**	INORGANIC CLAYS OF HIGH PLASTICITY
			▥	**OH**	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			⁂	**PT**	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

GROUND WATER

►—◄	Inflow
◁—▷	Outflow
▽	Standing level on completion
1/2 ▼	Standing level 1/2 hour after completion
▨	Collapse of borehole annulus
VS	Very slight seepage
S	Slight seepage rate
M	Moderate seepage rate
H	High seepage rate
NOT OBSERVED	Ground water observation not possible. Ground water may or may not be present
NOT ENCOUNTERED	Ground water was not evident during excavation or a short time after completion

SAMPLING AND TESTING

DS	Disturbed sample
U60	Thin walled tube sample. Number indicates nominal sample diameter in mm
ES	Environmental sample
SPT	Standard penetration test
3/6/9 N=15	3,6 and 9 refer to blows per 150mm penetration. N=15 is the sum of blows after the initial 150mm penetration
3/6/9 blows for 20mm penetration: N>15.	3 and 6 refer to blows per 150mm penetration. 9 blows resulted in 20mm penetration at which point practical refusal of penetration occurred
S=47kPa	In-situ vane shear test. Result expressed as peak undrained shear strength in kPa
PP=145kPa	Pocket penetrometer test. Result expressed as dial reading in kPa
DCP	Dynamic Cone Penetrometer Test
EX	Excavation. Test starts at base of excavation
S	DCP sank under own weight or last blow of previous 100mm increment
E	End of DCP test
R	End of DCP test due to effective refusal of penetration

Figure 1

EXPLANATION NOTES FOR BOREHOLE AND TEST PIT LOGS

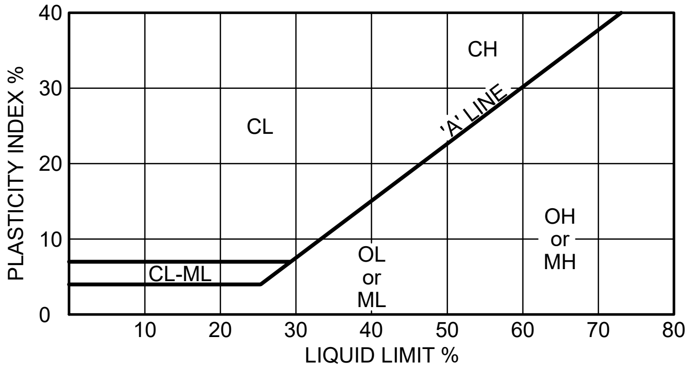
SOIL DESCRIPTION

PARTICLE SIZE

MAJOR DIVISION	SUB-DIVISION	SIZE (mm)
Boulders		>200mm
Cobbles		63 to 200mm
Gravel	Coarse	20 to 63mm
	Medium	6 to 20mm
	Fine	2.36 to 6mm
Sand	Coarse	0.6 to 2.36mm
	Medium	0.2 to 0.6mm
	Fine	0.075 to 0.2mm

0.075mm is the approximate minimum particle size discernible by eye

PLASTICITY CHART



MATERIAL PROPORTIONS

COARSE GRAINED SOILS		FINE GRAINED SOILS		IDENTIFICATION
% Fines	Modifier	% Coarse	Modifier	Field Assessment
≤ 5	Omit or use 'trace'	≤ 15	Omit or use 'trace'	Presence just detectable by feel or eye. Properties little or no different to those of primary soil
> 5 ≤ 12	Describe as 'with clay/silt' as applicable	> 15 ≤ 30	Describe as 'with sand/gravel' as applicable	Presence easily detected by feel or eye. Properties little or no different to those of primary soil
> 12	Prefix soil as 'silty/clayey' as applicable	> 30	Prefix soil as 'sandy/gravelly'	Presence obvious by feel or eye. Properties of soil are altered from those of the primary soil

COHESIVE SOILS - CONSISTENCY TERMS

LOG SYMBOL	TERM	UNDRAINED STRENGTH	FIELD ASSESSMENT
VS	Very Soft	<12kPa	Exudes between fingers when squeezed
S	Soft	12 - 25kPa	Can be moulded by light finger pressure
F	Firm	25 - 50kPa	Can be moulded by strong finger pressure
St	Stiff	50 -100kPa	Cannot be moulded by fingers. Can be indented by thumb
VSt	Very Stiff	100 - 200kPa	Can be indented by thumb nail
H	Hard	> 200kPa	Can be indented by thumb nail with difficulty

GRANULAR SOILS - DENSITY

LOG SYMBOL	TERM	DENSITY INDEX (%)
VL	Very Loose	< 15
L	Loose	15 - 35
MD	Medium Dense	35 - 65
D	Dense	65 - 85
VD	Very Dense	> 85

MOISTURE CONDITION

LOG SYMBOL	TERM	FIELD ASSESSMENT
D	Dry	Clay and silt are hard, friable, powdery, well dry of plastic limit. Sands and gravels are cohesionless, free running
M	Moist	Feels cool, darkened colour. Cohesive soils can be moulded. Granular soils tend to cohere
W	Wet	Feels cool, darkened in colour. Cohesive soils weakened, free water forms on hands when handling. Granular soils cohere

FIELD ASSESSMENT OF FILL COMPACTION

LOG SYMBOL	TERM
APC	Appears poorly compacted
AMC	Appears moderately compacted
AWC	Appears well compacted

Figure 2

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EXPLANATION NOTES FOR BOREHOLE AND TEST PIT LOGS

ROCK DESCRIPTION

STRENGTH OF INTACT ROCK MATERIAL

LOG SYMBOL	TERM	POINT LOAD INDEX (MPa) Is50	FIELD ASSESSMENT
EL	Extremely Low	Is50 <0.03	Easily remoulded by hand to a material with soil properties
VL	Very Low	0.03 ⩽ Is50 < 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; pieces up to 30mm thick can be broken by finger pressure
L	Low	0.1 ⩽ Is50 < 0.3	Easily scored with knife; indentations 1mm to 3mm after firm blows with pick point; core 150mm long and 50mm diameter can be broken by hand; sharp edges of core friable
M	Medium	0.3 ⩽ Is50 < 1.0	Readily scored with knife; core 150mm long and 50mm diameter can be broken by hand with difficulty
H	High	1 ⩽ Is50 < 3	Core 150mm long and 50mm diameter cannot be broken by hand but can be broken by single firm blow of pick; rock rings under hammer
VH	Very High	3 ⩽ Is50 < 10	Hand held specimen breaks with pick after more than one blow; rock rings under hammer
EH	Extremely High	10 ⩽ Is50	Specimen requires many pick blows to break intact rock, rock rings under hammer

ROCK WEATHERING CLASSIFICATION

LOG SYMBOL	TERM	DEFINITION
EW	Extremely Weathered	Rock is weathered to such an extent that it has soil properties , i.e. it iether disintegrates or can be remoulded in water
DW	Distinctly Weathered	Rock strength usually changed by weathering. May be discoloured. Porosity may be increased by leaching, or may be decreased by deposition of weathering products in pores
SW	Slightly Weathered	Rock is slightly discoloured but shows little or no change of strength from fresh rock
FR	Fresh	Rock shows no sign of decomposition or staining

ROCK MASS PROPERTIES

TERM	SEPARATION OF STRATIFICATION PLANES	TERM	DESCRIPTION
Thinly laminated	< 6mm	Fragmented	Primarily fragments < 20mm length and mostly of width < core diameter
Laminated	6mm to 20mm	Highly fractured	Core lengths generally less than 20mm to 40mm with occasional fragments
Very thinly bedded	20mm to 60mm		
Thinly bedded	60mm to 200mm	Fractured	Core lengths mainly 30mm to 100mm with occasional shorter and longer pieces
Medium bedded	0.2m to 0.6m	Slightly fractured	Core lengths generally 0.3m to 1.0m with occasional longer and shorter sections
Thickly beddded	0.6m to 2.0m		
Massive	> 2m	Unbroken	Core has no fractures

ROCK QUALITY DESIGNATION (RQD). RQD is calculated for each core run. The RQD is the sum of the length of all pieces of rock core longer than 100mm expressed as a percentage of the total core run length.

CORE RECOVERY. Core recovery is calculated for each core run. Core recovery is the total length of core, rock or soil, recovered expressed as a percentage of the total length of the core run.

ROCK DEFECT DESCRIPTION - Description order: type, orientation in degrees, infill, infill thickness, surface shape, roughness

DEFECT TYPE		INFILL		INFILL THICKNESS		SURFACE SHAPE		ROUGHNESS	
LOG SYMBOL	TERM	LOG SYMBOL	TERM	LOG SYMBOL	TERM	LOG SYMBOL	TERM	LOG SYMBOL	TERM
BP	Bedding parting	**KL**	Clean	**V**	Veneer	**PL**	Planar	**SL**	Slickensided
JT	Joint	**CL**	Clay		<1mm thick	**CV**	Curved	**PO**	Polished
FT	Fault	**CA**	Carbonate	**SN**	Stain	**IR**	Irregular	**SO**	Smooth
SM	Seam	**RF**	Rock fragments		<1mm thick	**UN**	Undular	**RO**	Rough
SH	Sheared zone	**RC**	Rock fragments and clay	**5**	5mm thick	**ST**	Stepped	**VR**	Very Rough
CR	Crushed seam								
IF	Infilled zone								
FR	Fractured zone								

Figure 3

APPENDIX C

Bore Logs

GeoAust
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T: (03) 8787 5663 F: (03) 8782 0276
E-mail: enquiries@geoaust.com.au

BOREHOLE LOG

TEST LOCATION
1
SHEET 1 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.34m
DATUM: AHD
DATE: 20/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
100mm Diameter Auger		0.11		-	**FILL: Concrete**	-	-							50mm diameter PVC standpipe installed to 13.2m depth. Screened from 7.2m to 13.2m.
		0.15		-	**FILL: Bituminous Seal, 10mm thick over Gravel,** medium to coarse grained, angular, igneous, grey	-	-							
		0.3		-		-	-							
		0.42		-	**FILL: Bricks**	-	-							
				-	**FILL: Concrete**	Moist (MC>PL)	St				0.5			
		0.85			**FILL: Sandy Silt,** low plasticity, mottled grey and dark grey, with Clay fines									
				CL	**CLAY:** medium plasticity, yellow-brown mottled grey and orange-brown	Moist (MC>PL)	St VSt				1.0			S > 140kPa
											1.5			S > 140kPa
		2		CL	**Silty CLAY:** low to medium plasticity, pale grey mottled yellow-brown, Silt content increasing with depth	Moist (MC<PL)	VSt to H				2.0			S > 140kPa
		2.5		ML	**Clayey SILT:** low plasticity, pale grey mottled yellow-brown, Clay content decreasing with depth, trace pockets of Clay		H				2.5			S > 140kPa
											3.0			S > 140kPa 8/11/12 N = 23.
											3.5			
											4.0			
		4.3		SM	**Silty SAND:** fine to medium grained, pale grey with yellow-brown and orange-brown, Silt content decreasing with depth	Moist	D to VD				4.5			8/21/26 N = 47.
		5									5.0			

Refer Appendices for definition of logging terms and symbols

Figure 1

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BOREHOLE LOG

TEST LOCATION
1
SHEET 2 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
RL: 46.34m
DRILLED BY: Gem Drilling
DATUM: AHD
LOGGED BY: A.M
DATE: 20/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
100mm Diameter Auger				SM	**Silty SAND:** fine to coarse grained, yellow-brown and pale grey, trace fine to medium grained rounded Quartzose Gravel	Moist	D to VD				5.5 6.0 6.5		☒	24/37/13 blows for 50mm penetration: N > 50.
	24/3/25 ▼	7		-	**SILTSTONE:** orange-brown and grey	EW to DW	EL to VL				7.0			
N.M.L.C Diamond Coring		7.55		-	**SILTSTONE:** orange-brown with grey, bedding poorly defined, fractured, defects are joints, 0° to 70°, planar to irregular, rough, iron stained, trace Clay infill	DW	VL L to M				7.5 8.0		☒	20 blows for 50mm penetration: SPT. Hammer double bouncing. Refusal. START CORING AT 7.55m RUN 1 (7.55m - 8.8m) 70% CORE RECOVERY RQD = 25%
				-	8.17m - quartz rich seam, 260mm thick		H							
		8.43		-	**CORE LOSS**	-	-				8.5			
		8.8		CL	**Silty CLAY:** low plasticity, mottled orange-brown and grey, with fine to medium grained Gravel	Moist (MC>PL)	VSt				9.0			RUN 2 (8.8m - 10.3m) 44% CORE RECOVERY RQD = 0%
		9.46		-	**CORE LOSS**	-	-				9.5 10.0			

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BOREHOLE LOG

TEST LOCATION
1
SHEET 3 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
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253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
RL: 46.34m
DRILLED BY: Gem Drilling
DATUM: AHD
LOGGED BY: A.M
DATE: 20/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
N.M.L.C Diamond Coring					**CORE LOSS**	-	-							
		10.3		-	**SILTSTONE:** grey and orange-brown, bedding dipping at approximately 70°, fractured to slightly fractured, defects are joints, mostly 0° to 45°, lesser 45° to 70°, mostly planar, lesser irregular, iron stained, extremely weathered veneer or clean	EW	EL							RUN 3 (10.3m - 10.7m) 41% CORE RECOVERY RQD = 0%
		10.47		-	**CORE LOSS**	-	-				10.5			
		10.7		-	**SILTSTONE:** grey and orange-brown, bedding dipping at approximately 70°, fractured to slightly fractured, defects are joints, mostly 0° to 45°, lesser 45° to 70°, mostly planar, lesser irregular, iron stained, Clay veneer or clean	EW	EL				11.0 11.5			RUN 4 (10.7m - 11.8m) 86% CORE RECOVERY RQD = 34%
		11.65		-	**CORE LOSS**	-	-							
		11.8		-	**SILTSTONE:** grey and orange-brown, bedding dipping at approximately 70°, fractured to slightly fractured, defects are joints, mostly 0° to 45°, lesser 45° to 70°, mostly planar, lesser irregular, iron stained, Clay veneer or clean	EW	EL				12.0 12.5 13.0			RUN 5 (11.8m - 13.39m) 92% CORE RECOVERY RQD = 79%
		13.26		-	**CORE LOSS**	-	-							
		13.39		-	**SILTSTONE:** grey and orange-brown, bedding dipping at approximately 70°, fractured to slightly fractured, defects are joints, mostly 0° to 45°, lesser 45° to 70°, mostly planar, lesser irregular, iron stained, Clay veneer or clean	EW DW EW DW	EL VL EL M VL				13.5 14.0 14.5			RUN 6 (13.39m - 14.8m) 100% CORE RECOVERY RQD = 56% RUN 7 (14.8m - 16.26m) 100% CORE RECOVERY RQD = 34%
		15									15.0			

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Figure 3

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BOREHOLE LOG

TEST LOCATION
1
SHEET 4 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.34m
DATUM: AHD
DATE: 20/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
N.M.L.C Diamond Coring			× × ×	-	**SILTSTONE:** grey and orange-brown, bedding dipping at approximately 70°, fractured to slightly fractured, defects are joints, mostly 0° to 45°, lesser 45° to 70°, mostly planar, lesser irregular, iron stained, Clay veneer or clean	DW	VL							
						EW to DW	EL to VL							
						DW	VL with L seams				15.5			
							L				16.0			RUN 8 (16.26m - 17.86m) 100% CORE RECOVERY RQD = 64%
											16.5			
											17.0			
											17.5			RUN 9 (17.86m - 19.36m) 100% CORE RECOVERY RQD = 51%
							M				18.0			
											18.5			
											19.0			RUN 10 (19.36m - 20.86m) 100% CORE RECOVERY RQD = 73%
											19.5			
		20									20.0			

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Figure 4

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BOREHOLE LOG

TEST LOCATION
1
SHEET 5 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
RL: 46.34m
DRILLED BY: Gem Drilling
DATUM: AHD
LOGGED BY: A.M
DATE: 20/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
N.M.L.C Diamond Coring		22.32	× × ×	-	**SILTSTONE:** grey and orange-brown, bedding dipping at approximately 70°, fractured to slightly fractured, defects are joints, mostly 0° to 45°, lesser 45° to 70°, mostly planar, lesser irregular, iron stained, Clay veneer or clean	DW	M				20.5 21.0 21.5 22.0			RUN 11 (20.86m - 22.32m) 100% CORE RECOVERY RQD = 44%
					END OF BOREHOLE LOG AT 22.32M									

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Figure 5

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BOREHOLE LOG

TEST LOCATION
2
SHEET 1 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.40m
DATUM: AHD
DATE: 24/02/2025

Method	Ground Water	Depth	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample (DS / U60 / ES)	Depth	DCP Test	Test	Comments and Test Results
127mm Diameter Auger		0.11	-	**FILL: Concrete**	-	-					50mm diameter PVC standpipe installed to 13.0m depth. Screened from 7.0m to 13.0m.
		0.45	-	**FILL: Bituminous Seal over Gravel,** medium to coarse grained, angular, igneous, grey	Moist	-					
		0.6	ML	**Sandy SILT:** low plasticity, yellow-brown	Moist (MC>PL)	St		0.5			
			CL	**CLAY:** medium plasticity, yellow-brown mottled grey trace red-brown						◢	S = 70kPa
						VSt		1.0			
								1.5		◢	S > 140kPa
			-	2.0m - tending Sandy with depth				2.0			
		2.5	SM	**Silty SAND:** fine to medium grained, with minor coarse grained fraction, orange-brown and yellow-brown with grey trace red-brown, with Clay fines and bands of Clayey Sand and Sandy Clay of hard consistency	Moist	D		2.5			
								3.0		☒	13/18/21 N = 39.
Wash Boring								3.5			
		4	SM	**Silty SAND:** fine to coarse grained, red-brown and yellow-brown				4.0		☒	17/25/25 blows for 130mm penetration: N > 50.
								4.5			
		5						5.0			

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BOREHOLE LOG

TEST LOCATION
2
SHEET 2 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.40m
DATUM: AHD
DATE: 24/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
Wash Boring				SC	**Interbedded Clayey SAND:** fine to coarse grained, pale grey with yellow-brown, **and Silty SAND:** fine to coarse grained, pale grey and yellow-brown, with Gravelly seams, fine to medium grained, quartzose, and seams of Clayey Silt and Clay of very stiff to hard consistency	Moist	D				5.5 6.0 6.5		☒	8/15/24 N = 39.
	24/3/25	6.7		ML	**Clayey SILT:** low to medium plasticity, yellow-brown and pale grey	Moist (MC<PL)	H				7.0 7.5		☒	1/9/9 N = 18. Excessive Fall In PP = >400kPa Sample cracks
		8		-	**SILTSTONE:** grey	EW to DW	EL to VL				8.0 8.5			
N.M.L.C Diamond Coring		8.68		-	**SILTSTONE:** grey and orange-brown, bedding dipping at 45° to 55°, fractured with highly fractured and fragmented seams, defects are joints, mostly planar or irregular, 0° to 90°, smooth to rough, clean, iron stained or Clay veneer or infill	EW DW EW	EL VL L EL				9.0 9.5 10.0			START CORING AT 8.68m RUN 1 (8.68m - 8.92m) 100% CORE RECOVERY RQD = 0% RUN 2 (8.92m - 10.42m) 100% CORE RECOVERY RQD = 7%

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BOREHOLE LOG

TEST LOCATION
2
SHEET 3 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
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LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.40m
DATUM: AHD
DATE: 24/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
N.M.L.C Diamond Coring					**SILTSTONE:** grey and orange-brown, bedding dipping at 45° to 55°, fractured with highly fractured and fragmented seams, defects are joints, mostly planar or irregular, 0° to 90°, smooth to rough, clean, iron stained or Clay veneer or infill	EW	EL							
						DW	L to M							RUN 3 (10.42m - 11.92m) 90% CORE RECOVERY RQD = 0%
						EW	EL				10.5			
						DW	L				11.0			
				-	11.35m - fractured, trace fragmented seams	EW	EL				11.5			
		11.77		-	**CORE LOSS**	-	-							
		11.92		- - - -	**SILTSTONE:** grey and orange-brown, bedding dipping at 45° to 55°, fractured, trace fragmented seams, defects are joints, mostly planar or irregular, 0° to 90°, smooth to rough, clean, iron stained or Clay veneer or infill 12.56m - Clay seam, 11mm thick 12.7m - Clay seam, 3mm thick 12.72m - Clay seam, 5mm thick	EW	EL				12.0 12.5 13.0			RUN 4 (11.92m - 13.42m) 100% CORE RECOVERY RQD = 0%
						DW	L							RUN 5 (13.42m - 14.92m) 100% CORE RECOVERY RQD = 73%
							VL				13.5			
						EW to DW	EL to VL							
						DW	L							
						EW to DW	EL to VL				14.0			
						DW	VL with EL seams				14.5			
							L							
		15				EW to DW	EL to VL				15.0			

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BOREHOLE LOG

TEST LOCATION
2
SHEET 4 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
RL: 46.40m
DRILLED BY: Gem Drilling
DATUM: AHD
LOGGED BY: A.M
DATE: 24/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
N.M.L.C Diamond Coring				-	**SILTSTONE:** grey and orange-brown, bedding dipping at 45° to 55°, fractured, trace fragmented seams, defects are joints, mostly planar or irregular, 0° to 90°, smooth to rough, clean, iron stained or Clay veneer or infill	EW to DW	EL to VL							RUN 6 (14.92m - 16.42m) 100% CORE RECOVERY RQD = 65%
				-		DW	VL							
					15.18m - Clay seam, 9mm thick						15.5			
				-	15.76m - Clay seam, 5mm thick		M							
				-	15.93m - Clay seam, 15mm thick		L				16.0			
											16.5			RUN 7 (16.42m - 17.92m) 100% CORE RECOVERY RQD = 55%
											17.0			
				-	17.36m - Clay seam, 24mm thick						17.5			
											18.0			RUN 8 (17.92m - 19.42m) 100% CORE RECOVERY RQD = 47%
				-	18.26m - Clay seam, 6mm thick									
				-	18.49m - Clay seam, 16mm thick						18.5			
							M				19.0			
											19.5			RUN 9 (19.42m - 20.92m) 100% CORE RECOVERY RQD = 67%
		20									20.0			

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BOREHOLE LOG

TEST LOCATION
2
SHEET 5 of 5

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LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.40m
DATUM: AHD
DATE: 24/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample			Depth	DCP Test	Test	Comments and Test Results
								DS	U60	ES				
N.M.L.C Diamond Coring		22.42	× × ×	-	**SILTSTONE:** grey and orange-brown, bedding dipping at 45° to 55°, fractured, trace fragmented seams, defects are joints, mostly planar or irregular, 0° to 90°, smooth to rough, clean, iron stained or Clay veneer or infill	DW	M				20.5 21.0 21.5 22.0			RUN 10 (20.92m - 22.42m) 100% CORE RECOVERY RQD = 58%
					END OF BOREHOLE LOG AT 22.42M									

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Figure 10

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BOREHOLE LOG

TEST LOCATION
3
SHEET 1 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.37m
DATUM: AHD
DATE: 4/03/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
127mm Diameter Auger		0.1		-	**FILL: Concrete**	-	-							50mm diameter PVC standpipe installed to 12.5m depth. Screened from 6.5 to 12.5m
		0.23		-	**FILL: Bituminous Seal, 20mm thick over Gravel,** medium to coarse grained, igneous, grey	-	-							
				-	**FILL: Mixture of Clay,** medium plasticity, grey and brown, **Silty Sand,** fine to coarse grained, brown, **and Sandy Silt,** low plasticity, grey and brown, trace fine to coarse grained Gravel and cobbles	Moist (MC>PL)	VSt				0.5			
											1.0			
											1.5		☒	10/16/20 N = 36.
		1.8		SC	**Clayey SAND:** fine to coarse grained, red-brown, Clay content decreasing with depth	Moist	MD to D				2.0			
											2.5			
		2.7		SM	**Silty SAND:** fine to coarse grained, mottled grey and brown, with fine to coarse grained Quartzose Gravel, with Clayey seams		D							
											3.0		☒	14/18/25 N = 43.
											3.5			
											4.0			
											4.5		☒	12/19/18 N = 37.
		5									5.0			

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Figure 11

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BOREHOLE LOG

TEST LOCATION
3
SHEET 2 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.37m
DATUM: AHD
DATE: 4/03/2025

Method	Ground Water	Depth	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Comments and Test Results
Wash Boring			SM	**Silty SAND:** fine to coarse grained, mottled grey and brown, with fine to coarse grained Quartzose Gravel, with Clayey seams	Moist	D	SPT Not Attempted. Hole collapse to 5.2m depth.
	24/3/25 ▼	6.9	-	**SANDSTONE:** fine grained, red-brown, yellow-brown and grey, fractured, defects are joints, 0° to 90°, planar, smooth, clean	DW	L	START CORING AT 7.2m RUN 1 (7.2m - 8.7m) 97% CORE RECOVERY RQD = 0%
N.M.L.C Diamond Coring		8.25	-	**SILTSTONE:** yellow-brown mottled grey, bedding dipping at approximately 60°	EW	EL	
		8.65			DW	L	
		8.7	-	**CORE LOSS**	EW	EL	RUN 2 (8.7m - 9.0m) 43% CORE RECOVERY RQD = 0%
		8.83	-	**SILTSTONE:** yellow-brown and pale grey	-	-	
		9	-	**CORE LOSS**	EW	EL	RUN 3 (9.0m - 10.3m) 82% CORE RECOVERY RQD = 55%
			-	**SILTSTONE:** yellow-brown and pale grey	-	-	
					EW	EL	
		10					

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BOREHOLE LOG

TEST LOCATION
3
SHEET 3 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
RL: 46.37m
DRILLED BY: Gem Drilling
DATUM: AHD
LOGGED BY: A.M
DATE: 4/03/2025

Method	Ground Water	Depth	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
N.M.L.C Diamond Coring		10.06	-	**SILTSTONE:** yellow-brown and pale grey	EW	EL							
			-	**CORE LOSS**	-	-							RUN 4 (10.3m - 11.8m) 85% CORE RECOVERY RQD = 0%
		10.52	-	**SILTSTONE:** yellow-brown and pale grey	EW	EL				10.5			
										11.0			
										11.5			RUN 5 (11.8m - 13.3m) 87% CORE RECOVERY RQD = 0%
						EL with VL and L seams				12.0			
										12.5			
										13.0			
		13.1	-	**CORE LOSS**	-	-							RUN 6 (13.3m - 14.8m) 90% CORE RECOVERY RQD = 0%
		13.46	-	**SILTSTONE:** yellow-brown and pale grey	EW	EL				13.5			
										14.0			
						L							
						EL				14.5			RUN 7 (14.8m - 16.3m) 100% CORE RECOVERY RQD = 11%
		14.94								15.0			

Refer Appendices for definition of logging terms and symbols

Figure 13

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BOREHOLE LOG

TEST LOCATION
3
SHEET 4 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
RL: 46.37m
DATUM: AHD
DRILLED BY: Gem Drilling
LOGGED BY: A.M
DATE: 4/03/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
N.M.L.C Diamond Coring				-	**SILTSTONE:** pale grey with yellow-brown and red-brown, distinct bedding dipping at approximately 50°, fractured with highly fractured zones, defects are mostly joints and bedding partings, 0° to 90°, mostly planar, lesser curved or irregular, smooth lesser rough, mostly clean, lesser Clay veneer or infill	DW	L							
											15.5			
						EW	EL				16.0			
						DW	VL							RUN 8 (16.3m - 17.8m) 100% CORE RECOVERY RQD = 79%
						EW	EL							
											16.5			
						DW	L							
											17.0			
							M							
											17.5			
							L							RUN 9 (17.8m - 18.61m) 100% CORE RECOVERY RQD = 27%
											18.0			
							M							
											18.5			
							L							RUN 10 (18.61m - 20.16m) 100% CORE RECOVERY RQD = 70%
							H							
											19.0			
							M							
											19.5			
				-	19.65m - Clay seam, 4mm thick		L							
		20									20.0			

Refer Appendices for definition of logging terms and symbols

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BOREHOLE LOG

TEST LOCATION
3
SHEET 5 of 5

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
RL: 46.37m
DRILLED BY: Gem Drilling
DATUM: AHD
LOGGED BY: A.M
DATE: 4/03/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample			Depth	DCP Test	Test	Comments and Test Results
								DS	U60	ES				
N.M.L.C Diamond Coring		21.66		-	**SILTSTONE:** pale grey with yellow-brown and red-brown, distinct bedding dipping at approximately 50°, fractured with highly fractured zones, defects are mostly joints and bedding partings, 0° to 90°, mostly planar, lesser curved or irregular, smooth lesser rough, mostly clean, lesser Clay veneer or infill	DW	M				20.5 21.0 21.5			RUN 11 (20.16m - 21.66m) 100% CORE RECOVERY RQD = 65%
					END OF BOREHOLE LOG AT 21.66M									

Refer Appendices for definition of logging terms and symbols

Figure 15

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BOREHOLE LOG

TEST LOCATION
4
SHEET 1 of 1

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.37m
DATUM: AHD
DATE: 20/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample			Depth	DCP Test	Test	Comments and Test Results
								DS	U60	ES				
100mm Diameter Auger		0.11		-	**FILL: Concrete**	-	-							
		0.3		-	**FILL: Bituminous Seal, 10mm thick over Gravel,** medium to coarse grained, angular, igneous, grey	Moist	-							
				-	**FILL: Mixture of Sandy Clayey Silt,** low plasticity, grey trace brown; Sand, fine to coarse grained, **and Clay,** medium plasticity, grey, with Gravel, trace ash/slag	Moist (MC>PL)	St				0.5			
											1.0			
											1.5			
											2.0			
	S					Wet (MC>PL)					2.5			
				-	2.6m - Cobbles / Gravel, 200mm thick									
	S	3		-	**FILL: Silty Sand,** fine to coarse grained, pale yellow-brown mottled pale grey, with fine to medium grained Quartzose Gravel	Moist	-				3.0			
		3.3		SM	**Silty SAND:** fine to coarse grained, pale yellow-brown mottled pale grey, with fine to medium grained Quartzose Gravel	Moist	-				3.5			
											4.0			
		4.5									4.5			
					END OF BOREHOLE LOG AT 4.5M									

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Figure 16

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BOREHOLE LOG

TEST LOCATION
5
SHEET 1 of 1

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.38m
DATUM: AHD
DATE: 20/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
100mm Diameter Auger	NOT ENCOUNTERED	0.1	▨	-	**FILL: Concrete**	-	-							
		0.3	▨	-	**FILL: Bituminous Seal, 10mm thick over Gravel,** medium to coarse grained, angular, igneous, dark grey, with fine to coarse grained Sand	Moist	-							
		1.8	▨	-	**FILL: Mixture of Sandy Clayey Silt,** low plasticity, grey trace brown; Sand, fine to coarse grained, **and Clay,** medium plasticity, grey, with Gravel, trace ash/slag	Moist (MC>PL)	-				0.5 1.0 1.5			
					END OF BOREHOLE LOG AT 1.8M									Borehole terminated on initial contact with hard Fill.

Refer Appendices for definition of logging terms and symbols

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BOREHOLE LOG

TEST LOCATION
6
SHEET 1 of 1

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
RL: 46.38m
DRILLED BY: Gem Drilling
DATUM: AHD
LOGGED BY: A.M
DATE: 20/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample			Depth	DCP Test	Test	Comments and Test Results
								DS	U60	ES				
100mm Ø Auger	N/E	0.1	▨	-	**FILL: Concrete**	-	-							
		0.3	▨	-	**FILL: Bituminous Seal, 10mm thick over Gravel,** medium to coarse grained, angular, igneous, dark grey, with fine to coarse grained Sand	Moist	-							
		1.8	▨	-	**FILL: Mixture of Sandy Clayey Silt,** low plasticity, grey trace brown; Sand, fine to coarse grained, **and Clay,** medium plasticity, grey, with Gravel, trace ash/slag	Moist (MC>PL)	-				0.5 1.0 1.5			
					END OF BOREHOLE LOG AT 1.8M									Borehole terminated on initial contact with hard Fill.

Refer Appendices for definition of logging terms and symbols

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BOREHOLE LOG

TEST LOCATION
7
SHEET 1 of 1

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
RL: 46.38m
DRILLED BY: Gem Drilling
DATUM: AHD
LOGGED BY: A.M
DATE: 20/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
100mm Ø Auger	N/E	0.1	▨	-	**FILL: Concrete**	-	-							Two additional bores attempted within 1m radius of Borehole 7 Concrete depth varies from >0.26m to >0.7m.
		0.2	▨	-	**FILL: Gravel,** medium to coarse grained, with bituminous binder, angular, igneous, black	-	-							
		0.7	▨	-	**FILL: Concrete**	-	-				0.5			

END OF BOREHOLE LOG AT 0.7M

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BOREHOLE LOG

TEST LOCATION
8
SHEET 1 of 1

JOB No: 8257
CLIENT: TF 253 Brunswick Pty Ltd
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road, BRUNSWICK
LOCATION: Refer to Test Location Plan (Figure 1)
DRILLED BY: Gem Drilling
LOGGED BY: A.M
RL: 46.37m
DATUM: AHD
DATE: 20/02/2025

Method	Ground Water	Depth	Graphic Log	Classification Symbol	Material description	Moisture / Weathering	Density / Consistency	Sample DS	Sample U60	Sample ES	Depth	DCP Test	Test	Comments and Test Results
100mm Ø Auger	N/E	0.08	▨	-	**FILL: Concrete**	-	-							Two additional bores attempted within 1m radius of Borehole 8
		0.14	▨	-	**FILL: Bituminous Binder, 20mm thick over Gravel,** medium to coarse grained, angular, igneous, grey	-	-							
		0.45	▨	-	**FILL: Masonry**	-	-							

END OF BOREHOLE LOG AT 0.45M

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Figure 20

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APPENDIX D

Core Photographs

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Photograph of Core Recovered from Borehole 1

JOB No: 8257
PROJECT: Proposed Student Accommodation Development
LOCATION: 253-259 Brunswick Road, BRUNSWICK

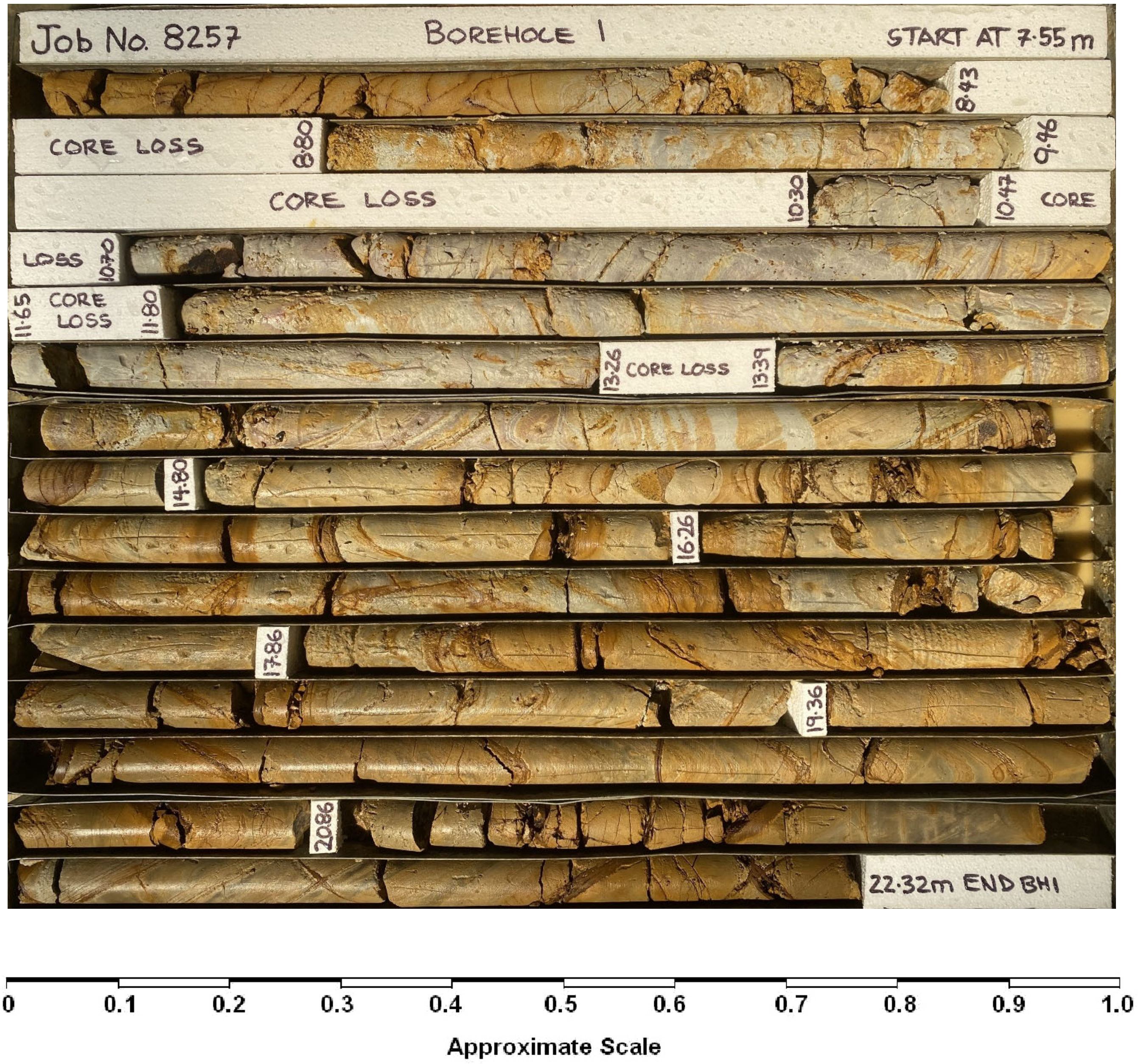

Figure 1

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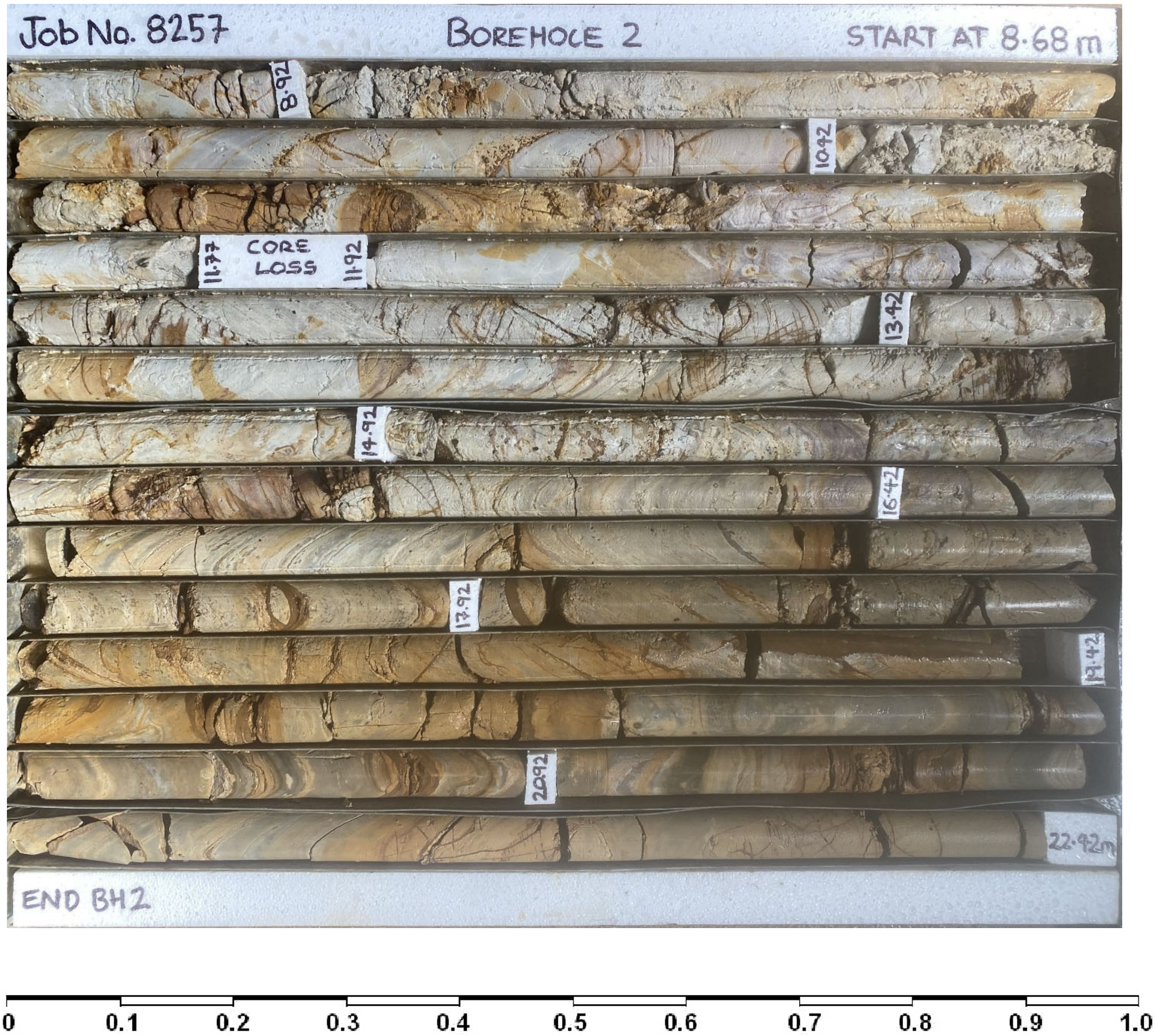
Photograph of Core Recovered from Borehole 2

JOB No: 8257
PROJECT: Proposed Student Accommodation Development
LOCATION: 253-259 Brunswick Road, BRUNSWICK



Approximate Scale

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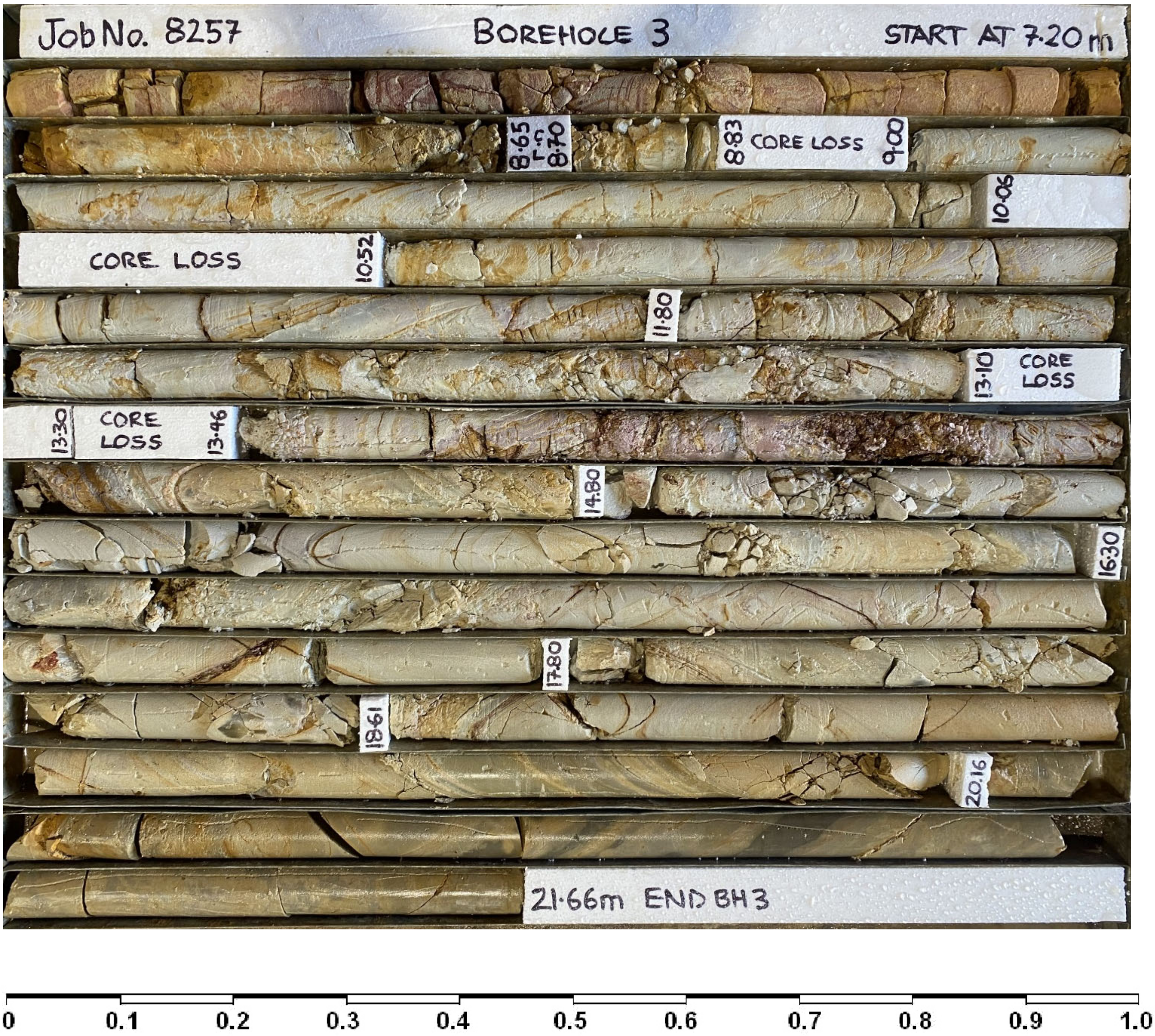
Photograph of Core Recovered from Borehole 3

JOB No: 8257
PROJECT: Proposed Student Accommodation Development
LOCATION: 253-259 Brunswick Road, BRUNSWICK



Approximate Scale

Figure 3

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APPENDIX E

Laboratory Test Results

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POINT LOAD STRENGTH INDEX

TEST RESULTS

JOB NO: 8257

PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road
BRUNSWICK

Borehole Number	Sample Depth (m)	Material	Is(50)	Rock Strength
1	7.78	Siltstone	0.29	Low
1	11.30	Siltstone	0.02	Extremely Low
1	12.40	Siltstone	0.04	Very Low
1	13.90	Siltstone	0.06	Very Low
1	15.00	Siltstone	0.09	Very Low
1	16.50	Siltstone	0.18	Low
1	17.70	Siltstone	0.31	Medium
1	18.28	Siltstone	0.38	Medium
1	19.50	Siltstone	0.50	Medium
1	20.15	Siltstone	0.52	Medium
1	22.00	Siltstone	0.35	Medium
2	9.90	Siltstone	0.02	Extremely Low
2	10.30	Siltstone	0.32	Medium
2	12.10	Siltstone	0.02	Extremely Low
2	14.00	Siltstone	0.04	Very Low
2	14.70	Siltstone	0.08	Very Low
2	16.10	Siltstone	0.18	Low
2	17.80	Siltstone	0.28	Low
2	18.10	Siltstone	0.22	Low
2	19.10	Siltstone	0.36	Medium
2	20.30	Siltstone	0.39	Medium

Australian Standard AS 4133.4.1 - 2007

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POINT LOAD STRENGTH INDEX

TEST RESULTS

JOB NO: 8257
PROJECT: Proposed Student Accommodation Development
253-259 Brunswick Road
BRUNSWICK

Borehole Number	Sample Depth (m)	Material	Is(50)	Rock Strength
2	21.10	Siltstone	0.39	Medium
2	22.00	Siltstone	0.44	Medium
3	7.41	Siltstone	0.09	Very Low
3	9.60	Siltstone	0.03	Extremely Low
3	10.90	Siltstone	0.02	Extremely Low
3	12.15	Siltstone	0.02	Extremely Low
3	14.61	Siltstone	0.03	Extremely Low
3	17.00	Siltstone	0.18	Low
3	17.70	Siltstone	0.25	Low
3	18.90	Siltstone	0.35	Medium
3	20.70	Siltstone	0.49	Medium
3	21.50	Siltstone	0.52	Medium