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CADDENS ESTATE PTY LTD

Geotechnical Investigation

68 & 80 O'Connell Street, Caddens NSW

E25834.G03_Rev3
18 August 2025

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Author	Technical Reviewer
	
Salah Khalifa **Geotechnical Engineer**	**Orville Vasquez** **Associate Geotechnical Engineer**

Revision	Details	Date	Amended By
	Original	18 January 2023	
1	Updates on Architectural Drawings	7 March 2023	MC
2	Updates on Architectural Drawings and FFL	8 March 2024	JB
3	Additional Geotechnical Investigations	1 August 2025	S2
4	Edited report as per client's comments	8 August 2025	S2
5	Edited report as per client's comments	18 August 2025	S2

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1. Introduction

1.1 Background

At the request of Caddens Estate Pty Ltd (the Client), EI Australia (EI) has carried out a Geotechnical Investigation (GI) for the proposed development at 68 & 80 O'Connell Street, Caddens NSW (the Site).

This GI has been prepared by EI for Caddens Estate Pty Ltd to accompany a State Significant Development Application (SSDA) for a mixed use development (including in-fill affordable housing) at 68-80 O'Connell Street, Caddens, within the Penrith Local Government Area (LGA).

This GI report has been prepared to provide advice and recommendations to assist in the preparation of designs for the proposed development. The investigation has been carried out in accordance with the agreed scope of works outlined in EI's proposal referenced P20860.4_Rev3, dated 7 May 2025.

1.2 Proposed Development

The following documents, supplied by the Client, were used to assist with the preparation of this GI report:

- Architectural Drawings prepared by Group GSA, project number A252106, Drawing Nos: SSDA0000-SSDA3026, Issue P2,dated 22 July 2025;
- Site survey plan prepared by Ramsay Surveyors Pty Ltd – Drawing Ref No. 8966, Sheet 1 to 7, dated on 5 February 2021; and
- Request for Geotechnical Proposal prepared by Northrop, dated 19 October 2022.

Based on the provided documents and clarifications from Holdmark, EI understands that the proposed development involves the following:

- Demolition of an existing at grade car park
- Construction of 4 x 4 - 6 storey shop top housing buildings at 68 O'Connell Street, Caddens, comprising:
    - 177 residential dwellings
    - Ground floor commercial retail, and medial uses
- Construction of a single storey commercial premises (shop) located at the southwestern corner of 68 O'Connell Street
- Construction of basement car parking to service the shop top housing, ground floor commercial and commercial premises at the southwestern corner
- Construction of 11 x 4 – 7 storey residential flat buildings at 80 O'Connell Street, including:
    - 305 residential dwellings
    - Basement car parking
- Internal roads
- Associated infrastructure and services

- Landscaping and communal open spaces including a ‘public square’

EI understand that No.68&80O’Connell Street has a proposed layout of the basement and the design Finish Floor Level (FFL) of the lowest basement level is RL 38.90m and RL 55.3m to 49.6 AHD, respectively . A bulk excavation Level (BEL) is assumed to be 38.6m and 55.0m to 49.3m AHD, respectively, including the basement slab thickness.

To achieve the BEL, excavation depths from 4.4m to 10.9m Below Existing Ground Level (BEGL) have been estimated. Locally deeper excavations may be required for footings, lift overrun pits, crane pads, and service trenches.

1.3 Objectives

This report has been prepared in response to the requirements contained within the Secretary’s Environmental Assessment Requirements (SEARs) dated 14 March 2025 (SSD-80875966)

The objective of the GI was to assess the existing site surface and subsurface conditions at nine borehole locations, and to provide preliminary geotechnical advice and recommendations addressing the following:

- Excavation methodologies and monitoring requirements;
- Groundwater considerations;
- Vibration considerations;
- Excavation support requirements, including preliminary geotechnical design parameters for retaining walls and shoring systems;
- Building foundation options, including;
  - Preliminary design parameters.
  - Earthquake loading factor in accordance with AS1170.4:2007.
- The requirement for additional geotechnical works.

1.4 Scope of Works

The scope of works for the GI included:

- Preparation of a Work Health and Safety Plan;
- Review of relevant geological maps for the project area;
- Site walkover inspection by a Geotechnical Engineer to assess topographical features and site conditions;
- Scanning of proposed borehole locations for buried conductive services using a licensed service locator with reference to Dial Before You Dig (DBYD) plans;
- Concrete Diatube coring through the existing concrete surfacing at two borehole locations to enable access to the subsoils;
- Auger drilling of thirteen (13) boreholes (BHA1M, BHA4, BHA7M, BHC1, BHC7, BHD4M, BHG1M, BHH4, BHH7M, BH101M, BH102, BH103M and BH104M) by a track-mounted drill rig using solid flight augers equipped with a ‘Tungsten-Carbide’ (T-C) bit. The boreholes were auger drilled to depths as shown in **Table1-1** below:

Table 1-1 Augering and Rock Coring Depths

Borehole ID	Augering		Rock Coring	
	Depth (m)	RL (m AHD)	Depth (m)	RL (m AHD)
BHA1M	4.70	44.30	10.10	38.90
BHA4	4.60	44.40	10.48	38.52
BHA7M	4.25	45.25	10.85	38.65
BHC1	9.90	43.40	14.70	38.60
BHC6	1.60	52.70	15.20	39.10
BHD4M	6.15	47.35	10.10	43.40
BHG1M	4.60	50.50	9.75	45.35
BHH4	2.70	56.30	7.80	51.20
BHH7M	2.30	60.70	10.22	52.78
BH101M	7.40	41.80	20.70	28.50
BH102	6.00	49.30	16.57	38.73
BH103M	7.07	47.83	15.70	39.20
BH104M	7.17	50.83	15.90	42.10

- Standard Penetration Testing (SPT) was carried out (as per AS 1289.6.3.1-2004), where possible, during auger drilling of the boreholes to assess soil strength/relative densities.
- Measurements of groundwater seepage/levels, where possible, in the augered sections of the boreholes during and shortly after completion of auger drilling;
- The strength of the bedrock in the augered sections of the boreholes was assessed by observation of the auger penetration resistance using a T-C drill bit and examination of the recovered rock cuttings. It should be noted that rock strengths assessed from augered boreholes are approximate and strength variances can be expected.
- The approximate surface levels shown on the borehole logs were interpolated from spot levels shown on the supplied survey plan. Approximate borehole locations are shown on **Figure 2**;
- Continuation of all nine boreholes using NMLC diamond coring techniques to termination depths shown above in **Table 1-1**. The rock core photographs are presented in **Appendix A**;
- Borehole BHA1M, BHA7M, BHD4M, BHG1M BHH7M,BH101M,BH103M and BH104M were converted into groundwater monitoring standpipe wells installed to depths of 8.0m BEGL (RL 41.0m AHD), 9.0m BEGL (RL 40.5m AHD), 8.8m BEGL (RL 44.7m AHD), 4.0m BEGL (RL 51.1m AHD) 8.5m BEGL (RL 54.5m AHD), 11.6m BEGL (RL 37.6m AHD), 8.0m BEGL (RL 46.9m AHD) and 5.2m BEGL (RL 52.8m AHD),respectively, to allow for long-term groundwater monitoring. The well construction details of the installed wells including the screened zones are presented in the monitoring well logs;
- Boreholes BHA4, BHC1, BHC6, BHH4 and BH102 were backfilled with drilling spoils;

- Soil and rock samples were sent to STS Geotechnics Pty Ltd (STS) ,SGS Australia (SGS) and Geotech Pty Ltd which are National Australian Testing Authority (NATA) accredited laboratories, for testing and storage; and
- Preparation of this GI report.

EI's Geotechnical Engineer was present full-time onsite to set out the borehole locations, direct the testing and sampling, log the subsurface conditions and record groundwater levels.

1.5 Constraints

The GI was limited by the intent of the investigation. The discussions and advice presented in this report are preliminary and intended to assist in the preparation of initial designs for the proposed development. Further additional investigation in the form of boreholes of the site is required. Further geotechnical inspections should be carried out during construction to confirm the geotechnical and groundwater models, and the preliminary design parameters provided in this report.

2. Site Description

2.1 Site Description and Identification

The site identification details and associated information are presented in **Table 2-1** below while the site locality is shown on **Figure 1.** An aerial photograph of the site is presented in **Plate 1** below.

Table 2-1 Summary of Site Information

Information	Detail
Street Address	68 & 80 O'Connell Street, Caddens NSW
Lot and Deposited Plan (DP) Identification	Lot 1 and 2 in DP 1268507
Brief Site Description	At the time of our investigation, the site was occupied by a carpark area with asphalt pavement at the western portion and vacant grassy area on the eastern portion. There is an existing asphalt paved road that runs through the middle eastern portion of the site.
Site Area	The site area is approximately 64000m^2.

Plate 1: Aerial photograph of the site (source: Sixmaps, accessed 18 August 2025)

2.2 Local Land Use

The site is situated within an area of residential use. Current uses on surrounding land at the time of our presence on site are described in **Table 2-2** below. For the sake of this report, the site boundary adjacent to O'Connell Street shall be adopted as the southern site boundary.

Table 2-2 Summary of Local Land Use

Direction Relative to Site	Land Use Description
North	Vacant, grassy land.
East	Vacant, grassy land.
South	O'Connell Street, a two-lane asphalt paved road, beyond this road are one to two storey residential dwellings.
West	Caddens Corner Shopping Centre, a single-storey commercial building with no basements and as advised by the client there is an existing sub terranean parking off O'Connell Street, adjacent to the childcare centre

2.3 Regional Setting

The site topography and geological information for the locality is summarised in **Table 2-3** below**.**

Table 2-3 Topographic and Geological Information

Attribute	Description
Topography	The site is located on the low north side of the road within gently (3° to 4°) northwest dipping topography with site levels varying from R.L. 48.5m at the northwest site corner to R.L. 66.2m at the southeast site corner.
Regional Geology	Information on regional sub-surface conditions, referenced from the Department of Mineral Resources Geological Map Penrith 1:100,000 Geological Series Sheet 9030 (Edition 1) 1991, indicates the site to be underlain by Bringelly Shale (Rwb), which consists of shale, carbonaceous claystone, laminite, fine to medium-grained lithic sandstone, rare coal and tuff.

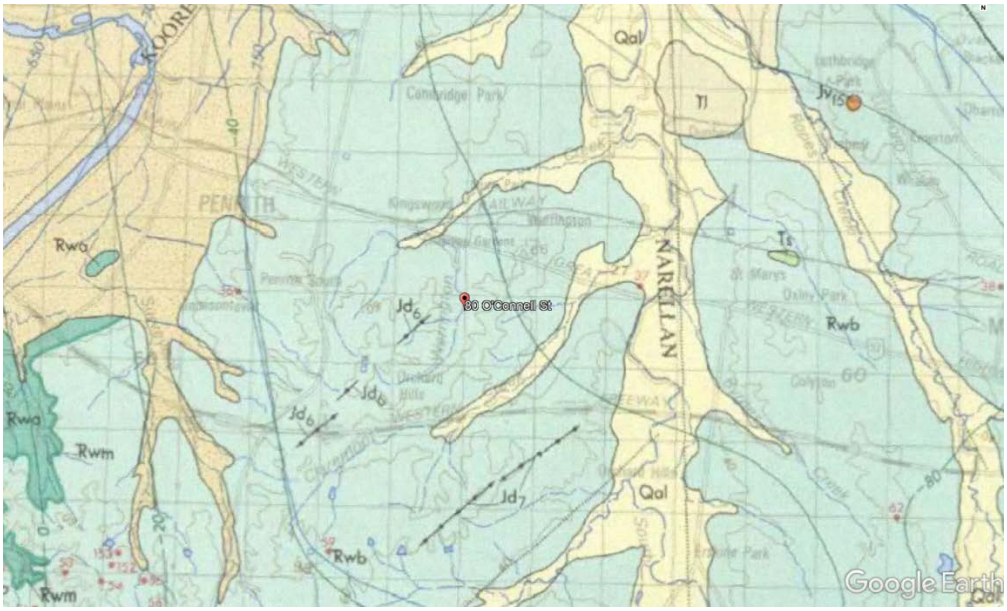

Plate 2: Excerpt of geological map showing location of site.

3. Investigation Results

3.1 Stratigraphy

For the development of a site-specific geotechnical model, the stratigraphy observed in the GI has been grouped into five geotechnical units. A summary of the subsurface conditions across the site, interpreted from the assessment results, is presented in **Table 3-1** below. More detailed descriptions of subsurface conditions at each borehole location are available on the borehole logs presented in **Appendix A**. The details of the methods of soil and rock classifications, explanatory notes and abbreviations adopted on the borehole logs are also presented in **Appendix A.**

Table 3-1 Summary of Subsurface Conditions

Unit	Material[2]	Depth to Top of Unit (m BEGL)[1]	RL of Top of Unit (m AHD)[1]	Observed Thickness (m)	Comments
1	**Topsoil/Fill**	0.00	49.0 to 63.0	0.1 to 3.3	Sandy clay, sandy gravel, gravelly sand, gravelly sandy clay, silty gravel and silty clay with rootlets and fine to medium grained sand and igneous gravels. 40 to 50mm asphalt pavement was observed in the carpark area.
2	**Residual Soil[3]**	0.1 to 3.3	48.4 to 62.9	0.8 to 6.0	Medium to high plasticity, stiff to very stiff silty clay and sandy clay with trace ironstone gravels, grading into extremely weathered materials with depth. SPT values ranged from 6 to refusal, indicated by hammer bounce.
3	**Very Low Strength Bedrock (Siltstone / Shale / Sandstone)**	0.2 to 9.3	44.0 to 62.1	1.4 to 7.3	Distinctly weathered very low strength sandstone / shale / siltstone bedrock. Core loss observed from depths between 5.0m to 5.3m in BHA4, from depths between 2.3m to 3.4m in BHC6, from depths between 4.3m to 4.8m in BHC6, between 7.4m to 7.6m in BH101M and 9.77m to 9.94m in BH104M. The bedrock generally consisted of very close to close spacing defects consisting of joints, bedding parts and fractured zones and extremely weathered zones.
4	**Low Strength Bedrock (Siltstone / Shale / Sandstone)**	2.7 to 12.0	41.3 to 56.3	2.1 to 2.8	Distinctly to Slightly weathered, low strength sandstone / shale / siltstone bedrock. Occasional medium strength bands were encountered in BHA1M, BHC1, BHC6, BHD4M, BHG1M and BHH4. Core loss was observed from depths between 14.0m to 14.2m in BHC1 and from depths between 3.05m to 4.00m in BHH4.

Unit	Material[2]	Depth to Top of Unit (m BEGL)[1]	RL of Top of Unit (m AHD)[1]	Observed Thickness (m)	Comments
					The bedrock generally consisted of close to medium spacing defects consisting of joints, bedding parts and fractured zones and extremely weathered zones.
5	**Medium Strength Bedrock (Siltstone / Sandstone)**	2.3 to 15.4	36.6 to 60.7	- [3]	Slightly weathered to fresh, medium strength sandstone/siltstone. Encountered in BHA4, BHA7M, BHC6, BHH7M and BH102 only.

Note 1 Approximate depth and level at the time of our assessment. Depths and levels may vary across the site.
Note 2 For more detailed descriptions of the subsurface conditions, reference should be made to the borehole logs attached to **Appendix A.**
Note 3 Observed in boreholes BHA4, BHA7M, BHC6, BH101M, BH102, BH103M, BH104 and BHH7M only.

3.2 Groundwater Observations

Groundwater seepage was observed during auger drilling of BHC1, BHD4M, BHG1M and BH103M only. Following their completion, groundwater monitoring wells were installed in BHA1M, BHA7M, BHD4M, BHG1M,BHH7M, BH101M,BH103M and BH104M and bailed dry. The groundwater levels were then measured within the monitoring wells as per **Table 3-2** below:

Table 3-2 Groundwater Levels

Borehole ID	Groundwater Seepage Level During Augering		Groundwater Level After Well Development		Time elapsed (approx.)
	m BEGL	RL (m AHD)	m BEGL	RL (m AHD)	
BHA1M	Not encountered	Not encountered	2.6	46.4	24 hours
BHA4	Not encountered	Not encountered	N/A	N/A	N/A
BHA7M	Not encountered	Not encountered	3.25	46.25	24 hours
BHC1	5.6	47.7	N/A	N/A	N/A
BHC6	Not encountered	Not encountered	N/A	N/A	N/A
BHD4M	3.2	50.3	5.6	47.9	2 hours
BHG1M	3.0	52.1	1.8	53.3	24 hours
BHH4	Not encountered	Not encountered	N/A	N/A	N/A
BHH7M	Not encountered	Not encountered	4.55	58.45	24 hours
BH101M	Not encountered	Not encountered	3.80	45.4	1 week
BH102	Not encountered	Not encountered	Not encountered	Not encountered	1 week
BH103M	2.0	62.6	4.90	50.0	1 week
BH104M	Not encountered	Not encountered	3.60	54.4	1 week

Note 1 N/A – Not available

Water circulation due to coring within the boreholes prevented further observations of groundwater levels within BHA1M, BHA7M, BHD4M ,BHG1M, BH101M, BH102 and BH104M. We note that the groundwater levels may not have become evident or stabilised in the augered boreholes within the limited observation period.

3.3 Rising Head Tests

Rising Head Tests were completed on 12 June 2025 in three monitoring wells, BH101M, BH102M and BH103M at the site. The following procedure was adopted:

- The groundwater level within the well was initially recorded;
- The well was purged an electrical groundwater pump;
- The rising groundwater level within the well was measured at various time intervals of 5 minutes over 1 hour duration.

The results were then used to estimate the permeability of the bedrock using the Hvorslev Method based on the borehole geometry. The initials inflows were high, which then quickly tapered off to lower inflows. The estimated permeability of the bedrock is summarised in **Table 3-3**.

Table 3-3 Pump-out Test Results

Borehole ID	Screened Material	Estimated Permeability (m/s)
BH101M	Unit 3	1.62×10^{-7}
BH103M	Unit 3	3.51×10^{-9}
BH104M	Unit 2	-[1]

Note 1- No recharge observed after bailing well dry.

3.4 Test Results

Fifteen soil and five bulk samples were selected for laboratory testing to assess the following:

- Atterberg Limits and Linear Shrinkage
- Soil aggressivity (pH, chloride and sulfate content and electrical conductivity).
- California Bearing Ratio (CBR);

A summary of the soil test results is provided in **Table 3-4 and Table 3-5** below. Laboratory test certificates are presented in **Appendix B**.

Table 3-4 Summary of Soil Laboratory Test Results

Test/ Sample ID		BHA1M_1.5-1.95	BHA4_1.5-1.95	BHA4_3.0-3.45	BHC1_4.5-4.95	BHC1_7.5-7.95
Unit		2	2	2	2	2
Material Description [1]		Silty CLAY	Sandy CLAY	Sandy CLAY	Silty CLAY	Silty CLAY
Aggressivity	Chloride Cl (ppm)	68	150	-	590	-
	Sulfate SO_4 (ppm)	100	32	-	54	-
	pH	9.6	9.9	-	8.3	-
	Electrical Conductivity (µS/cm)	440	550	-	490	-
	Moisture Content (%)	16.7	18.0	22.9	14.6	17.8
rber g Limi	Liquid Limit (%)	-	-	66	-	42

Test/ Sample ID		BHA1M_1.5-1.95	BHA4_1.5-1.95	BHA4_3.0-3.45	BHC1_4.5-4.95	BHC1_7.5-7.95
	Plastic Limit (%)	-	-	21	-	15
	Plasticity Index (%)	-	-	45	-	27
	Linear Shrinkage (%)	-	-	16.0	-	12.0
Test/ Sample ID		**BHD4M_3.0-3.45**	**BHG1M_0.5-0.95**	**BHG1M_1.5-1.95**	**BHH4_0.5-0.6**	**BHH7M_0.5-0.9**
Unit		2	2	2	2	2
Material Description [1]		Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY
Aggressivity	Chloride Cl (ppm)	-	27	-	59	2.8
	Sulfate SO_4 (ppm)	-	67	-	71	26
	pH	-	8.9	-	7.2	6.6
	Electrical Conductivity (µS/cm)	-	300	-	90	22
	Moisture Content (%)	12.4	20.1	20.9	14.5	13.0
Atterberg Limits	Liquid Limit (%)	42	-	49	-	-
	Plastic Limit (%)	19	-	15	-	-
	Plasticity Index (%)	27	-	34	-	-
	Linear Shrinkage (%)	11.0	-	15.0	-	-

Note 1 More detailed descriptions of the subsurface conditions at each borehole location are available on the borehole logs presented in **Appendix A**.

The Atterberg Limits result on the selected clay sample indicated clays to be of medium to high plasticity and of moderate shrink-swell potential.

The assessment indicated low permeability soil was present above and below the groundwater table. In accordance with Tables 6.4.2(C) and 6.5.2(C) of AS 2159:2009 'Piling – Design and Installation', the results of the pH, chloride and sulfate content and electrical conductivity of the soil provided the following exposure classifications:

- 'Non-aggressive' for buried concrete structural elements; and
- 'Mild' for buried steel structural elements.

Table 3-5 Summary of CBR Test Results

Test/ Sample ID	BHC1_CBR	BHD4M_CBR	BHG1M_CBR	BH103M_CBR	BH104M_CBR
Depth (m BEGL)	3.5-4.5	2.6 to 3.5	0.5 to 1.5	0.3 to 1.5	1.0 to 2.0
Unit	2	2	2	2	2
Material Description [1]	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY

Test/ Sample ID	BHC1_CBR	BHD4M_CBR	BHG1M_CBR	BH103M_CBR	BH104M_CBR
CBR (4-day Soaked) (%)	6.0%	3.0%	4.5%	4.5%	6.0%
Maximum Dry Density (t/m^3)	1.69	1.74	1.78	1.82	1.74
Optimum Moisture Content (%)	20.5	18.8	17.9	15.5	18.0

Note 1 More detailed descriptions of the subsurface conditions at each borehole location are available on the borehole logs presented in **Appendix A**.

Bulk samples of the Unit 2 material from BHC1, BHD4M, BHG1M,BH103M and BH104M were tested for compaction and four day soaked CBR, resulted in values of 3% to 6% when compaction to 100% of Standard Maximum Dry Density (SMDD) and surcharged with 9kg.

84 selected rock core samples were tested by STS to estimate the Point Load Strength Index (Is_{50}) values to assist with rock strength assessment. The results of the testing are summarised on the attached borehole logs.

The point load strength index tests correlated reasonably well with our field assessments of rock strength. The approximate Unconfined Compressive Strength (UCS) of the rock core, estimated from correlations with the point load strength index test results, varied from <1 MPa to 34 MPa.

4. Recommendations

4.1 Geotechnical Issues

Based on the results of the assessment, we consider the following to be the main geotechnical issues for the proposed development:

- Basement excavation and retention to limit lateral deflections and ground loss as a result of excavations, resulting in damage to nearby structures;
- Rock excavation and vibrations;
- Groundwater within the depth of the excavation; and
- Foundation design for building loads.

4.2 Dilapidation Surveys

Prior to excavation and construction, we recommend that detailed dilapidation surveys be carried out on all structures and infrastructures surrounding the site that falls within the zone of influence of the excavation to allow assessment of the recommended vibration limits. The zone of influence of the excavation is defined by a distance back from the excavation perimeter of twice the total depth of the excavation. The reports would provide a record of existing conditions prior to commencement of the work. A copy of each report should be provided to the adjoining property owner who should be asked to confirm that it represents a fair assessment of existing conditions. The reports should be carefully reviewed prior to demolition and construction.

4.3 Excavation Methodology

4.3.1 Excavation Assessment

Prior to any excavation commencing, we recommend that reference be made to the Safe Work Australia Excavation Work Code of Practice, dated January 2020.

EI assumes that the proposed development will require a BEL of between RL 38.6m and 49.3m for the basements, or an excavation depth of between about 4.4m and 10.9m BEGL. Locally deeper excavations for footings, service trenches, crane pads and lifts overrun pits may be required.

Based on the borehole logs, the proposed basement excavations will therefore extend through all units as outlined in **Table 3-1** above. As such, an engineered retention system must be installed prior to excavation commencing.

Units 1 and 2 could be excavated using buckets of large earthmoving Hydraulic Excavators, particularly if fitted with ‘Tiger Teeth’. Excavation of Units 3, 4 and 5 (where encountered) may present hard or heavy ripping, or “hard rock” excavation conditions. Ripping would require a high capacity and heavy bulldozer for effective production. Wear and tear should also be allowed for. The use of a smaller size bulldozer will result in lower productivity and higher wear and tear, and this should be allowed for. Alternatively, hydraulic rock breakers, rock saws, ripping hooks or rotary grinders could be used, though productivity would be lower and equipment wear increased, and this should be allowed for.

Should rock hammers be used for the excavation of the bedrock, excavation should commence away from the adjoining structures and the transmitted vibrations monitored to assess how close the hammer can operate to the adjoining structures while maintaining transmitted vibrations within acceptable limits. To fall within these limits, we recommend that the size of rock hammers do not exceed a medium sized rock hammer, say 900 kg, such as a Krupp 580, and be trialled

prior to use. The transmitted vibrations from rock hammers should be measured to determine how close each individual hammer can operate to the adjoining buildings.

The vibration measurements can be carried out using either an attended or an unattended vibration monitoring system. An unattended vibration monitoring system must be fitted with an alarm in the form of a strobe light or siren or alerts sent directly to the site supervisor to make the plant operator aware immediately when the vibration limit is exceeded. The vibration monitor must be set to trigger the alarm when the overall Peak Particle Velocity (PPV) exceeds set limits outlined by a vibration monitoring plan. Reference should be made to **Appendix C** for a guide to acceptable limits of transmitted vibrations.

If it is found that the transmitted vibrations by the use of rock hammers are unacceptable, then it would be necessary to change to a smaller excavator with a smaller rock hammer, or to a rotary grinder, rock saws, jackhammers, ripping hooks, chemical rock splitting and milling machines. Although these are likely to be less productive, they would reduce or possibly eliminate risks of damage to adjoining properties through vibration effects transmitted via the ground. Such equipment would also be required for detailed excavation, such as footings or service trenches, and for trimming of faces. Final trimming of faces may also be completed using a grinder attachment rather than a rock breaker in order to assist in limiting vibrations. The use of rotary grinders generally generates dust and this may be supressed by spraying with water.

To assist in reducing vibrations and over-break of the bedrock, we recommend that initial saw cutting of the excavation perimeters through the bedrock may be provided using rock saw attachments fitted to the excavator. Rock sawing of the excavation perimeter has several advantages as it often reduces the need for rock bolting as the cut faces generally remain more stable and require a lower level of rock support than hammer cut excavations, ground vibrations from rock saws are minimal and the saw cuts will provide a slight increase in buffer distance for use of rock hammers. However, the effectiveness of such approach must be confirmed by the results of vibration monitoring.

Groundwater seepage monitoring should be carried out during bulk excavation works and prior to finalising the design of a pump out facility. Outlets into the stormwater system will require Council approval.

Furthermore, any existing buried services, which run below the site, will require diversion prior to the commencement of excavation or alternatively be temporarily supported during excavation, subject to permission or other instructions from the relevant service authorities. Enquiries should also be made for further information and details, such as invert levels, on the buried services.

4.3.2 Excavation Monitoring

Consideration should be made to the impact of the proposed development upon neighbouring structures, roadways and services. Basement excavation retention systems should be designed so as to limit lateral deflections.

Contractors should also consider the following limits associated with carrying out excavation and construction activities:

- Limit lateral deflection of temporary or permanent retaining structures;
- Limit vertical settlements of ground surface at common property boundaries and services easement; and
- Limit Peak Particle Velocities (PPV) from vibrations, caused by construction equipment or excavation, experienced by any nearby structures and services.

Monitoring of deflections of retaining structures and surface settlements should be carried out by a registered surveyor at agreed points along the excavation boundaries and along existing building foundations / services/ pavements and other structures located within or near the zone of influence of the excavation. Owners of existing services adjacent to the site should be

consulted to assess appropriate deflection limits for their infrastructures. Measurements should be taken in the following sequence:

- Before commencing installation of retaining structures where appropriate to determine the baseline readings. Two independent sets of measurements must be taken confirming measurement consistency;
- After installation of the retaining structures, but before commencement of excavation;
- After excavation to the first row of supports or anchors, but prior to installation of these supports or anchors;
- After excavation to any subsequent rows of supports or anchors, but prior to installation of these supports or anchors;
- After excavation to the base of the excavation;
- After de-stressing and removal of any rows of supports or anchors; and
- One month after completion of the permanent retaining structure or after three consecutive measurements not less than a week apart showing no further movements, whichever is the latter.

4.4 Groundwater Considerations

Groundwater was observed in the monitoring wells as detailed in **Table 3-2**, all of which are above the assumed BEL. Based on our site observations and as mentioned in **Table 3-2,** dewatering management will be required during the construction phase.

Due to the low permeability of the bedrock profile any groundwater inflows into the excavation should not have an adverse impact on the proposed development or on the neighbouring sites and should be manageable. However, we expect that some groundwater inflows into the excavation along the soil/rock interface and through any defects within the bedrock (such as jointing, and bedding planes, etc.) particularly following a period of heavy rainfall. The initial flows into the excavation may be locally high, but would be expected to decrease considerably with time as the bedding seams/joints are drained. We recommend that monitoring of seepage be implemented during the excavation works to confirm the capacity of the drainage system.

We expect that any seepage that does occur will be able to be controlled by a conventional sump and pump system. We recommend that a sump-and-pump system be used both during construction and for permanent groundwater control below the basement floor slab.

In the long term, drainage should be provided behind all basement retaining walls, around the perimeter of the basement and below the basement slab. The completed excavation should be inspected by the hydraulic engineer to confirm that adequate drainage has been allowed for. Drainage should be connected to the sump-and-pump system and discharging into the stormwater system. The permanent groundwater control system should take into account any possible soluble substances in the groundwater which may dictate whether or not groundwater can be pumped into the stormwater system.

The design of drainage and pump systems should take the above issues into account along with careful ongoing inspections and maintenance programs.

4.5 Excavation Retention

4.5.1 Support Systems

From a geotechnical perspective, it is critical to maintain the stability of all adjacent structures and infrastructures during demolition, excavation and construction works. The setback distances of each building are detailed as below:

- **Basement of Buildings B, C, J & H:** The proposed basement outline has a minimum setback of approximately 57m and 22m from the northern and eastern boundaries, respectively and 20m south toward to the adjacent buildings L&K and a setback of approximately 3.0m from the western boundary.
- **Basement of Buildings E, F & G:** The proposed basement outline has a minimum setback of approximately 57m from the northern boundary and 20m south toward to the adjacent buildings N and a setback of approximately 3.0m from both eastern and western boundaries.
- **Basement of Buildings N, L & K:** The proposed basement outline has a minimum setback of approximately 20m from the north adjacent buildings F, G, H, and J. Building L& N has no setback towards all southern, eastern and western boundaries. Buildings K have a setback of approximately 22m from the eastern boundary and a setback of approximately 3.0m from the southern boundary.
- **Basement of Buildings U & T:** The proposed basement outline has a minimum setback of approximately 4 to 20m from the northern boundary, approximately 24m to the eastern boundary and have a setback of approximately 3.0m towards both southern and western boundaries.
- **Basement of Buildings R, S & P:** The proposed basement outline has a minimum setback of approximately 24m from the eastern boundary and a setback of approximately 3.0m from the northern, southern and western boundary.

Based on the above, the encountered subsurface conditions, the depth of excavation, temporary batters of no steeper than a safe angle of 1 Vertical (V) to 1 Horizontal (H) may be feasible where space allows for the fill and residual soil profile. The above temporary batters should remain stable provided that all surcharge loads, including construction loads, are kept at a distance of at least 2h (where 'h' is the height of the batter in metres) from the crest of the batter. If steeper batters are to be used, then these must be supported by shotcrete and soil nail system designed by a suitable structural or geotechnical engineer. The stability of these batters can be assessed using computer slope stability analysis software such as Slope/W. we can complete such analysis, if commissioned to do so.

Where batters are used, the space between the batters and the permanent retaining walls will need to be carefully backfilled to reduce future settlement of the backfill. Only light compaction equipment should be used for compaction behind retaining walls so that excessive lateral pressures are not placed on the walls. This will require the backfill to be placed in thin layers, say 100mm loose thickness, appropriate to the compaction equipment being used. The compaction specification for the backfill will depend on whether paving or structures are to be supported on the fill. If the fill is to support paved areas it should be compacted to a density of at least 98% of Standard Maximum Dry Density (SMDD) for granular fill materials, but if it is only to support landscaped areas of lower compaction specification, say 95% of SMDD, may be appropriate, provided the risk of future settlement and maintenance can be accepted. An alternative for backfill would also be to use a uniform granular material, wrapped in a geofabric.

Where space for temporary batters is not available, especially towards the southern site boundary and northern boundary of building U, a suitable retention system will be required for the support of the entire depth of the excavation. For this site, we consider that an anchored and/or propped soldier pile wall with shotcrete in between the piles installed to below BEL to be the most suitable. Anchors/props and mass concrete must be installed progressively as excavation proceeds. However, an option of contiguous pile wall may be considered if required by the designer.

A suitable retention system will be required for the support all units. For this site, EI recommends an anchored and/or propped soldier pile wall with mass concrete in between the piles be founded into low to medium strength bedrock (Unit 4 or better). Consideration may be made for some

piers, which are not supporting the vertical structural loads of the building, to be terminated at least 0.5m, into Unit 4 material or better, above the base of the bulk excavation levels.

Bored piles are considered to be the most suitable for this site. Tremie pumps may be required where high groundwater seepage inflows are present during the drilling of the bored piles. However, relatively large capacity piling rigs will be required for drilling through the bedrock. The proposed pile locations should take into account the presence of buried services. Further advice should be sought from prospective piling contractors who should be provided with a copy of this report.

4.5.2 Retaining Wall Design Parameters

The following parameters may be used for static design of temporary and permanent retaining walls at the subject site:

- Conventional free-standing cantilever walls which support areas where movement is of little concern (i.e. where only gardens or open areas are to be retained), may be designed using a triangular lateral earth pressure distribution and an 'active' earth pressure coefficient, K_a, as shown in **Table 4-1;**
- Cantilevered walls, where the tops of which are restrained by the floor slabs of the permanent structure or which support movement sensitive elements, should be designed using a triangular lateral earth pressure distribution and an 'at rest' earth pressure coefficient, Ko, as shown in Table 4-1 below.
- For progressively anchored or propped walls where minor movements can be tolerated (provided there are no buried movement sensitive services), we recommend the use of a trapezoidal earth pressure distribution of 5H kPa for soil, where H is the retained height in meters. These pressures should be assumed to be uniform over the central 50% of the support system, tapering to nil at top and bottom;
- For progressively anchored or propped walls which support areas which are highly sensitive to movement (such as areas where movement sensitive structures or infrastructures or buried services are located in close proximity), we recommend the use of a trapezoidal earth pressure distribution of 8H kPa for soil, where 'H' is the retained height in meters. These pressures should be assumed to be uniform over the central 50% of the support system, tapering to nil at top and bottom;
- All surcharge loading affecting the walls (including from construction equipment, construction loads, adjacent high level footings, etc.) should be adopted in the retaining wall design as an additional surcharge using an 'at rest' earth pressure coefficient, Ko.
- The retaining walls should be designed as drained and measures are to be taken to provide complete and permanent drainage behind the walls. Strip drains protected with a non-woven geotextile fabric should be used behind the shotcrete infill panels for soldier pile walls.
- For piles embedded into Unit 5 or better, the allowable lateral toe resistance values outlined in **Table 4-1** below may be adopted. These values assume excavation is not carried out within the zone of influence of the wall toe and the rock does not contain adverse defects etc. The upper 0.3m depth of the socket should not be taken into account to allow for tolerance and disturbance effects during excavation.
- If temporary anchors extend beyond the site boundaries, then permission from the neighbouring properties would need to be obtained prior to installation. Also, the presence of neighbouring basements and/or services and their levels must be confirmed prior to finalising anchor design**.**

- Anchors should have their bond length within Unit 4 or better. For the design of anchors bonded into Unit 4 or better, the allowable bond stress value outlined in **Table 4-1** below may be used, subject to the following conditions:

  1. Anchor bond lengths of at least 3m behind the 'active' zone of the excavation (taken as a 45 degree zone above the base of the excavation) is provided;
  2. Overall stability, including anchor group interaction, is satisfied;
  3. All anchors should be proof loaded to at least 1.33 times the design working load before locked off at working load. Such proof loading is to be witnessed by and engineer independent of the anchoring contractor. We recommend that only experienced contractors be considered for anchor installation with appropriate insurances;
  4. If permanent anchors are to be used, these must have appropriate corrosion provisions for longevity.

Table 4-1 Geotechnical Design Parameters

Material [1]		Unit 1 Fill	Unit 2 Residual Soil	Unit 3 Very Low Strength Bedrock (Sandstone / Siltstone/Shale)	Unit 4 Low Strength Bedrock (Sandstone / Siltstone/Shale)	Unit 5 Medium Strength Bedrock (Sandstone / Siltstone)
Bulk Unit Weight (kN/m^3)		**18**	**20**	**23**	**24**	**24**
Friction Angle, ϕ' (°)		**25**	**25**	**28**	**30**	**36**
Earth Pressure Coefficients	At rest, K_o [3]	0.58	0.58	0.53	0.50	0.41
	Active, K_a [3]	0.41	0.41	0.36	0.33	0.26
	Passive, K_p [3]	-	-	2.77	3.00	3.85
Young's Modulus (E, MPa)		2	10	35	80	300
Cohesion, c (kPa)		-	5	35	50	150
Poison's Ratio		-	0.35	0.3	0.3	0.25
Allowable Bearing Pressure (kPa) [5]		-	-	700	1200	3000
Allowable Shaft Adhesion (kPa) [4, 5]	in Compression	-	-	70	120	300
	in Uplift	-	-	35	60	150
Allowable Toe Resistance (kPa)		-	-	-	60	300
Allowable Bond Stress (kPa)		-	-	70	100	250
Earthquake Site Risk Classification		▪ AS 1170.4:2007 indicates an earthquake subsoil class of Class C_e.(Shallow Soil) ▪ AS 1170.4:2007 indicates that the hazard factor (z) for Sydney is 0.09.				

Notes:

1 More detailed descriptions of subsurface conditions are available on the borehole logs presented in **Appendix A.**
2 Approximate levels of top of unit at the time of our investigation. Levels may vary across the site.
3 Earth pressures are provided on the assumption that the ground behind the retaining walls is horizontal.
4 Side adhesion values given assume there is intimate contact between the pile and foundation material and should achieve a clean socket roughness category R2 or better. Design engineer to check both 'piston pull-out' and 'cone liftout' mechanics in accordance with AS4678-2002 Earth Retaining Structures.
5 To adopt these parameters we have assumed that:
- Footings have a nominal socket of at least 0.3m, into the relevant founding material;
- For piles, there is intimate contact between the pile and foundation material (a clean socket roughness category of R2 or better);
- Potential soil and groundwater aggressivity will be considered in the design of piles and footings;
- Piles should be drilled in the presence of a Geotechnical Engineer prior to pile construction to verify that ground conditions meet design assumptions. Where groundwater ingress is encountered during pile excavation, concrete is to be placed as soon as possible upon completion of pile excavation. Pile excavations should be pumped dry of water prior to pouring concrete, or alternatively a tremmie system could be used;
- The bases of all pile, pad and strip footing excavations are cleaned of loose and softened material and water is pumped out prior to placement of concrete;

- The concrete is poured on the same day as drilling, inspection and cleaning.
- The allowable bearing pressures given above are based on serviceability criteria of settlements at the footing base/pile toe of less than or equal to 1% of the minimum footing dimension (or pile diameter).

4.6 Foundations

Following bulk excavation of each building, we expect Unit 2, Unit 3 and Unit 4 to be exposed at BEL of the basements

It is recommended that all footings for the building be founded within medium strength bedrock (Unit 5) or better to provide uniform support and reduce the potential for differential settlements.

4.6.1 Pile Footings

The most competent foundation stratum at the site is the weathered Siltstone/Shale/Sandstone and in view of the reactivity of the residual clay, expected column loads of the proposed development, and moderate depths to medium strength Siltstone/Sandstone, we recommend that building is supported on pile footings founded into Siltstone/Sandstone bedrock.

For piles founded within Unit 5 Siltstone/Sandstone bedrock, these must be embedded a minimum of 0.5m into Siltstone/Sandstone, and can be designed for a maximum allowable bearing capacity of 3000kPa. The allowable shaft adhesion in siltstone/sandstone bedrock may be designed as 10% of the allowable bearing pressure (or 5% for uplift) for the socket length in excess of 0.5m.

At least the initial drilling of piles should be completed in the presence of a geotechnical engineer to verify that ground conditions meet design assumptions.

Bored piles are considered to be the most suitable for this site. Concrete must be poured on the same day as drilling, inspection and drilling. Where groundwater ingress is encountered during pile excavation, concrete is to be placed as soon as possible upon completion of pile excavation. Pile excavations should be pumped dry of water prior to pouring concrete, or alternatively a tremmie system could be used. The use of a cleaning bucket is recommended to remove drill cuttings and debris from the base of pile holes prior to concrete placement. Placement of concrete from the base of the bored pile using a tremie pipe is recommended. However, relatively large capacity piling rigs will be required for drilling through the shale bedrock. Further advice should be sought from prospective piling contractors who should be provided with a copy of this report. The aggressivity of natural soils and groundwater (if encountered) should be taken into consideration in the design to assess exposure classification to steel and concrete structures.

Grout injected cased CFA piles may also be considered for this site.

Parameters including end bearing and skin friction can only be properly assessed once pile loading, dimensions and layouts are better defined, and are dependent on soil densities, groundwater levels, and the presence of any weaker/softer layers beneath. Pile design should be completed by an experienced pile design engineer. Further detailed assessment of the expected performance of such designs would be required once design loads are finalised.

All piles must be designed in accordance with the Australian Standard AS2159-2009 Piling – Design and installation.

4.7 Basement Floor Slab

Following bulk excavations for the proposed basement, residual soil or bedrock is expected to be exposed at the basement floor BEL.

Following the removal of all loose and softened materials, we recommend that underfloor drainage be provided and should comprise a strong, durable, single sized washed aggregate such as ‘blue metal gravel’. Joints in the concrete floor slab should be designed to accommodate shear forces but not bending moments by using dowelled and keyed joints. The basement floor

slab should be isolated from columns. The completed excavation should be inspected by the hydraulic engineer to confirm the extent of the drainage required.

In addition, a system of sub-soil drains comprising a durable single sized aggregate with perforated drains/pipes leading to sumps should be provided. The basement floor slab should be isolated from columns.

Permission may need to be obtained from the NSW Department of Primary Industries (DPI) and possibly Council for any permanent discharge of seepage into the drainage system. Given the subsurface conditions, we expect that seepage volumes would be low and within the DPI limits. However, if permission for discharge is not obtained, the basement may need to be designed as a tanked basement.

4.8 Subgrade Preparation and Engineered Fill

Earthworks recommendations provided in this report should be complemented by reference to AS3798.

1 Fill should be fully excavated down to surface of the residual soils, and stockpiled separately since these materials are not suitable for re-use as engineered fill. Such excavation may need to be carried out with the excavation sides battered at an angle of no steeper than 1 Vertical to 1 Horizontal. The new fill must be 'keyed-in' the sides of these batters.

2 The exposed subgrade at the base of the excavation should be proof rolled with a smooth drum roller (say 12 tonne) used in static or non-vibratory mode of operation. Caution is required when proof rolling near existing infrastructures and utilities (where present). The purpose of the proof rolling is to detect any soft or heaving areas, and to allow for some further improvement in strength or compaction.

3 The final pass should be undertaken in the presence of an experienced geotechnician or geotechnical engineer, to detect any unstable or soft subgrade areas, and to allow for some further improvement in strength/compaction.

4 If dry conditions prevail at the time of construction then any exposed residual clay subgrade may become desiccated or have shrinkage cracks prior to pouring any concrete slabs. If this occurs, the subgrade must be watered and rolled until the cracks disappear.

5 Unstable subgrade detected during proof rolling should be locally excavated down to a sound base and replaced with engineered fill or further advice should be sought. Any fill placed to raise site levels should also be engineered fill, as per the specifications below.

If suspended floor slabs and pavement are designed, then it would be unnecessary to complete any particular subgrade preparation other than stripping of root affected soils from the footprint of the proposed building structures and replaced with surface levelling compacted fill for the floor slab formwork.

4.9 Pavement Design

The design of new pavements will depend on subgrade preparation, subgrade drainage, the nature and composition of fill excavated or imported to the site, as well as vehicle loadings and use. Various alternative types of construction could be used for the pavements. Concrete construction would undoubtedly be the best in areas where heavy vehicles manoeuvre such as trucks turning and manoeuvring. Flexible pavements may have a lower initial cost, but maintenance will be higher. These factors should be considered when making the final choice.

Based on the laboratory test results, the samples collected from the proposed road alignments return the CBR value 3.0% to 6.0%. We recommend that pavement design may be based on the CBR value of 3.0%.

The 3.0% CBR value is low but it may be increased by stabilising the subgrade to a depth of 200mm to 300mm by the addition of lime. When thoroughly mixed and re-compacted to a

minimum of 90% of SMDD, a reduction in reactivity along with substantial increase in strength will be achieved.

Alternatively, an appropriate select fill layer comprising of good quality, well graded granular material (such as unbound base or ripped, crushed sandstone with CBR greater than 10%, a maximum particle size of 60mm, well graded and Plastic Index less than 10, compacted to at least 98% of SMDD) may be used below the pavement.

Further soaked CBR tests may be carried out on representative samples of the subgrade to obtain a large population of values to enable a proper statistical analysis to be performed and possibly an increase in the design CBR value. However, it should be borne in mind that even with more test values being obtained there will still be isolated pavement areas where the risk of potential failure and higher maintenance will occur due to the subgrade having a lower CBR value than the statistical characteristic value opted for design purposes.

We recommend that in situ density tests be completed on the proof rolled and prepared subgrade to confirm that at least 98% Standard Maximum Dry Density (SMDD) has been achieved. If the existing fill is removed and replaced with imported fill, the CBR of the imported material may be taken into account. These design values should be confirmed by inspection and Dynamic Cone Penetration (DCP) testing of the subgrade following proof rolling.

All upper (base) course should be crushed rock to RMS QA specification 3051 (2013) unbound base and compacted to at least 100% of SMDD. All lower (sub-base) course should be crushed rock to RMS QA specification 3051 (2013) unbound base or ripped/crushed sandstone with CBR greater than 40%, maximum particle size of 60mm, well graded and Plastic Index less than 10. All lower course material should be compacted to an average of no less than 100% of SMDD, but with a minimum acceptance value of 98% of SMDD.

Concrete pavements should have a sub-base layer of at least 100mm thickness of crushed rock to RMS QA specification 3051 (2013) unbound base material (or equivalent good quality and durable fine crushed rock) which is compacted to at least 100% SMDD. Concrete pavements should be designed with an effective shear transmission of all joints by way of either doweled or keyed joints.

Careful attention to subsurface and surface drainage is required in view of the effect of moisture on the clay soils. Pavement levels will need to be graded to promote rapid removal of surface water so ponding does not occur on the surface of pavements. The drainage trenches should be excavated with a uniform longitudinal fall to appropriate discharge points so as to reduce the risk of water ponding. The capacity of the stormwater collection system from the pavement should be checked and upgraded if necessary. In order to protect the pavement edge, subsoil drains should be provided along the perimeter of all proposed new external pavement areas, particularly in those areas of cut, with invert levels of at least 200mm below subgrade level.

The long-term successful performance of the pavements is dependent on the satisfactory completion of the earthworks. In order to achieve this, the quality assurance programme should not be limited to routine compaction density testing only. Other important factors associated with the earthworks includes subgrade preparation, selection of fill materials, control of moisture content and drainage, etc.

5. Further Geotechnical Inputs

Below is a summary of the previously recommended additional work that needs to be carried out:

- Additional Geotechnical Investigation in the form of cored boreholes to confirm the depth and quality of Unit 5 bedrock or better across each building blocks, if needed;
- Long term groundwater monitoring, pump out testing and seepage modelling;
- Stability assessment of temporary batters using computer modelling, if required;
- Dilapidation surveys;
- Design of working platforms (if required) for construction plant by an experienced and qualified geotechnical engineer;
- Classification of all excavated material transported off site;
- Witnessing installation of support measures and proof-testing of anchors (if required).
- Geotechnical inspections of unsupported excavations in where betters would be adopted;
- Geotechnical inspections of all new footings/piles by an experienced geotechnical professional before concrete or steel are placed to verify their bearing capacity and the in-situ nature of the founding strata; and
- Ongoing monitoring of groundwater inflows into the bulk excavation;

We recommend that a meeting be held after initial structural design has been completed to confirm that our recommendations have been correctly interpreted. We also recommend a meeting at the commencement of construction to discuss the primary geotechnical issues and inspection requirements.

6. Statement of Limitations

This report has been prepared for the exclusive use of Marvin Huang and Caddens Estate Pty Ltd who is the only intended beneficiary of EI's work. The scope of the assessment carried out for the purpose of this report is limited to those agreed with Marvin Huang and Caddens Estate Pty Ltd

No other party should rely on the document without the prior written consent of EI, and EI undertakes no duty, or accepts any responsibility or liability, to any third party who purports to rely upon this document without EI's approval.

EI has used a degree of care and skill ordinarily exercised in similar investigations by reputable members of the geotechnical industry in Australia as at the date of this document. No other warranty, expressed or implied, is made or intended. Each section of this report must be read in conjunction with the whole of this report, including its appendices and attachments.

The conclusions presented in this report are based on a limited investigation of conditions, with specific sampling and test locations chosen to be as representative as possible under the given circumstances.

EI's professional opinions are reasonable and based on its professional judgment, experience, training and results from analytical data. EI may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified by EI.

EI's professional opinions contained in this document are subject to modification if additional information is obtained through further investigation, observations, or validation testing and analysis during construction. In some cases, further testing and analysis may be required, which may result in a further report with different conclusions.

We draw your attention to the document "Important Information", which is included in **Appendix D** of this report. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be. The document is not intended to reduce the level of responsibility accepted by EI, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

Should you have any queries regarding this report, please do not hesitate to contact EI.

References

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AS1726:2017, *Geotechnical Site Investigations*, Standards Australia.

AS2159:2009, *Piling – Design and Installation*, Standards Australia.

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Abbreviations

AHD	Australian Height Datum
AS	Australian Standard
BEL	Bulk Excavation Level
BEGL	Below Existing Ground Level
BH	Borehole
DBYD	Dial Before You Dig
DP	Deposited Plan
EI	EI Australia
GI	Geotechnical Investigation
NATA	National Association of Testing Authorities, Australia
RL	Reduced Level
SPT	Standard Penetration Test
T-C	Tungsten-Carbide
UCS	Unconfined Compressive Strength

Figures

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	J.O.
Approved:	K.X.
Date:	9-12-22
Scale:	Not To Scale

Caddens Estate Development Pty Ltd

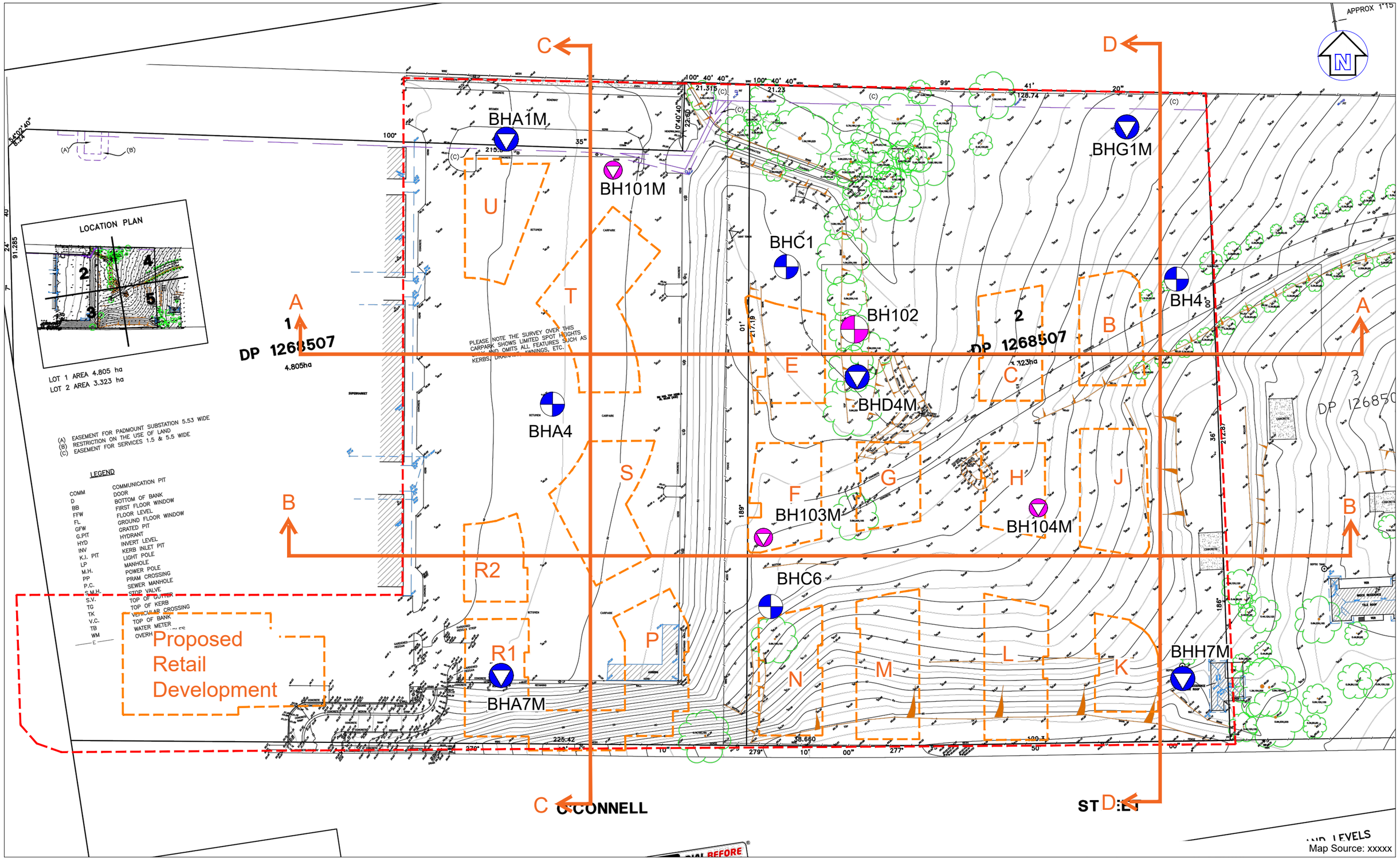
Geotechnical Investigation

Caddens Corner, 80 O'Connell Street Kingswood NSW

Site Locality Plan

Figure: 1

Project: E25834.G03



LEGEND (All Locations are Approximate)

- Site boundary
- Section
- Borehole location (EI Australia 2023)
- Monitoring well location (EI Australia, 2023)
- Monitoring well location (EI Australia 2025)
- Borehole location (EI Australia 2025)

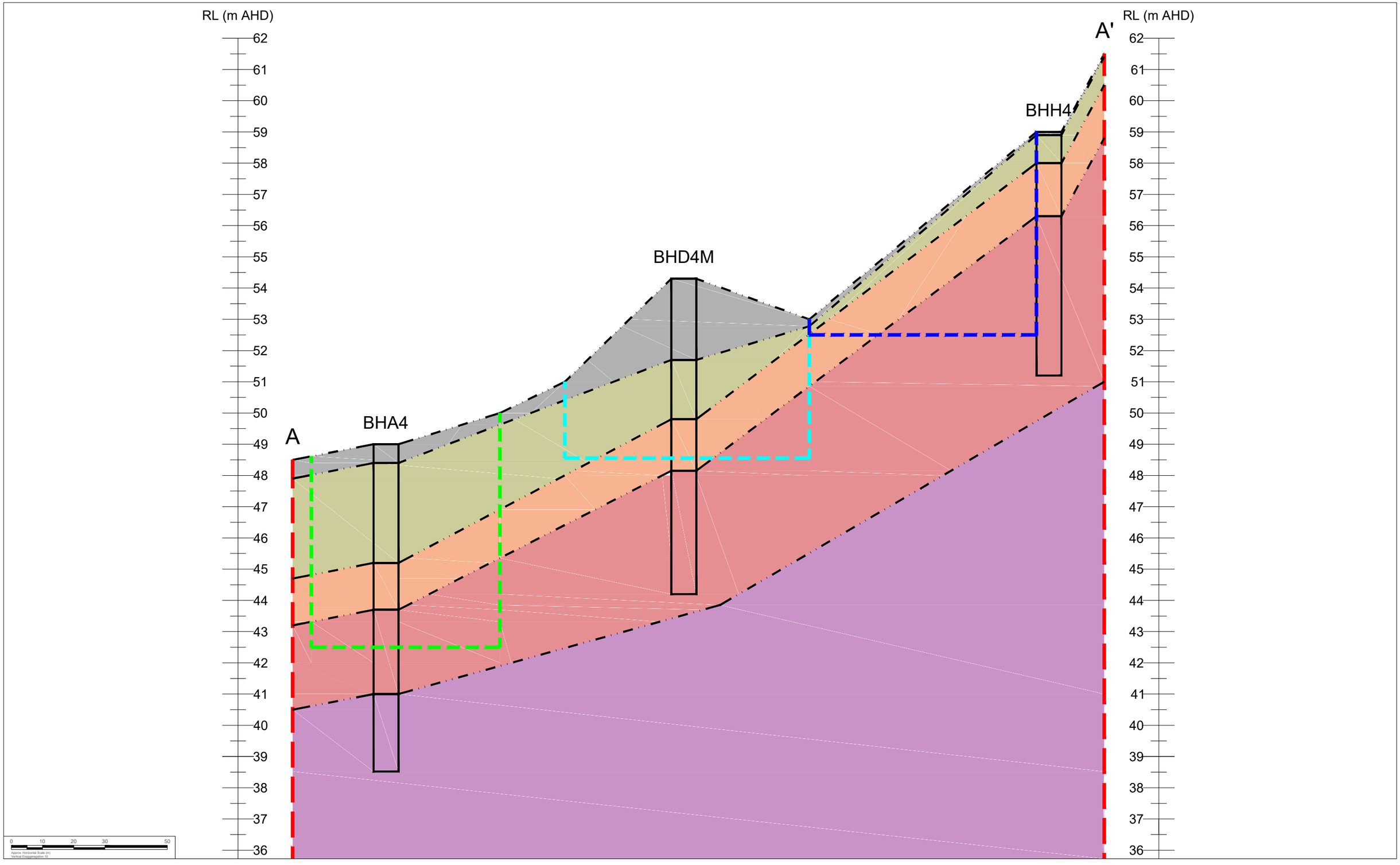
eiaustralia
Practical Solutions for Built Environments
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	S.K
Approved:	O.V
Date:	08-08-25

Caddens Estate Development Pty Ltd
Geotechnical Investigation
68&80 O'cnnell Street, Caddens, NSW
Borehole Location Plan

Figure: 2

Project: E25834.G04



LEGEND (All Locations are Approximate)

- Site boundary
- Basement boundary FFL of 42.5
- Basement boundary FFL of 48.555
- Basement boundary FFL of 52.5
- Inferred unit boundary from limited borehole information (might not be accurate)

- Topsoil/Fill
- Residual Soil
- Very Low Strength Siltstone
- Low Strength Siltstone/Sandstone
- Medium Strength Siltstone/Sandstone

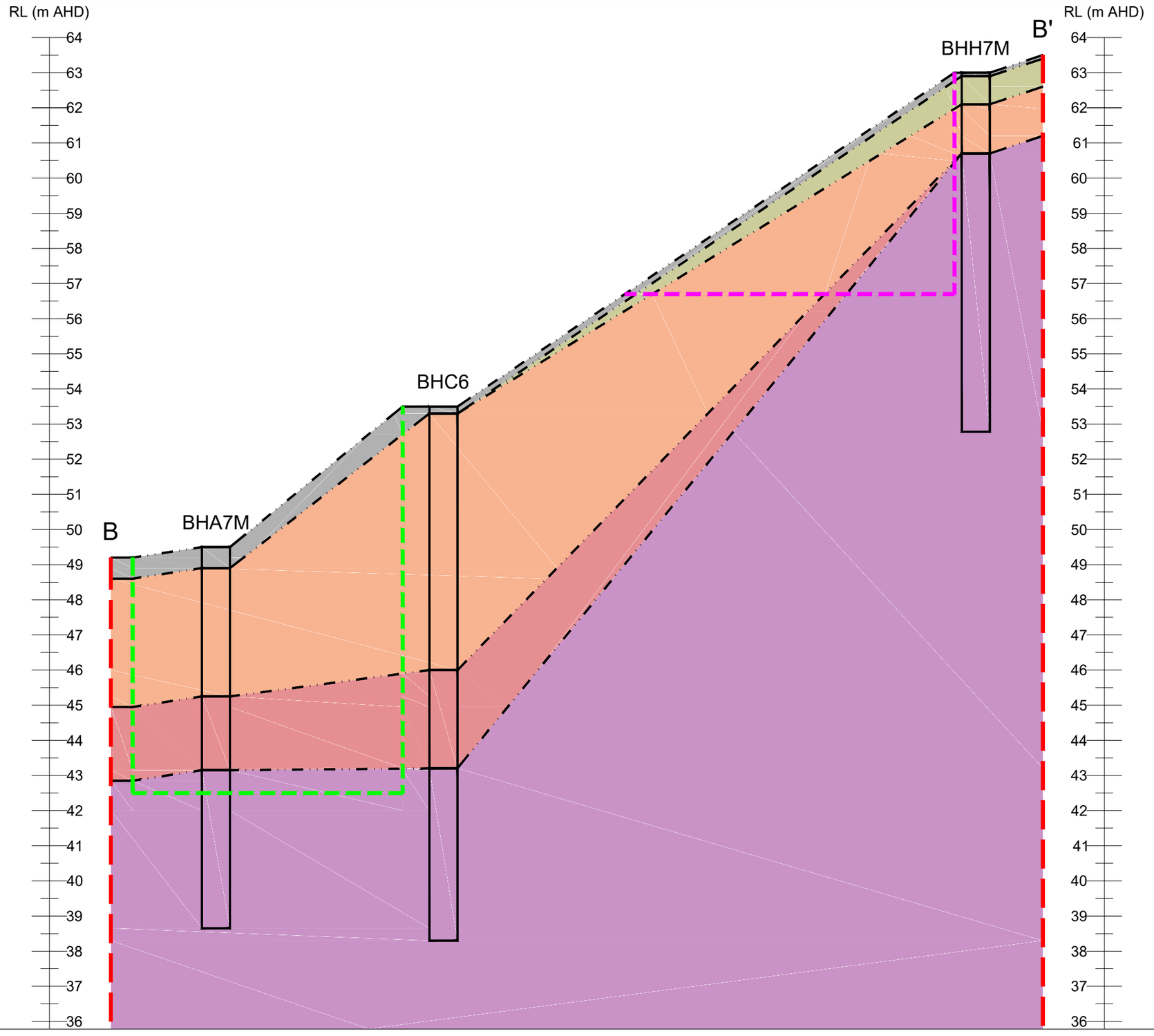
eiaustralia
Practical Solutions for Built Environments
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.C.
Approved:	N.J.
Date:	28-02-23

Caddens Estate Development Pty Ltd
Geotechnical Investigation
Caddens Corner, 80 O'Connell Street,
Kingswood, NSW
Section A-A'

Figure: 3

Project: E25834.G03



LEGEND (All Locations are Approximate)

- Site boundary
- Basement boundary FFL of 42.5
- Basement boundary FFL of 56.7
- Topsoil/Fill
- Residual Soil
- Very Low Strength Siltstone
- Low Strength Siltstone/Sandstone
- Medium Strength Siltstone/Sandstone
- Inferred unit boundary from limited borehole information (might not be accurate)

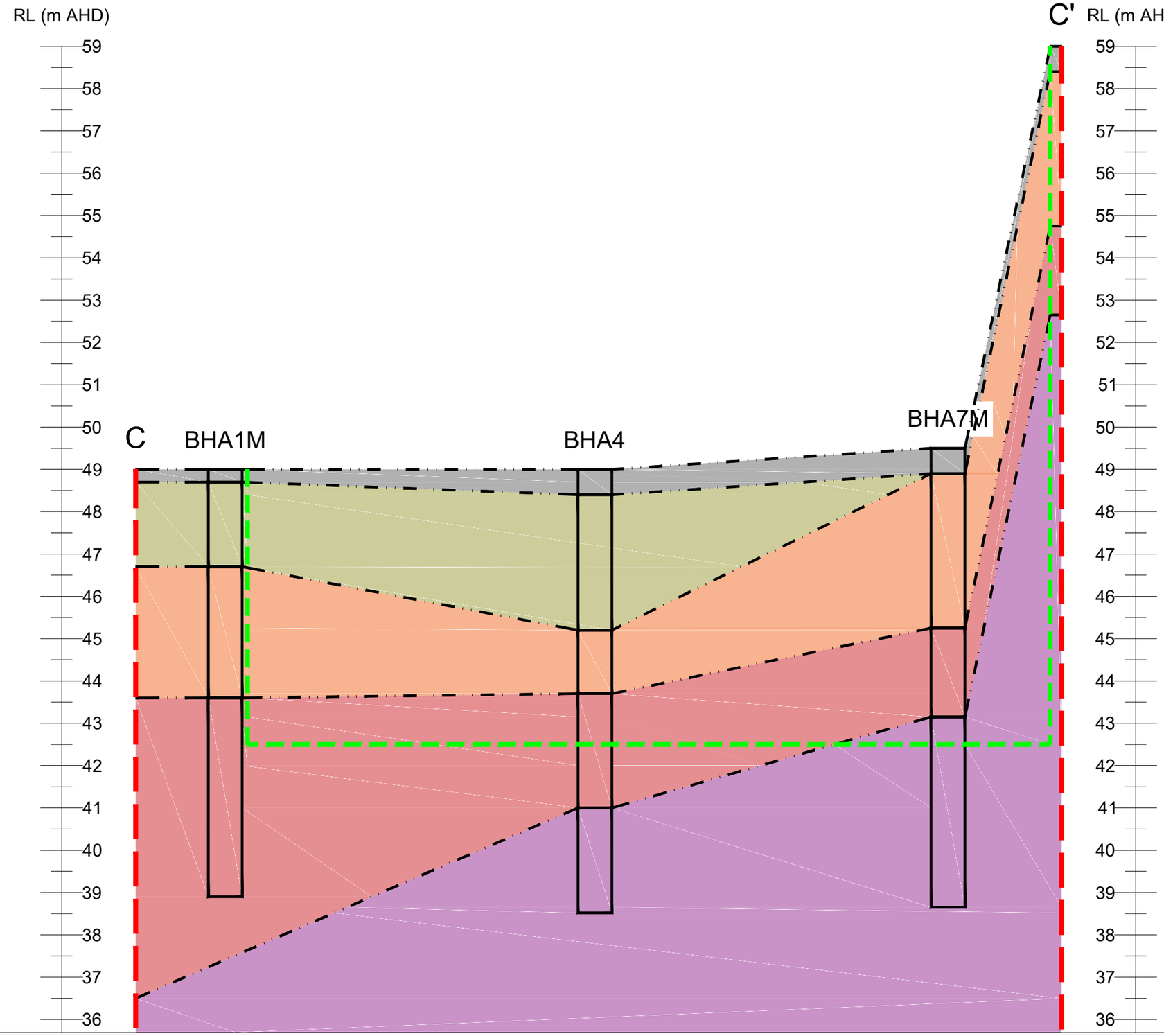
eiaustralia
Practical Solutions for Built Environments
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.C.
Approved:	N.J.
Date:	28-02-23

Caddens Estate Development Pty Ltd
Geotechnical Investigation
Caddens Corner, 80 O'Connell Street, Kingswood, NSW
Section B-B'

Figure: 4

Project: E25834.G03



LEGEND (All Locations are Approximate)

- Site boundary
- Basement boundary FFL of 42.5
- Topsoil/Fill
- Residual Soil
- Very Low Strength Siltstone
- Low Strength Siltstone/Sandstone
- Medium Strength Siltstone/Sandstone
- Inferred unit boundary from limited borehole information (might not be accurate)

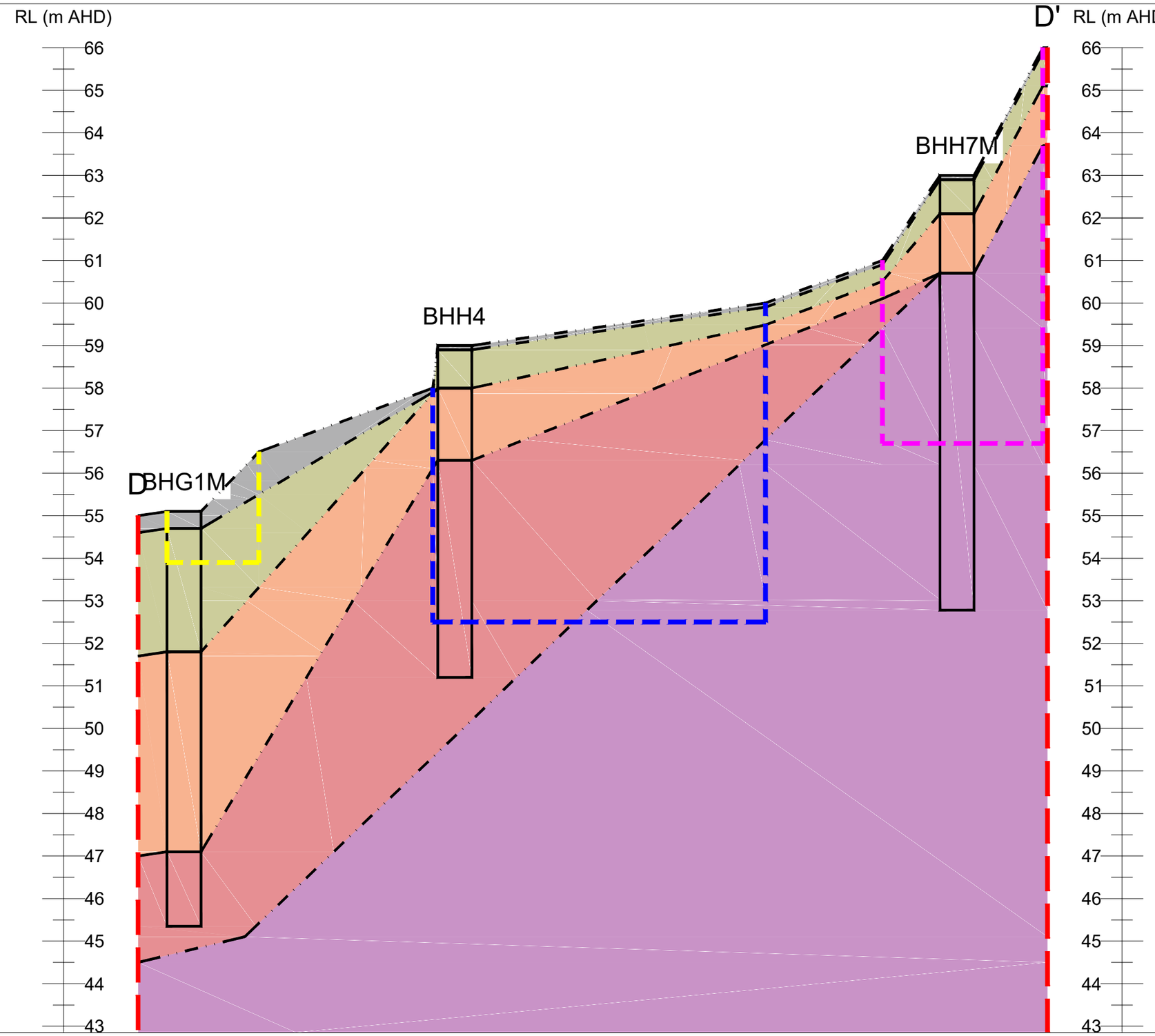
eiaustralia
Practical Solutions for Built Environments
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.C.
Approved:	N.J.
Date:	28-02-23

Caddens Estate Development Pty Ltd
Geotechnical Investigation
Caddens Corner, 80 O'Connell Street,
Kingswood, NSW
Section C-C'

Figure: 5

Project: E25834.G03



LEGEND (All Locations are Approximate)

- Site boundary
- Basement boundary FFL of 52.5
- Basement boundary FFL of 53.9
- Basement boundary FFL of 56.7
- Inferred unit boundary from limited borehole information (might not be accurate)

- Topsoil/Fill
- Residual Soil
- Very Low Strength Siltstone
- Low Strength Siltstone/Sandstone
- Medium Strength Siltstone/Sandstone

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Practical Solutions for Built Environments
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	M.C.
Approved:	N.J.
Date:	28-02-23

Caddens Estate Development Pty Ltd
Geotechnical Investigation
Caddens Corner, 80 O'Connell Street, Kingswood, NSW
Section D-D'

Figure: 6

Project: E25834.G03

Appendix A – Borehole Logs And Explanatory Notes

BOREHOLE LOG

BH NO. BHA1M

Project	Multiple Mixed-use Developments	**Sheet**	1 of 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	11/11/2022
Position	Refer to Figure 2	**Date Completed**	11/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 11/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	49.00	DS 0.10-0.20 m			-	FILL: Sandy CLAY; low plasticity, dark grey, trace rootlets.	M	-	FILL
				0.30								
				48.70	SPT 0.50-0.95 m 3,4,5 N=9			CL-CI	Silty CLAY; low to medium plasticity, dark brown.	M (<PL)	St	RESIDUAL SOIL
			1		SPT 1.50-1.95 m 11,6,9 N=15						VSt	
			2	*2.30*								
	M			46.70				-	SILTSTONE; brown, distinctly weathered, very low to low strength.	-	-	BEDROCK
			3									
			4	*4.71*								
									Continued as Cored Borehole			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHA1M

Project	Multiple Mixed-use Developments	**Sheet**	2 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	11/11/2022
Position	Refer to Figure 2	**Date Completed**	11/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 11/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	*DEPTH* RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
NMLC	100% RETURN	100	23	0							
				1							
				2							
				3							
				4	*4.71*		Continuation from non-cored borehole				
				5	44.29		SILTSTONE; dark grey-brown, very thinly to thinly bedded.	DW		4.71-4.84: XWZ, 130mm 4.84-5.02: CS, 80mm 5.03-5.07: XWS, 40mm 5.09-5.18: CS, 90mm 5.21-5.25: XWS, 40mm	
				6						6.11-6.17: CS, 60mm 6.27: JT, 80°, PR, RO, CN	
				7						6.95-7.00: CS, 50mm 7.00: JT, 80°, PR, RO, CN	
	90-100% RETURN	100	68	8	*8.35* 40.65		From 8.35m, dark grey, medium bedded.	SW		7.62-7.80: CZ, 180mm 7.90-7.94: XWS, 40mm 8.08-8.15: CS, 70mm 8.20-8.22: CS, 200mm	
				9						8.73: JT, 90°, PR, RO, CN	
				10	*10.00*						

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHA1M

Project	Multiple Mixed-use Developments	**Sheet**	3 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	11/11/2022
Position	Refer to Figure 2	**Date Completed**	11/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 11/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	*DEPTH* RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				10	38.90		SILTSTONE; dark grey, medium bedded Hole Terminated at 10.10 m Target Depth Reached.				
				11							
				12							
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BHA1M

Project	Multiple Mixed-use Developments			**Depth Range**	4.71m to 10.10m BEGL		
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW			**Contractor**	Geosense Drilling Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 49.0m	**Drill Rig**	Comacchio Geo 205		
Job No.	E25834.G03	**Inclination**	-90°	**Logged**	MW	**Date**	11 / 11 / 2022
Client	Caddens Estate Development Pty Ltd	**Box**	1-2 of 2	**Checked**	NJ	**Date**	18 / 01 / 2023

MONITORING WELL LOG

MW NO. BHA1M

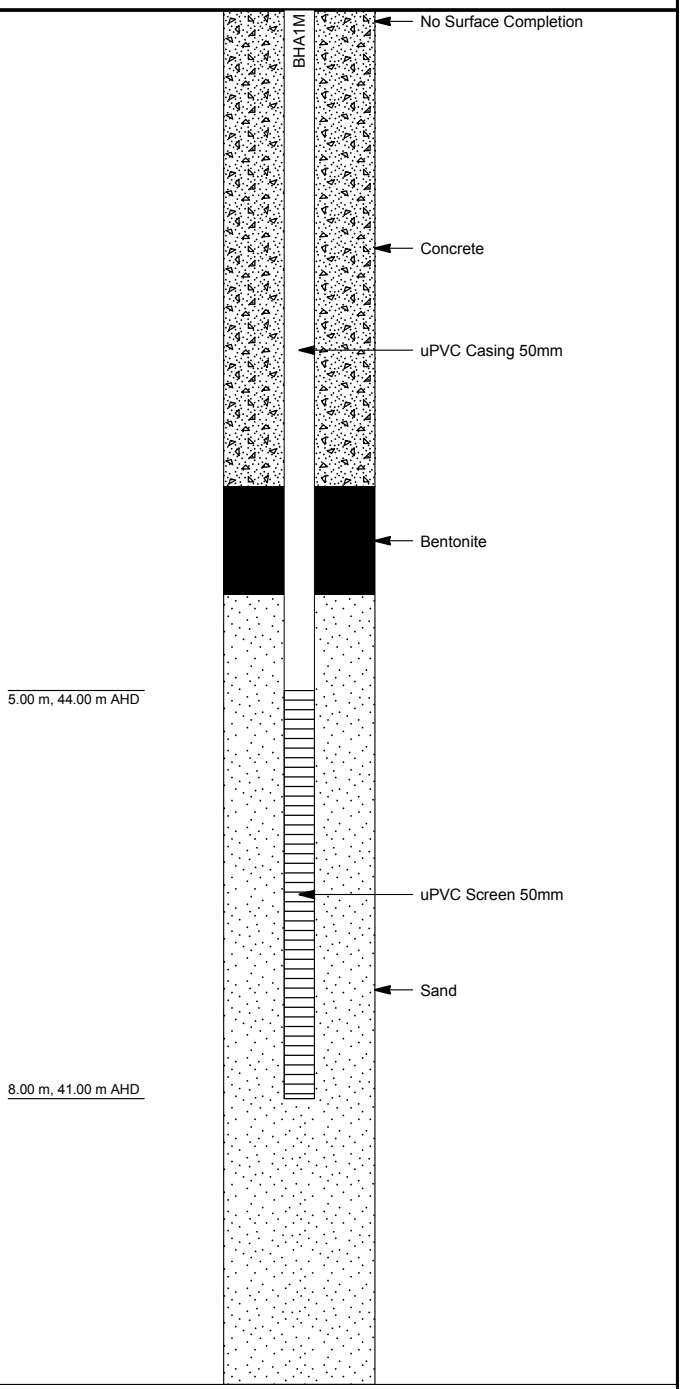
Project	Multiple Mixed-use Developments	**Sheet**	1 of 2
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	11/11/2022
Position	Refer to Figure 2	**Date Completed**	11/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 11/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

METHOD	WATER	DEPTH (m)	RL (m AHD)	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION
AD/T	GWNE	0	49		FILL: Sandy CLAY; low plasticity, dark grey, trace rootlets.
					Silty CLAY; low to medium plasticity, dark brown.
		1	48		
		2	47		SILTSTONE; brown, distinctly weathered, very low to low strength.
		3	46		
		4	45		
NMLC	100% RETURN	5	44		SILTSTONE; dark grey-brown, very thinly to thinly bedded.
		6	43		
		7	42		
	90-100% RETURN	8	41		From 8.35m, dark grey, medium bedded.
		9	40		
		10	39		SILTSTONE; dark grey, medium bedded
					Hole Terminated at 10.10 m Target Depth Reached.
		11	38		

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
BHA1M	Standpipe Piezometer	-1.00 m 50.00 m	8.00 m 41.00 m	11/11/2022	



This well log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE LOG

BH NO. BHA4

Project	Multiple Mixed-use Developments	**Sheet**	1 of 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	10/11/2022
Position	Refer to Figure 2	**Date Completed**	11/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 11/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0	48.95				-	ASPHALT; 50mm thickness.	-	-	PAVEMENT
					DS 0.20-0.30 m			-	FILL: Sandy GRAVEL; fine to coarse-grained, sub-angular to sub-rounded, sand is fine to coarse-grained pale grey/yellow-brown.	D	-	FILL
				0.60								
				48.40	DS 0.70-0.80 m			CH	Silty CLAY; high plasticity, yellow-red mottled brown, traces of sub-angular, fine to medium ironstone gravels.			RESIDUAL SOIL
			1									
					SPT 1.50-1.95 m 3,6,7 N=13						St	
	-			*2.00*								
			2	47.00	DS 2.00-2.10 m				From 2.0m, yellow-brown mottled pale grey.	M (>PL)		
AD/T		GWNE										
			3		SPT 3.00-3.45 m 4,7,10 N=17						VSt	
				3.80								
	M		4	45.20				-	SILTSTONE; brown/dark grey, distinctly weathered, very low to low strength.	-	-	BEDROCK
				4.60								
									Continued as Cored Borehole			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHA4

Project	Multiple Mixed-use Developments	**Sheet**	2 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	10/11/2022
Position	Refer to Figure 2	**Date Completed**	11/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 11/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				0							
				1							
				2							
				3							
				4							
					4.60		Continuation from non-cored borehole				
NMLC	80% RETURN	100	15	5	44.40		SILTSTONE; dark grey/brown, very thinly bedded.	DW		4.71: JT, 80°, PR, RO, CN 4.74: JT, 40°, ST, RO, CN 4.92: JT, 70°, PR, RO, CN 4.95: JT, 30°, PR, RO, CN 4.98: JT, 30°, PR, RO, CN	
					5.00						
					44.00		CORELOSS; 300mm.				
					5.30						
				6	43.70		SILTSTONE; dark grey/brown,very thinly to thinly bedded.	DW		5.37-5.38: CS, 10mm 5.49-5.51: CS, 20mm 5.54: JT, 90°, PR, RO, CN 5.66: JT, 70°, PR, RO, CN 5.81-5.82: CS, 10mm 5.90-5.92: XWS, 20mm 6.03: JT, 60°, CU, RO, CN 6.20: JT, 75°, IR, RO, CN 6.34: JT, 75°, PR, RO, CN 6.40-6.60: CS, 200mm	
					6.60						
	90-100% RETURN	100	33	7	42.40		From 6.60m, thinly to medium bedded.			6.68-6.72: CS, 40mm 6.80-6.81: XWS, 10mm 7.30-7.54: CZ, 240mm	
				8				SW		7.96-8.00: CS, 40mm 8.30: JT, 40°, ST, RO, CN	
				9						9.07-9.15: XWS, 80mm	
	90-100% RETURN	100	43	10	*10.00*					9.68: JT, 45°, ST, RO, CN	

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHA4

Project	Multiple Mixed-use Developments	**Sheet**	3 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	10/11/2022
Position	Refer to Figure 2	**Date Completed**	11/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 11/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	*DEPTH* RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
NMLC		100	43	10	39.00		SILTSTONE; dark grey/brwn, thinly to medium bedded	SW		9.97-10.00: CS, 30mm	
					10.48						
					38.52		Hole Terminated at 10.48 m Target Depth Reached.				
				11							
				12							
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BHA4

Project	Multiple Mixed-use Developments			**Depth Range**	4.60m to10.48m BEGL		
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW			**Contractor**	Geosense Drilling Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 49.0m	**Drill Rig**	Comacchio Geo 205		
Job No.	E25834.G03	**Inclination**	-90°	**Logged**	MW	**Date**	10 / 11 / 2022
Client	Caddens Estate Development Pty Ltd	**Box**	1-2 of 2	**Checked**	NJ	**Date**	18 / 01 / 2023

BOREHOLE LOG

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BH NO. BHA7M

Project	Multiple Mixed-use Developments	**Sheet**	1 of 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	10/11/2022
Position	Refer to Figure 2	**Date Completed**	10/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 10/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.50 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	49.45	DS 0.20-0.30 m			-	ASPHALT; 50mm thickness.	-	-	PAVEMENT
								-	FILL: Gravelly SAND; medium to coarse-grained, yellow-brown mottled pale grey, gravel is fine to coarse, sub-angular to sub-rounded.	D	-	FILL
				0.60	SPT 0.50-0.70 m							
				48.90	6,8/50mm HB			-	SILTSTONE; dark grey, distinctly weathered, very low to low strength.			BEDROCK
	M		1		DS 0.70-0.80 m					-	-	
			2									
			3									
			4	*4.25*								
									Continued as Cored Borehole			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHA7M

Project	Multiple Mixed-use Developments	**Sheet**	2 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	10/11/2022
Position	Refer to Figure 2	**Date Completed**	10/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 10/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.50 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				0							
				1							
				2							
				3							
				4	*4.25*		Continuation from non-cored borehole				
NMLC	90% RETURN	100	57	5	45.25 *5.30* 44.20		SILTSTONE; dark grey/brown, thinly to medium bedded. From 5.30m, dark grey, thinly to medium bedded.	DW - SW FR		4.25-4.27: CS, 20mm 4.30: JT, 70°, PR, RO, SN 4.37: JT, 20°, ST, RO, CN 4.69: JT, 70 - 80°, IR, RO, CN 4.74-4.78: XWS, 40mm 4.80: JT, 60°, PR, RO, CN 4.98: JT, 85°, CU, RO, CN 5.15-5.21: XWS, 60mm 5.32: JT, 20°, PR, RO, CN 5.55: JT, 75°, PR, RO, CN 5.81: JT, 80°, PR, RO, CN 6.35-6.36: CS, 10mm	
				6							
	90% RETURN	100	48	7						7.38-7.39: CS, 10mm 7.48: JT, 10°, CU, RO, CN 7.55: JT, 70°, IR, RO, CN 7.65-7.66: XWS, 10mm 7.96-8.00: CS, 40mm 8.05-8.07: CS, 20mm 8.15-8.16: CS, 10mm 8.67-8.80: CZ, 130mm 8.82-8.86: XWS, 40mm 8.89-8.90: XWS, 10mm	
				8							
				9				SW		9.39-9.42: XWS, 30mm 9.51-9.53: CS, 20mm 9.53-9.61: XWS, x4 80mm 9.61-9.66: XWS, 50mm	
				10	*10.00*			FR		9.72: JT, 85°, PR, RO, CN	

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHA7M

Project	Multiple Mixed-use Developments	**Sheet**	3 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	10/11/2022
Position	Refer to Figure 2	**Date Completed**	10/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 10/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.50 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	*DEPTH* RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
NMLC	90% RETURN	100	99	10	39.50		SILTSTONE; dark grey, thinly to medium bedded.	FR		9.80-9.81: XWS, 10mm 10.63-10.64: CS, 10mm	
					10.85 38.65		Hole Terminated at 10.85 m Target Depth Reached.				
				11							
				12							
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BHA7M

Project	Multiple Mixed-use Developments			**Depth Range**	4.25m to 10.85m BEGL		
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW			**Contractor**	Geosense Drilling Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 49.5m	**Drill Rig**	Comacchio Geo 205		
Job No.	E25834.G03	**Inclination**	-90°	**Logged**	MW	**Date**	10 / 11 / 2022
Client	Caddens Estate Development Pty Ltd	**Box**	1-2 of 2	**Checked**	NJ	**Date**	18 / 01 / 2023

MONITORING WELL LOG

MW NO. BHA7M

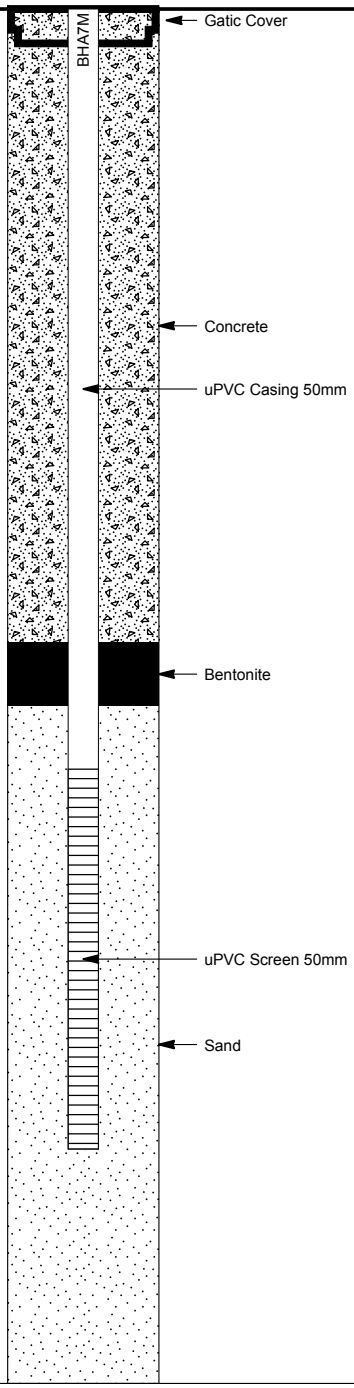
Project	Multiple Mixed-use Developments	**Sheet**	1 of 2
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	10/11/2022
Position	Refer to Figure 2	**Date Completed**	10/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 10/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈49.50 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

METHOD	WATER	DEPTH (m)	RL (m AHD)	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION
AD/T	GWNE	0	49		ASPHALT; 50mm thickness.
					FILL: Gravelly SAND; medium to coarse-grained, yellow-brown mottled pale grey, gravel is fine to coarse, sub-angular to sub-rounded.
		1	48		SILTSTONE; dark grey, distinctly weathered, very low to low strength.
		2	47		
		3	46		
		4	45		
NMLC	90% RETURN	5	44		SILTSTONE; dark grey/brown, thinly to medium bedded.
		6	43		From 5.30m, dark grey, thinly to medium bedded.
	90% RETURN	7	42		
		8	41		
		9	40		
	90% RETURN	10	39		SILTSTONE; dark grey, thinly to medium bedded.
		11	38		Hole Terminated at 10.85 m Target Depth Reached.

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
BHA7M	Standpipe Piezometer	0.00 m 49.50 m	9.00 m 40.50 m	10/11/2022	



This well log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE LOG

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Practical Solutions for Built Environments

BH NO. BHC1

Project	Multiple Mixed-use Developments	**Sheet**	1 of 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	14/11/2022
Position	Refer to Figure 2	**Date Completed**	14/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 14/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈53.30 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	▽	0	53.30	DS 0.10-0.20 m			-	FILL: Gravelly Silty CLAY; low plasticity, dark brown/brown, gravel is fine to medium, sub-angular to sub-rounded.			FILL
			1		SPT 0.50-0.95 m 3,3,5 N=8 DS 0.70-0.80 m							
			2		SPT 1.50-1.75 m 1,10/100mm HB					M (=PL)	-	
			3		SPT 3.00-3.45 m 3,3,5 N=8							
				3.30 50.00				Cl	Silty CLAY; medium plasticity, yellow-brown mottled grey.			RESIDUAL SOIL
			4		BS 3.50-4.50 m DS 3.50-3.60 m							
			5		SPT 4.50-4.95 m 7,7,8 N=15							
			6		SPT 6.00-6.45 m 3,4,6 N=10					M (>PL)	St	
			7	*7.50* 45.80	SPT 7.50-7.95 m 5,8,15 N=23				From 7.50m, yellow-brown mottled pale grey, with siltstone bands.			
			8									
			9		SPT 9.00-9.30 m 11,20/150mm HB							
				9.30 44.00				-	SILTSTONE; brown/dark grey, distinctly weathered, very low to low strength.	-	-	BEDROCK
	M			*9.90*								
			10						Continued as Cored Borehole			

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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Practical Solutions for Built Environments

BH NO. BHC1

Project	Multiple Mixed-use Developments	**Sheet**	2 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	14/11/2022
Position	Refer to Figure 2	**Date Completed**	14/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 14/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈53.30 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	*DEPTH* RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				0							
				1							
				2							
				3							
				4							
				5							
				6							
				7							
				8							
				9							
				10	*9.90* 43.40		Continuation from non-cored borehole				
		100	0							9.90-9.94: XWS, 40mm	

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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Practical Solutions for Built Environments

BH NO. BHC1

Project	Multiple Mixed-use Developments	**Sheet**	3 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	14/11/2022
Position	Refer to Figure 2	**Date Completed**	14/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 14/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈53.30 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
NMLC	90% RETURN	100	0	10			SILTSTONE; dark grey/brown, very thinly to thinly bedded.	DW		9.96-10.08: XWZ, 120mm 10.11: JT, 70°, IR, RO, CN 10.22-10.23: CS, 10mm 10.26-10.29: XWS, 30mm 10.31-10.34: XWS, 30mm 10.43-10.46: XWS, 30mm 10.50: JT, 80°, PR, RO, CN 10.60-10.62: XWS, 20mm 10.90-10.92: XWS, 20mm	
				11						11.18-11.30: XWZ, 120mm 11.36: JT, 20°, IR, RO, CN 11.43-12.00: XWZ, 570mm	
	90% RETURN	100	26	12				SW		12.11-12.12: XWS, 10mm	
				13						12.57: JT, 70°, IR, RO, CN 12.64-12.67: CS, 30mm 12.72: JT, 70°, PR, RO, CN	
					13.50					13.19-13.21: XWS, 20mm	
					39.80		From 13.5m, dark grey, thinly bedded			13.41: JT, 70°, PR, RO, CN 13.54: JT, 70°, IR, RO, CN 13.64-13.70: XWS, 60mm 13.75: JT, 80°, IR, RO, CN 13.85-14.00: XWS, 150mm	
				14	14.00						
	90% RETURN	100	0		14.20 39.10		CORELOSS; 200mm. SILTSTONE; dark grey, thinly bedded.	SW		14.48: JT, 70°, PR, RO, CN 14.65: JT, 70°, PR, RO, CN	
					14.70 38.60		Hole Terminated at 14.70 m Target Depth Reached.				
				15							
				16							
				17							
				18							
				19							
				20							

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BHC1

Project	Multiple Mixed-use Developments			**Depth Range**	9.90m to 14.7m BEGL		
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW			**Contractor**	Geosense Drilling Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 53.3m	**Drill Rig**	Comacchio Geo 205		
Job No.	E25834.G03	**Inclination**	-90°	**Logged**	MW	**Date**	14 / 11 / 2022
Client	Caddens Estate Development Pty Ltd	**Box**	1-2 of 2	**Checked**	NJ	**Date**	18 / 01 / 2023

BOREHOLE LOG

BH NO. BHC6

Project	Multiple Mixed-use Developments	**Sheet**	1 of 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	15/11/2022
Position	Refer to Figure 2	**Date Completed**	15/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 15/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈54.30 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-		0	54.30 *0.20*				-	FILL: Gravelly CLAY; low plasticity, brown, gravel is fine to coarse sub-angular to sub-rounded.	-	-	FILL
	M	GWNE	1	54.10 *1.60*				-	SILTSTONE; brown, distinctly weathered, very low to low strength.	-	-	BEDROCK
									Continued as Cored Borehole			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHC6

Project	Multiple Mixed-use Developments	**Sheet**	2 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	15/11/2022
Position	Refer to Figure 2	**Date Completed**	15/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 15/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈54.30 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				0							
				1							
					1.60		Continuation from non-cored borehole				
NMLC	80% RETURN	100	0	2	52.70		SILTSTONE; dark brown/grey, very thinly bedded.	DW		1.60-1.63: CS, 30mm 1.67: JT, 80°, PR, RO, CN 1.83-1.92: CS, 90mm 2.05-2.07: XWS, 20mm 2.11-2.30: XWZ, 190mm	
					2.30						
					52.00		CORE LOSS; 1100mm.				
				3	*3.40*						
	80% RETURN	100	0		50.90		SILTSTONE; dark brown/grey, very thinly bedded.	DW		3.42: JT, 80°, IR, RO, CN 3.50-3.60: XWZ, 100mm 3.67-3.69: XWS, 20mm 3.72: JT, 90°, PR, RO, CN 3.75-3.85: XWZ, 100mm 3.93-3.96: XWS, 30mm	
				4	*4.30*						
					50.00		CORE LOSS; 500mm.				
					4.80						
					~~49.90~~						
				5	49.40		SILTSTONE; dark brown/grey, very thinly bedded. From 4.90m, thinly bedded.	DW - SW		4.80-4.85: XWS, 50mm 4.99: JT, 85°, IR, RO, CN 5.26-5.32: CS, 60mm 5.40-5.43: XWS, 30mm 5.53: JT, 80°, PR, RO, CCN	
	80% RETURN	100	0							5.74: JT, 60°, PR, RO, SN 5.80: JT, 60°, PR, RO, SN 5.86: JT, 70°, PR, RO, CN 6.09-6.11: CS, 20mm 6.31: JT, 60°, PR, RO, SN 6.50: JT, 70°, CU, RO, SN	
				6							
				7						7.09-7.28: XWZ, 190mm	
								FR			
				8						7.58: JT, 70°, x2 PR, RO, SN	
					8.10						
					46.20		SANDSTONE; fine to medium grained, pale grey, medium bedded				
					8.70						
	80% RETURN	100	51		45.60		SILTSTONE; pale grey, medium bedded	SW		8.80-8.81: CS, 10mm 8.89: JT, 75°, PR, RO, SN 8.95-9.04: CS, 90mm 9.07: JT, 75°, PR, RO, SN 9.11: JT, 70°, ST, RO, SN 9.31: JT, 70°, ST, RO, SN	
				9							
					10.00					9.79: JT, 70°, PR, RO, CN 9.88-9.93: XWS, 50mm	
				10							

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CORED BOREHOLE LOG

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BH NO. BHC6

Project	Multiple Mixed-use Developments	**Sheet**	3 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	15/11/2022
Position	Refer to Figure 2	**Date Completed**	15/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 15/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈54.30 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
NMLC	90% RETURN	100	88	10	44.30		SILTSTONE; pale grey, medium bedded	SW		10.06-10.09: CS, 30mm 10.10-10.11: XWS, 10mm 10.18-10.20: XWS, 20mm	
				11				FR			
				12							
	90% RETURN	100	94	13							
				14							
				15	15.20					14.74: JT, 30°, CU, RO, CN 14.96-15.03: XWS, 70mm	
					39.10		Hole Terminated at 15.20 m Target Depth Reached.				
				16							
				17							
				18							
				19							
				20							

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BHC6

Project	Multiple Mixed-use Developments			**Depth Range**	1.60m to 15.20m BEGL		
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW			**Contractor**	Geosense Drilling Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 54.3m	**Drill Rig**	Comacchio Geo 205		
Job No.	E25834.G03	**Inclination**	-90°	**Logged**	MW	**Date**	15 / 11 / 2022
Client	Caddens Estate Development Pty Ltd	**Box**	1-3 of 3	**Checked**	NJ	**Date**	18 / 01 / 2023

BOREHOLE LOG

BH NO. BHD4M

Project	Multiple Mixed-use Developments	**Sheet**	1 of 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	17/11/2022
Position	Refer to Figure 2	**Date Completed**	17/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 17/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈53.50 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	▽	0	53.50				-	FILL: Gravelly Sandy CLAY; low plasticity, dark brown, gravel is fine to medium, angular to sub-angular, sand is fine to medium-grained.	M (<PL)	-	FILL
			1	*1.60*								
				51.90				-	FILL: Silty CLAY; low plasticity, dark grey, traces of sub-rounded to rounded, fine gravels.	M (>PL)	-	
			2	*2.60*								
				50.90	B 2.60-3.50 m			CI	Silty CLAY; medium plasticity, yellow-brown/grey.			RESIDUAL SOIL
				3.00								
			3	50.50	SPT 3.00-3.45 m 4,11,14 N=25				From 3.0m, grading into extremely weathered materials.	M (<PL)	VSt	
			4	*4.50*								
	M			49.00				-	SILTSTONE; dark brown, distinctly weathered, very low to low strength.	-	-	BEDROCK
			5									
			6	*6.15*								
									Continued as Cored Borehole			
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHD4M

Project	Multiple Mixed-use Developments	**Sheet**	2 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	17/11/2022
Position	Refer to Figure 2	**Date Completed**	17/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 17/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈53.50 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				0							
				1							
				2							
				3							
				4							
				5							
				6	*6.15*		Continuation from non-cored borehole				
NMLC	60% RETURN	100	59	7	47.35		SILTSTONE; dark brown, very thinly bedded.	DW - SW		6.26: JT, 15°, CU, RO, CN 6.50: JT, 60°, PR, RO, SN 6.53-6.62: CS, 90mm 6.76-6.81: CS, 50mm 6.86: JT, 75°, PR, RO, SN 6.96: JT, 70°, PR, RO, SN 7.10: JT, 70°, ST, RO, CN 7.13-7.23: CZ, 100mm 7.29: JT, 60°, PR, RO, CN 7.36-7.50: CZ, 140mm 7.53: JT, 70°, CU, RO, CN 7.56: JT, 60°, CU, RO, CN 7.63: JT, 70°, PR, RO, CN	
	60% RETURN	100	0	8						7.96: JT, 30°, IR, RO, SN 8.00-8.08: CS, 80mm 8.10: JT, ST, RO, SN 8.19-8.23: CS, 40mm 8.29-8.42: CZ, 130mm 8.46-8.47: XWS, 10mm	
	80% RETURN	100	51	9	*8.60* 44.90		From 8.6m, dark grey, thinly bedded			8.77-8.79: CS, 20mm 9.16-9.17: CS, 10mm 9.48: JT, 60°, PR, RO, SN 9.76: JT, 10°, PR, RO, SN	
				10	*10.00*						

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHD4M

Project	Multiple Mixed-use Developments	**Sheet**	3 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	17/11/2022
Position	Refer to Figure 2	**Date Completed**	17/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 17/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈53.50 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	*DEPTH* RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				10	43.40		SILTSTONE; dark grey, thinly bedded Hole Terminated at 10.10 m Target Depth Reached.				
				11							
				12							
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BHD4M

Project	Multiple Mixed-use Developments			**Depth Range**	6.15m to 10.10m BEGL		
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW			**Contractor**	Geosense Drilling Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 53.5m	**Drill Rig**	Comacchio Geo 205		
Job No.	E25834.G03	**Inclination**	-90°	**Logged**	MW	**Date**	17 / 11 / 2022
Client	Caddens Estate Development Pty Ltd	**Box**	1-2 of 2	**Checked**	NJ	**Date**	18 / 01 / 2023

MONITORING WELL LOG

MW NO. BHD4M

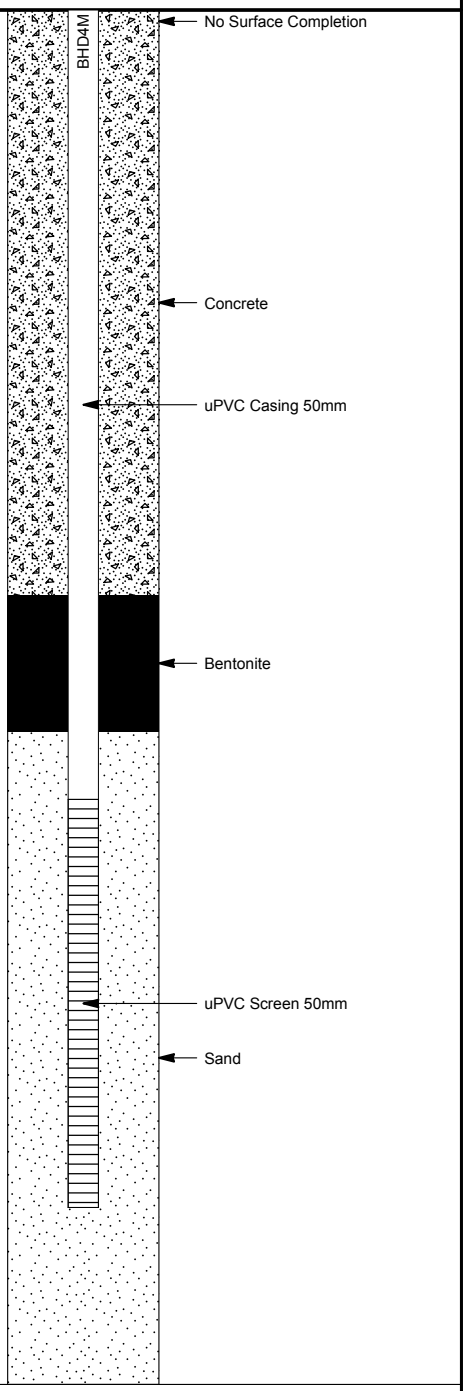
Project	Multiple Mixed-use Developments	**Sheet**	1 of 2
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	17/11/2022
Position	Refer to Figure 2	**Date Completed**	17/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 17/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈53.50 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

METHOD	WATER	DEPTH (m)	RL (m AHD)	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION
AD/T		0	53		FILL: Gravelly Sandy CLAY; low plasticity, dark brown, gravel is fine to medium, angular to sub-angular, sand is fine to medium-grained.
		1	52		FILL: Silty CLAY; low plasticity, dark grey, traces of sub-rounded to rounded, fine gravels.
		2	51		Silty CLAY; medium plasticity, yellow-brown/grey.
		3	50		From 3.0m, grading into extremely weathered materials.
		4	49		SILTSTONE; dark brown, distinctly weathered, very low to low strength.
		5	48		
		6	47		SILTSTONE; dark brown, very thinly bedded.
NMLC	60% RETURN	7	46		
	60% RETURN	8	45		From 8.6m, dark grey, thinly bedded
	80% RETURN	9	44		
		10	43		SILTSTONE; dark grey, thinly bedded Hole Terminated at 10.10 m Target Depth Reached.
		11			

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
BHD4M	Standpipe Piezometer	-0.20 m 53.70 m	8.80 m 44.70 m	17/11/2022	



This well log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE LOG

BH NO. BHG1M

Project	Multiple Mixed-use Developments	**Sheet**	1 of 2
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	16/11/2022
Position	Refer to Figure 2	**Date Completed**	16/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 16/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈55.10 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	▽	0	55.10	DS 0.10-0.20 m			-	FILL: Silty CLAY; low plasticity, dark grey, traces of sub-angular fine gravels.	M (>PL)	-	FILL
				0.40								
				54.70	B 0.50-1.50 m SPT 0.50-0.95 m 2,3,5 N=8 DS 0.60-0.70 m			CI	Silty CLAY; medium plasticity, yellow-brown mottled pale grey.			RESIDUAL SOIL
			1									
	-				SPT 1.50-1.95 m 2,3,5 N=8					M (>PL)	St	
			2									
		▽	3		SPT 3.00-3.35 m 11,14,5/50mm HB							
				3.30								
	M			51.80				-	SILTSTONE; brown/grey, distinctly weathered, very low to low strength.	-	-	BEDROCK
			4	*4.60*								
									Continued as Cored Borehole			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHG1M

Project	Multiple Mixed-use Developments	**Sheet**	2 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	16/11/2022
Position	Refer to Figure 2	**Date Completed**	16/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 16/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈55.10 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				0							
				1							
				2							
				3							
				4	*4.60*		Continuation from non-cored borehole				
NMLC	80% RETURN	100	0	5	50.50		SILTSTONE; dark brown/ dark grey, very thinly bedded.	DW		4.60-4.64: XWS, 40mm 4.72: JT, 70°, CU, RO, CN 4.77-4.83: XWS, 60mm 4.95-5.05: XWZ, 100mm 5.18-5.27: XWS, 90mm 5.30-5.50: XWZ, 200mm 5.55-5.57: XWS, 20mm 5.60-5.80: XWZ, 200mm	
	80% RETURN	100	0	6						6.06: JT, 80°, IR, RO, CN 6.10-6.32: XWZ, 220mm 6.16: JT, 30°, IR, RO, CN 6.36: JT, 70°, IR, RO, CN 6.60-6.70: XWZ, 100mm 6.76: JT, 75°, IR, RO, Clay 6.93-7.00: XWS, 70mm 7.18-7.37: XWZ, 190mm 7.44-7.50: XWS, 60mm	
	80% RETURN	100	0	7							
				8				SW		8.00: JT, 85°, PR, RO, CN 8.06-8.10: CS, 40mm 8.24: JT, 70°, ST, RO, CN 8.27-8.35: CS, 80mm 8.57: JT, 70°, CU, RO, CN 8.59-8.63: CS, 40mm 8.70: JT, 30°, ST, RO, CN 8.81: JT, 20°, 2x ST, RO, CN 8.91: JT, 60°, CU, RO, CN 8.97: JT, 60°, PR, RO, CN 9.10: JT, 60°, CU, RO, SN 9.16: JT, 40°, CU, RO, CN 9.21: JT, 20°, CU, RO, CN 9.32-9.42: CZ, 100mm 9.42-9.53: XWZ, 110mm 9.56: JT, 60°, CU, RO, CN	
	80% RETURN	100	0	9							
				10	*9.75* 45.35		Hole Terminated at 9.75 m Target Depth Reached.				

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHG1M

Project	Multiple Mixed-use Developments	**Sheet**	3 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	16/11/2022
Position	Refer to Figure 2	**Date Completed**	16/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 16/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈55.10 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	*DEPTH* RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				10						9.62: JT, 30°, CU, RO, CN 9.73: JT, 60°, PR, RO, CN	
				11							
				12							
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BHG1M

Project	Multiple Mixed-use Developments			**Depth Range**	4.60m to 9.75m BEGL		
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW			**Contractor**	Geosense Drilling Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 55.1m	**Drill Rig**	Comacchio Geo 205		
Job No.	E25834.G03	**Inclination**	-90°	**Logged**	MW	**Date**	16 / 11 / 2022
Client	Caddens Estate Development Pty Ltd	**Box**	1-2 of 2	**Checked**	NJ	**Date**	18 / 01 / 2023

MONITORING WELL LOG

MW NO. BHG1M

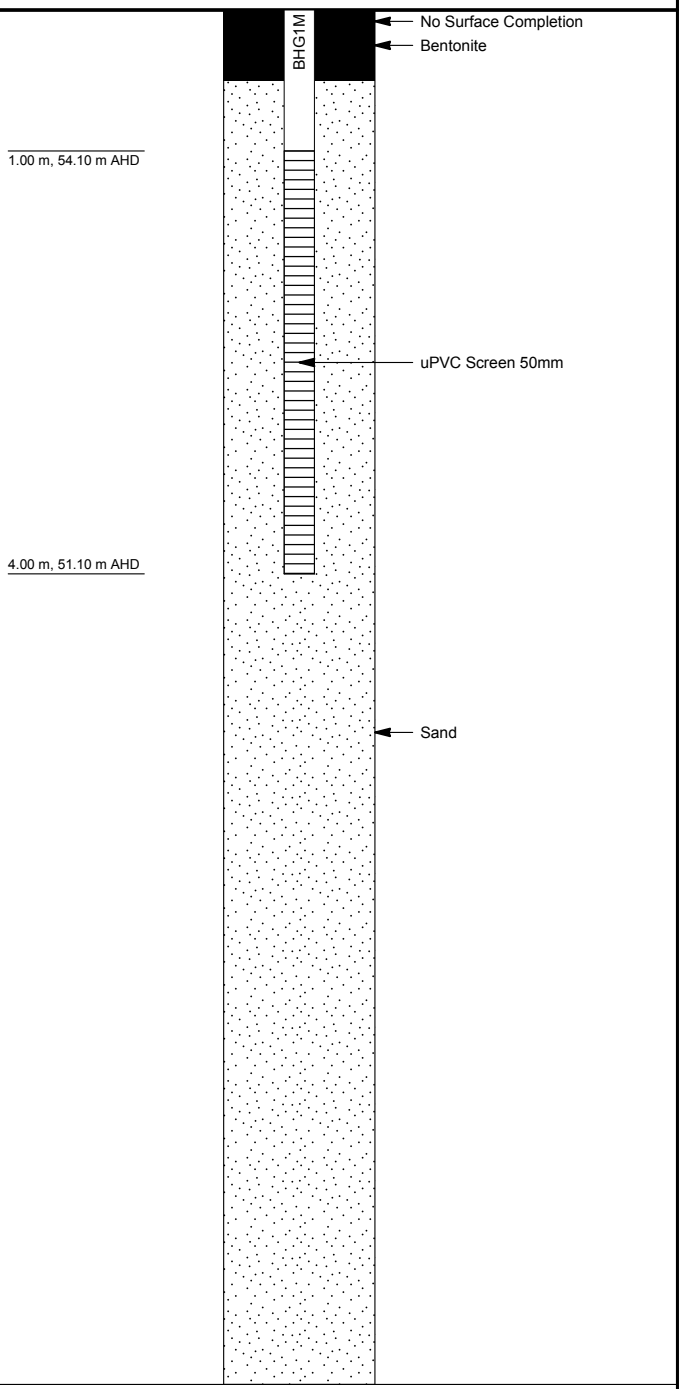
Project	Multiple Mixed-use Developments	**Sheet**	1 of 2
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	16/11/2022
Position	Refer to Figure 2	**Date Completed**	16/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 16/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈55.10 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

METHOD	WATER	DEPTH (m)	RL (m AHD)	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION
AD/T		0	55		FILL: Silty CLAY; low plasticity, dark grey, traces of sub-angular fine gravels.
		1	54		Silty CLAY; medium plasticity, yellow-brown mottled pale grey.
		2	53		
		3	52		
		4	51		SILTSTONE; brown/grey, distinctly weathered, very low to low strength.
NMLC	80% RETURN	5	50		SILTSTONE; dark brown/ dark grey, very thinly bedded.
	80% RETURN	6	49		
	80% RETURN	7	48		
		8	47		
		9	46		
		10	45		Hole Terminated at 9.75 m Target Depth Reached.

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
BHG1M	Standpipe Piezometer	-1.00 m 56.10 m	4.00 m 51.10 m	16/11/2022	



This well log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE LOG

BH NO. BHH4

Project	Multiple Mixed-use Developments	**Sheet**	1 of 2
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	17/11/2022
Position	Refer to Figure 2	**Date Completed**	17/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 17/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈59.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.10 58.90	DS 0.20-0.30 m			-	TOPSOIL: Silty CLAY; low plasticity, dark brown, with rootlets.	M (<PL)	-	TOPSOIL
								CI	Silty CLAY; medium plasticity, yellow-brown mottled grey, with sandstone bands.			RESIDUAL SOIL
	-				DS 0.50-0.60 m					M (=PL)	-	
			1	1.00 58.00				-	SANDSTONE; brown, distinctly weathered, very low to low strength.			BEDROCK
	M		2	2.70						-	-	
									Continued as Cored Borehole			
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHH4

Project	Multiple Mixed-use Developments	**Sheet**	2 OF 2
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	17/11/2022
Position	Refer to Figure 2	**Date Completed**	17/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 17/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈59.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				0							
				1							
				2							
					2.70		Continuation from non-cored borehole				
NMLC	90% RETURN	100	7	3	56.30		SANDSTONE; fine to medium-grained, brown, very thinly to thinly bedded.	SW		2.91-2.92: XWS, 10mm 3.03: JT, 50°, PR, RO, CN	
					3.05						
					55.95		CORE LOSS; 950mm.				
				4	4.00						
					55.00		SANDSTONE; fine to medium-grained, brown, very thinly to thinly bedded.	SW		4.00-4.20: CZ, 200mm 4.26: JT, 75°, IR, RO, CN 4.28-4.30: CS, 20mm 4.36: JT, 10°, PR, RO, CN 4.51: JT, 10°, CU, RO, CN 4.84: JT, 60°, PR, RO, CN 4.90-4.98: CS, 80mm 5.03: JT, 90°, PR, RO, CN 5.30: JT, 80°, PR, RO, CN 5.38-5.40: XWS, 20mm 5.44: JT, 70°, PR, RO, CN	
	60% RETURN	100	34	5							
				6	6.30						
					52.70		SILTSTONE; dark grey, very thinly bedded.	DW		6.33-6.34: XWS, 10mm 6.37: JT, 80°, PR, RO, CN 6.50: JT, 70°, ST, RO, CN 6.69: JT, 60°, CU, RO, SN 6.82: JT, 70°, IR, RO, CN 7.13-7.17: XWS, 40mm 7.17-7.23: CS, 60mm 7.32: JT, 70°, IR, RO, CN 7.36-7.48: CZ, 120mm 7.55: JT, 60°, CU, RO, CN 7.67-7.80: XWZ, 130mm	
				7	7.80						
					51.20		Hole Terminated at 7.80 m Target Depth Reached.				
				8							
				9							
				10							

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BHH4

Project	Multiple Mixed-use Developments			**Depth Range**	2.70m to 7.80m BEGL		
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW			**Contractor**	Geosense Drilling Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 59.0m	**Drill Rig**	Comacchio Geo 205		
Job No.	E25834.G03	**Inclination**	-90°	**Logged**	MW	**Date**	17 / 11 / 2022
Client	Caddens Estate Development Pty Ltd	**Box**	1-2 of 2	**Checked**	NJ	**Date**	18 / 01 / 2023

BOREHOLE LOG

BH NO. BHH7M

Project	Multiple Mixed-use Developments	**Sheet**	1 of 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	16/11/2022
Position	Refer to Figure 2	**Date Completed**	16/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 16/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈63.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	0.10 62.90				-	TOPSOIL: Silty CLAY; low plasticity, dark brown, with rootlets.	M (>PL)	-	TOPSOIL
								CI	Silty CLAY; medium plasticity, brown.			RESIDUAL SOIL
					SPT 0.50-0.90 m 4,11,14/100mm HB					M (=PL)	-	
				0.90								
	M		1	62.10				-	SANDSTONE; fine to medium-grained, brown, distinctly weathered, very low to low strength.	-	-	BEDROCK
			2	2.30								
									Continued as Cored Borehole			
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

BH NO. BHH7M

Project	Multiple Mixed-use Developments	**Sheet**	2 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	16/11/2022
Position	Refer to Figure 2	**Date Completed**	16/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 16/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈63.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
				0							
				1							
				2							
					2.30 60.70		Continuation from non-cored borehole				
NMLC	50% RETURN	100	37	3			SANDSTONE; fine to medium-grained, yellow-brown, very thinly to thinly bedded.	DW		2.38: JT, 75°, PR, RO, CN 2.61-2.64: XWS, 30mm 2.72-2.73: CS, 10mm 2.85-3.09: XWZ, 240mm 3.13-3.14: CS, 10mm 3.15: JT, 85°, IR, RO, CN 3.16-3.18: XWS, 20mm 3.42-3.48: XWS, 60mm 3.77-3.79: XWS, 20mm	
				4	*4.40* 58.60		From 4.40m, pale grey, mottled yellow-brown, medium bedded.	SW - FR		4.36-4.38: CS, 20mm 4.44: JT, 40°, ST, RO, CN	
	80% RETURN	100	77	5						5.03-5.04: CS, 10mm 5.20-5.21: XWS, 10mm 5.22-5.24: XWS, 20mm 5.68-5.69: CS, 10mm	
				6				FR			
				7							
				8						8.17-8.22: XWS, 50mm 8.32: JT, 75°, PR, RO, SN	
	90% RETURN	100	74	9						9.11-9.15: XWS, 40mm	
				10	*9.82* 53.18		SILTSTONE; dark grey, thinly bedded				

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORED BOREHOLE LOG

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BH NO. BHH7M

Project	Multiple Mixed-use Developments	**Sheet**	3 OF 3
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	16/11/2022
Position	Refer to Figure 2	**Date Completed**	16/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 16/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈63.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	*DEPTH* RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	Average Defect Spacing (mm) (30, 100, 300, 1000, 3000)
		100	74	10	*10.22* 52.78		SILTSTONE; dark grey, thinly bedded Hole Terminated at 10.22 m Target Depth Reached.	FR		10.14-10.15: XWS, 10mm	
				11							
				12							
				13							
				14							
				15							
				16							
				17							
				18							
				19							
				20							

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BHH7M

Project	Multiple Mixed-use Developments			**Depth Range**	2.30m to 10.22m BEGL		
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW			**Contractor**	Geosense Drilling Pty Ltd		
Position	See Figure 2	**Surface RL**	≈ 63.0m	**Drill Rig**	Comacchio Geo 205		
Job No.	E25834.G03	**Inclination**	-90°	**Logged**	MW	**Date**	16 / 11 / 2022
Client	Caddens Estate Development Pty Ltd	**Box**	1-2 of 2	**Checked**	NJ	**Date**	18 / 01 / 2023

MONITORING WELL LOG

MW NO. BHH7M

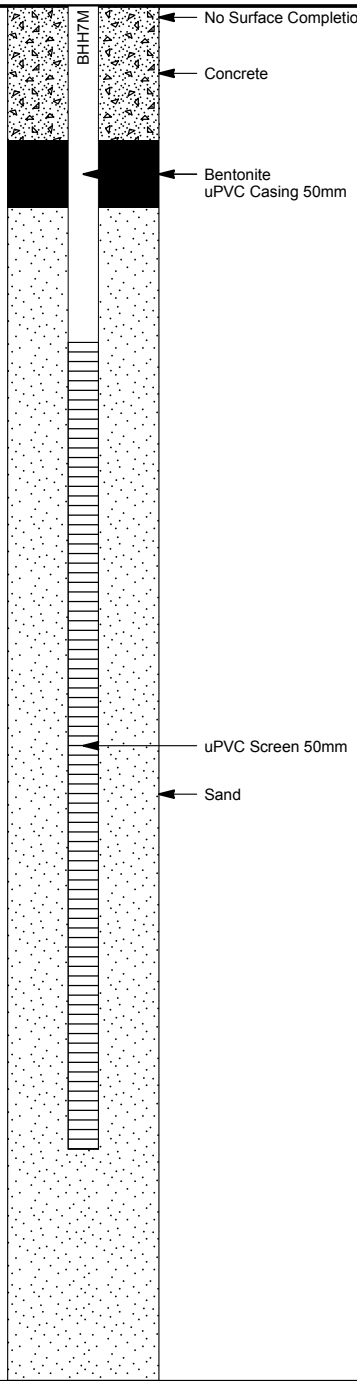
Project	Multiple Mixed-use Developments	**Sheet**	1 of 2
Location	Caddens Corner, 80 O'Connell Street, Kingswood NSW	**Date Started**	16/11/2022
Position	Refer to Figure 2	**Date Completed**	16/11/2022
Job No.	E25834.G03	**Logged By** MW	**Date** 16/11/2022
Client	Caddens Estate Development Pty Ltd	**Reviewed By** NJ	**Date** 18/01/2023

Drilling Contractor	Geosense Drilling Pty Ltd	**Surface RL**	≈63.00 m AHD
Drill Rig	Comacchio GEO 205	**Inclination**	-90°

METHOD	WATER	DEPTH (m)	RL (m AHD)	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION
AD/T	GWNE	0	63		TOPSOIL: Silty CLAY; low plasticity, dark brown, with rootlets.
					Silty CLAY; medium plasticity, brown.
		1	62		SANDSTONE; fine to medium-grained, brown, distinctly weathered, very low to low strength.
		2	61		
NMLC	50% RETURN				SANDSTONE; fine to medium-grained, yellow-brown, very thinly to thinly bedded.
		3	60		
		4	59		
					From 4.40m, pale grey, mottled yellow-brown, medium bedded.
	80% RETURN	5	58		
		6	57		
		7	56		
		8	55		
	90% RETURN	9	54		
		10	53		SILTSTONE; dark grey, thinly bedded
		11	52		Hole Terminated at 10.22 m Target Depth Reached.

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
BHH7M	Standpipe Piezometer	-0.50 m 63.50 m	8.50 m 54.50 m	16/11/2022	



This well log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE LOG

BH ID: BH101M

Location	68&80O'connell Street, Kingswood NSW	**Started**	02 June 2025
Client	Holdmark	**Completed**	02 June 2025
Job No.	E25834.G04	**Logged By**	SK **Date**
Sheets	1 of 4	**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈49.20 m (AHD)
Plant	Hanjin D&B 8-D	**Inclination**	90°
Northing	6261179.3812 (MGA 2020 Zone 56)		
Easting	290342.5987 (MGA 2020 Zone 56)		

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
DT		BH101M_0.20-0.40		0.00		49.20	ASPHALT: 40mm thick	-	-	ASPHALT
				0.04		49.16	CONCRETE: 150mm thick			CONCRETE
AD/V	GWNE	BH101M_0.50-0.95 SPT 0.50-0.95 4,7,7 N=14		0.19		49.01	FILL: Silty GRAVEL: fine to medium grained,igneous, grey, with fine to medium grained sand	M	-	FILL
				0.60		48.60	Silty CLAY: medium plasticity, pale brown. trace fine to medium grained sand and iron indurated nodules		St	RESIDUAL SOIL
		BH101M_1.50-1.95 SPT 1.50-1.95 5,13,13 N=26		1						
				2						
		BH101M_3.00-3.45 SPT 3.00-3.45 3,5,6 N=11		3				M > PL	St - VSt	
				4						
		BH101M_4.30-4.40								
		BH101M_4.50-4.95 SPT 4.50-4.95 3,6,10 N=16		5						
AD/T				5.30		43.90	SHALE: grey and brown, very low strength with extremely weathered bands, distinctly weathered.	-	-	WEATHERED ROCK
				6						
				7						
				7.40		41.80	*Log continued on next page.*			
				8						
				9						
				10						

BOREHOLE CORE LOG

BH ID: BH101M

Location	68&80O'connell Street, Kingswood NSW	**Started**	02 June 2025
Client	Holdmark	**Completed**	02 June 2025
Job No.	E25834.G04	**Logged By**	SK **Date**
Sheets	2 of 4	**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL** ≈49.20 m (AHD)	**Northing** 6261179.3812 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination** 90°	**Easting** 290342.5987 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral VL 0-1 / L 0-3 / M 1 / H 3 / VH 10 / EH	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING 30 / 100 / 300 / 1000 / 3000
				0			*Log continued from previous page.*				
				1							
				2							
				3							
				4							
				5							
				6							
				7							
				7.60		41.60	NO CORE: 200mm thick	---		7.60-8.70: XWZ	
	90%	100	0	8			SHALE: with claystone and extremely weathered band, brown and grey, thinly laminated				
				8.70		40.50	SHALE: brown and grey, with extremely weathered bands with interbedded fine grained sandstone and claystone bands, thinly laminated	DW		9.06-9.15: XWS 9.12: JT 45° PR CL,incipient 9.35-9.42: XWS 9.70-9.95: XWZ	
				9							
				10							

BOREHOLE CORE LOG

BH ID: BH101M

Location	68&80O'connell Street, Kingswood NSW			**Started**	02 June 2025
Client	Holdmark			**Completed**	02 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	3 of 4			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈49.20 m (AHD)	**Northing**	6261179.3812 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290342.5987 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
NMLC	90%	100	0	11			SHALE: brown and grey, with extremely weathered bands with interbedded fine grained sandstone and claystone bands, thinly laminated			10.10: JT UN Incipient CL 10.20-10.42: XWZ 10.43-12.00: XWZ	
				12		37.20					
				12.00			SILTSTONE: grey, with interbedded fine grained sandstone laminate, thinly to medium bedded.			12.12: JT 15° PR RO OP CN 12.23: JT 15° PR RO OP Clay VN 12.29-12.32: XWS 12.33: JT 10° PR RO OP Clay VN 12.46: JT 30° PR RO Infilled 12.53: JT 10° PR RO Clay VN 12.72: JT 85° CU RO OP CN 12.87: JT 20° PR RO Clay VN	
		100	67	13						13.55: JT PR RO OP Clay VN	
				14							
				15						15.30-15.32: CS	
		100	79	16				FR		15.83-15.86: XWS 15.92-16.03: XWZ	
										16.63-16.66: CS	
				17						17.15-17.48: XWZ	
				18						18.02-18.06: XWS 18.10: JT 20° PR RO Clay VN	
										18.41-18.44: XWS 18.57: JT 35° RO OP Clay VN	
		100	62	19						19.69-19.83: JT 20-30° PR RO set of 3 Clay VN 19.92: BP 5° PR SM Infilled	
				20							

BOREHOLE CORE LOG

BH ID: BH101M

Location	68&80O'connell Street, Kingswood NSW			**Started**	02 June 2025
Client	Holdmark			**Completed**	02 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	4 of 4			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈49.20 m (AHD)	**Northing**	6261179.3812 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290342.5987 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral VL 0-1 / L 0-3 / M 1 / H 3 / VH 10 / EH	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING 30 / 100 / 300 / 1000 / 3000
	90%						SILTSTONE: grey, with interbedded fine grained sandstone laminate, thinly to medium bedded.		▼ L	20.34-20.46: XWZ 20.52: JT 30° PR RO OP Clay VN	
						28.50	Terminated at 20.70m. Target Depth Reached.				
				21							
				22							
				23							
				24							
				25							
				26							
				27							
				28							
				29							
				30							

CORE PHOTOGRAPH OF BOREHOLE: BH101M

Project	Multiple Mixed-use Developments	**East**	6261179.3812	**Depth Range**	7.4 m to 16.0 m		
Location	Caddens Corner, 80 O'Connell St, Kingswood	**North**	290342.5987	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	49.20m	**Drill Rig**	Hanjin D&B 8D		
Job No.	E25834.G03 Rev3	**Inclination**	90°	**Logged**	SK	**Date**	03.06.2025
Client	Caddens Estate Development Pty Ltd	**Box**	1 of 2	**Checked**	OV	**Date**	01.08.2025

CORE PHOTOGRAPH OF BOREHOLE: BH101M

Project	Multiple Mixed-use Developments	**East**	6261179.3812	**Depth Range**	16.0 m to 20.7 m		
Location	Caddens Corner, 80 O'Connell St, Kingswood	**North**	290342.5987	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	49.20m	**Drill Rig**	Hanjin D&B 8D		
Job No.	E25834.G03 Rev3	**Inclination**	90°	**Logged**	SK	**Date**	03.06.2025
Client	Caddens Estate Development Pty Ltd	**Box**	**2** of 2	**Checked**	OV	**Date**	01.08.2025

MONITORING WELL LOG

BH ID: BH101M

Location	68&80O'connell Street, Kingswood NSW	**Started**	02 June 2025
Client	Holdmark	**Completed**	02 June 2025
Job No.	E25834.G04	**Logged By**	SK **Date**
Sheets	1 of 3	**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈49.20 m (AHD)
Plant	Hanjin D&B 8-D	**Inclination**	90°
Northing	6261179.3812 (MGA 2020 Zone 56)		
Easting	290342.5987 (MGA 2020 Zone 56)		

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
		0.00	49.20	ASPHALT: 40mm thick	-
	BH101M_0.20-0.40	0.04		CONCRETE: 150mm thick	
		0.19	49.01	FILL: Silty GRAVEL: fine to medium grained,igneous, grey, with fine to medium grained sand	M
	BH101M_0.50-0.95 SPT 0.50-0.95 4,7,7 N=14	0.60	48.60	Silty CLAY: medium plasticity, pale brown. trace fine to medium grained sand and iron indurated nodules	
	BH101M_1.50-1.95 SPT 1.50-1.95 5,13,13 N=26				
	BH101M_3.00-3.45 SPT 3.00-3.45 3,5,6 N=11				M > PL
GWNE	BH101M_4.30-4.40				
	BH101M_4.50-4.95 SPT 4.50-4.95 3,6,10 N=16	5.30	43.90	SHALE: grey and brown, very low strength with extremely weathered bands, distinctly weathered.	-
		7.40	41.80	NO CORE: 200mm thick	
90%		7.60	41.60	SHALE: with claystone and extremely weathered band, brown and grey, thinly laminated	
		8.70	40.50	SHALE: brown and grey, with extremely weathered bands with interbedded fine grained sandstone and claystone bands, thinly laminated	

BACKFILL DETAILS

- Grout 0.00m - 0.50m
- Sand 0.50m - 5.00m
- Bentonite 4.00m - 5.00m
- Sand 5.00m - 11.60m

STANDPIPE DETAILS

- Well Stickup =0.0m (RL 49.20m)
- 0.0m - 5.60m PVC casing (50mm Ø)
- 5.60m - 11.60m PVC screen (50mm Ø)

MONITORING WELL LOG

BH ID: BH101M

Location	68&80O'connell Street, Kingswood NSW			**Started**	02 June 2025
Client	Holdmark			**Completed**	02 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	2 of 3			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈49.20 m (AHD)	**Northing**	6261179.3812 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290342.5987 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
90%		11			SHALE: brown and grey, with extremely weathered bands with interbedded fine grained sandstone and claystone bands, thinly laminated			
		12		37.20			Bentonite 11.60m - 12.10m	
		12.00			SILTSTONE: grey, with interbedded fine grained sandstone laminate, thinly to medium bedded.			
		13						
		14						
		15						
		16					Sand 12.10m - 20.70m	
		17						
		18						
		19						
		20						

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

MONITORING WELL LOG

BH ID: BH101M

Location	68&80O'connell Street, Kingswood NSW			**Started**	02 June 2025
Client	Holdmark			**Completed**	02 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	3 of 3			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈49.20 m (AHD)	**Northing**	6261179.3812 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290342.5987 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
90%				28.50	SILTSTONE: grey, with interbedded fine grained sandstone laminate, thinly to medium bedded.			
					Terminated at 20.70m. Target Depth Reached.			

21 22 23 24 25 26 27 28 29 30

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

BOREHOLE LOG

BH ID: BH102

Location	68&80O'connell Street, Kingswood NSW			**Started**	03 June 2025
Client	Holdmark			**Completed**	03 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	1 of 3			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈55.30 m (AHD)	**Northing**	6261111.0313 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290279.0747 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/V	GWNE	BH102_0.00-0.10		0.00		55.30	TOPSOIL: Silty CLAY: low to medium plasticity, dark grey, trace of roots and fine to medium grained sand			TOPSOIL
				0.10		55.20	Silty CLAY: medium plasticity, brown mottled grey, trace root fibers			RESIDUAL SOIL
		BH102_0.50-0.95 SPT 0.50-0.95 2,4,5 N=9		1					St	
		BH102_1.50-1.95 SPT 1.50-1.95 5,6,11 N=17		1.50		53.80	From 1.50m to 3.45m, grey mottled brown, trace fine to coarse grained,sub-angular ironstone gravel.	M > PL		
		BH102_3.00-3.45 SPT 3.00-3.45 5,7,11 N=18		3					VSt	
				3.45		51.85	From 3.45m to 4.55m, grading into weathered rock.	M ≈ PL		
		BH102_4.50-4.55 SPT 4.50-4.55 RW/50 mm, 10/50 mm HB N=R		4.55		50.75				
AD/T				5			SHALE: brown and grey, very low strength, with extremely weathered bands.	-	-	WEATHERED ROCK
				6.00		49.30	*Log continued on next page.*			
				7						
				8						
				9						
				10						

BOREHOLE CORE LOG

BH ID: BH102

Location	68&80O'connell Street, Kingswood NSW			**Started**	03 June 2025
Client	Holdmark			**Completed**	03 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	2 of 3			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈55.30 m (AHD)	**Northing**	6261111.0313 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290279.0747 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral VL 0-1 / L 0-3 / M 1 / H 3 / VH 10 / EH	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING 30 / 100 / 300 / 1000 / 3000
				0			*Log continued from previous page.*				
				1							
				2							
				3							
				4							
				5							
				6			Silty CLAY: medium to high plasticity, brown and grey.	RS			
				7							
	90%	100	0	7.30		48.00	SHALE: grey and brown, with extremely weathered bands, thinly laminated.		▼	7.67-7.90: XWZ 7.93: JT 85° CU SM Infilled 8.30: JT 70° RO Fe SN 8.34-9.20: XWZ	
				8							
				9							
				10							

BOREHOLE CORE LOG

BH ID: BH102

Location	68&80O'connell Street, Kingswood NSW	**Started**	03 June 2025
Client	Holdmark	**Completed**	03 June 2025
Job No.	E25834.G04	**Logged By**	SK **Date**
Sheets	3 of 3	**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL** ≈55.30 m (AHD)	**Northing** 6261111.0313 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination** 90°	**Easting** 290279.0747 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING
NMLC	90%	100	0	11	43.90	SHALE: grey and brown, with extremely weathered bands, thinly laminated.			10.20: JT 15° CU Infilled 10.42-10.65: JT 10-30° PR RO set of 5 Fe SN 10.85: JT -30° PR RO Infilled 11.09: JT 20° PR RO Infilled	
		100	76	11.40 12 13		SILTSTONE: dark grey and brown, with interbedded fine grained sandstone laminate, thinly bedded	DW		11.54: JT 20° PR RO Fe SN 11.66: JT 20° PR RO Fe SN 11.77: JT 70° PR RO Fe SN 11.91-12.06: XWZ 12.11-12.15: CS 12.21-12.28: CS 12.37: JT 85° PR RO OP Infilled 12.71-13.31: CZ 13.45-13.66: CZ	
		100	100	13.60 14 15 16	41.70	SILTSTONE: dark grey, with interbedded fine grained sandstone laminate, medium bedded	FR		14.24: JT 20° PR RO OP Clay VN 14.97: JT 60° PR RO OP Clay VN 15.10-15.16: CS 15.94: JT 20° PR RO CN OP 16.18: BP 5° PR RO Clay VN	
					38.73	Terminated at 16.57m. Target Depth Reached.				
				17 18 19 20						

CORE PHOTOGRAPH OF BOREHOLE: BH102

Project	Multiple Mixed-use Developments	**East**	6261111.0313	**Depth Range**	6.0 m to 15.0 m		
Location	Caddens Corner, 80 O'Connell St, Kingswood	**North**	290279.0747	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	55.30m	**Drill Rig**	Hanjin D&B 8D		
Job No.	E25834.G03 Rev3	**Inclination**	90°	**Logged**	SK	**Date**	03.06.2025
Client	Caddens Estate Development Pty Ltd	**Box**	1 of 2	**Checked**	OV	**Date**	01.08.2025

CORE PHOTOGRAPH OF BOREHOLE: BH102

Project	Multiple Mixed-use Developments	**East**	6261111.0313	**Depth Range**	15.0 m to 16.57 m		
Location	Caddens Corner, 80 O'Connell St, Kingswood	**North**	290279.0747	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	55.30m	**Drill Rig**	Hanjin D&B 8D		
Job No.	E25834.G03 Rev3	**Inclination**	90° **Box** 2	**Logged**	SK	**Date**	03.06.2025
Client	Caddens Estate Development Pty Ltd	of 2		**Checked**	OV	**Date**	01.08.2025

BOREHOLE LOG

BH ID: BH103M

Location	68&80O'connell Street, Kingswood NSW			**Started**	04 June 2025
Client	Holdmark			**Completed**	04 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	1 of 3			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈54.90 m (AHD)	**Northing**	6261037.7661 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290369.0447 (MGA 2020 Zone 56)

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/V	▷	BH103M_0.00-0.20 D (0.00-0.20)		0.00		54.90	FILL: Silty CLAY: low to medium plasticity, grey and brown, trace fine to medium grained igneous gravels	M > PL	-	FILL
		BH103M_0.50-0.95 SPT 0.50-0.95 2,4,5 N=9		0.30		54.60	Silty CLAY: medium plasticity, brown and grey, trace fine to medium grained sand			RESIDUAL SOIL
		BH103M_1.50-1.95 SPT 1.50-1.95 0,2,4 N=6		1						
				2.00		52.90	Silty CLAY: medium to high plasticity, grey	M ≈ PL	F - St	
		BH103M_3.00-3.38 SPT 3.00-3.38 4,12,7/80 mm HB N=R		3						
				4						
				5.00		49.90	SHALE: brown and grey,very low strength, distinctly weathered.			WEATHERED ROCK
AD/T				6						
				7		47.83				
				7.07			*Log continued on next page.*			
				8						
				9						
				10						

BOREHOLE CORE LOG

BH ID: BH103M

Location	68&80O'connell Street, Kingswood NSW			**Started**	04 June 2025
Client	Holdmark			**Completed**	04 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	2 of 3			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈54.90 m (AHD)	**Northing**	6261037.7661 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290369.0447 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
				0			*Log continued from previous page.*				
		100	0	7			SHALE: brown and grey, with extremely weathered bands,thinly laminated.	DW		7.40-7.44: CS 7.62-7.69: XWS 7.91-8.07: CZ 8.52-8.57: XWS 8.87-8.89: CS	
				9.70		45.20	SILTSTONE: dark grey, with interbedded fine grained sandstone laminate,thinly bedded				

BOREHOLE CORE LOG

BH ID: BH103M

Location	68&80O'connell Street, Kingswood NSW			**Started**	04 June 2025
Client	Holdmark			**Completed**	04 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	3 of 3			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈54.90 m (AHD)	**Northing**	6261037.7661 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290369.0447 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral VL 0-1 / L 0-3 / M 1 / H 3 / VH 10 / EH	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING 30 / 100 / 300 / 1000 / 3000
NMLC		100	88	11			SILTSTONE: dark grey, with interbedded fine grained sandstone laminate,thinly bedded			10.25-10.32: XWS 10.95: JT 85° PR RO CL Clay VN 11.51-11.71: CZ	
		100	98	12 13 14 15				FR		13.68: JT 20° PR RO Clay VN 13.72: JT 15° PR RO VN 13.93-13.96: XWS 15.52-15.55: CS	
				16 17 18 19 20		39.20	Terminated at 15.70m. Target Depth Reached.				

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

CORE PHOTOGRAPH OF BOREHOLE: BH103M

Project	Multiple Mixed-use Developments	**East**	6261037.7661	**Depth Range**	7.07 m to 15.70 m		
Location	Caddens Corner, 80 O'Connell St, Kingswood	**North**	290369.0447	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	54.90m	**Drill Rig**	Hanjin D&B 8D		
Job No.	E25834.G03 Rev3	**Inclination**	90°	**Logged**	SK	**Date**	03.06.2025
Client	Caddens Estate Development Pty Ltd	**Box**	1 of 2	**Checked**	OV	**Date**	01.08.2025

MONITORING WELL LOG

BH ID: BH103M

Location	68&80O'connell Street, Kingswood NSW	**Started**	04 June 2025
Client	Holdmark	**Completed**	04 June 2025
Job No.	E25834.G04	**Logged By**	SK **Date**
Sheets	1 of 2	**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈54.90 m (AHD)
Plant	Hanjin D&B 8-D	**Inclination**	90°
Northing	6261037.7661 (MGA 2020 Zone 56)		
Easting	290369.0447 (MGA 2020 Zone 56)		

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
	BH103M_0.00-0.20 D (0.00-0.20)	0.00	54.90	FILL: Silty CLAY: low to medium plasticity, grey and brown, trace fine to medium grained igneous gravels	
		0.30	54.60	Silty CLAY: medium plasticity, brown and grey, trace fine to medium grained sand	
	BH103M_0.50-0.95 SPT 0.50-0.95 2,4,5 N=9	1			M > PL
	BH103M_1.50-1.95 SPT 1.50-1.95 0,2,4 N=6	2			
▷		2.00	52.90	Silty CLAY: medium to high plasticity, grey	
	BH103M_3.00-3.38 SPT 3.00-3.38 4,12,7/80 mm HB N=R	3			M ≈ PL
		4			
		5	49.90		
		5.00		SHALE: brown and grey,very low strength, distinctly weathered.	
		6			
		7			
		7.07	47.83	SHALE: brown and grey, with extremely weathered bands,thinly laminated.	
		8			
		9			
		9.70	45.20	SILTSTONE: dark grey, with interbedded fine grained sandstone laminate,thinly bedded	
		10			

BACKFILL DETAILS

Grout
0.00m - 0.50m

Cuttings
0.50m - 3.80m

Bentonite
3.80m - 4.50m

Sand
4.50m - 8.00m

Bentonite
8.00m - 8.40m

STANDPIPE DETAILS

Well Stickup =0.92m
(RL 55.82m)

-0.92m - 5.0m
PVC casing (50mm Ø)

5.0m - 8.0m
PVC screen (50mm Ø)

MONITORING WELL LOG

BH ID: BH103M

Location	68&80O'connell Street, Kingswood NSW			**Started**	04 June 2025
Client	Holdmark			**Completed**	04 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	2 of 2			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈54.90 m (AHD)	**Northing**	6261037.7661 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290369.0447 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
		11			SILTSTONE: dark grey, with interbedded fine grained sandstone laminate,thinly bedded			
		12					Sand 8.40m - 15.70m	
		13						
		14						
		15						
				39.20	Terminated at 15.70m. Target Depth Reached.			
		16						
		17						
		18						
		19						
		20						

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

BOREHOLE LOG

BH ID: BH104M

Location	68&80O'connell Street, Kingswood NSW	**Started**	05 June 2025
Client	Holdmark	**Completed**	05 June 2025
Job No.	E25834.G04	**Logged By**	SK **Date**
Sheets	1 of 3	**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈58.00 m (AHD)
Plant	Hanjin D&B 8-D	**Inclination**	90°
Northing	6261028.8913 (MGA 2020 Zone 56)		
Easting	290434.2929 (MGA 2020 Zone 56)		

METHOD	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	SAMPLE RECOVERY	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / REL. DENSITY	MATERIAL ORIGIN & OBSERVATIONS
AD/V	GWNE	BH104M_0.00-0.20		0.00		58.00	FILL: Silty CLAY: low plasticity, dark grey, trace fine to medium grained igneous and ironstone gravels and roots	M > PL	-	FILL
		BH104M_0.50-0.95 SPT 0.50-0.95 5,5,4 N=9		1.00		57.00	Silty CLAY: medium to high plasticity, brown, trace fine to medium, sub-angular ironstone gravel.	M ≈ PL	St - VSt	RESIDUAL SOIL
		BH104M_1.50-1.95 SPT 1.50-1.95 4,7,11 N=18		2						
		SPT 3.00-3.45 0,5,7 N=12		3						
				4.00		54.00	From 4.00m to 5.20m, brown and grey, grading into weathered rock.	M < PL		
		BH104M_4.50-4.85 SPT 4.50-4.85 5,13,8/50 mm HB N=R		5						
AD/T				5.20		52.80	SHALE: brown and grey, very low strength with extremely weathered bands, distinctly weathered.	-	-	WEATHERED ROCK
				6						
				7						
				7.17		50.83	*Log continued on next page.*			
				8						
				9						
				10						

BOREHOLE CORE LOG

BH ID: BH104M

Location	68&80O'connell Street, Kingswood NSW			**Started**	05 June 2025
Client	Holdmark			**Completed**	05 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	2 of 3			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈58.00 m (AHD)	**Northing**	6261028.8913 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290434.2929 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
				0			*Log continued from previous page.*				
				1							
				2							
				3							
				4							
				5							
				6							
				7							
		100	0	8			SHALE: grey and brown, with extremely weathered bands,thinly laminated.	DW		7.32-7.67: XWZ 7.79-7.87: CS 8.68-8.77: CS 8.81-8.83: CS 8.91-8.95: CS 9.32: JT 65° PR RO CL Fe SN 9.70-9.74: FS	
				9							
				9.00		49.00	SILTSTONE: dark grey, with interbedded fine grained sandstone bands, thinly bedded.				
				9.77		48.23	NO CORE: 170mm thick				
				10		48.06	SILTSTONE: dark grey, with interbedded fine grained sandstone laminate, medium to thickly laminated.	---			

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

BOREHOLE CORE LOG

BH ID: BH104M

Location	68&80O'connell Street, Kingswood NSW			**Started**	05 June 2025
Client	Holdmark			**Completed**	05 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	3 of 3			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈58.00 m (AHD)	**Northing**	6261028.8913 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290434.2929 (MGA 2020 Zone 56)

METHOD	Flush Return	TCR %	RQD %	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	WEATHERING	ESTIMATED STRENGTH Is(50) ▼ - Axial ▽ - Diametral (VL 0-1, L 0-3, M 1, H 3, VH 10, EH)	DISCONTINUITIES & ADDITIONAL DATA	FRACTURE SPACING (30, 100, 300, 1000, 3000)
NMLC		94	82	9.94			SILTSTONE: dark grey, with interbedded fine grained sandstone laminate, medium to thickly laminated.	SW		10.51: JT 50° PR RO OP Fe SN 11.00-11.12: XWZ	
		100	97	12 13 14 15				FR		12.67-14.88: CZ 12.80-12.82: CS 12.90-13.00: XWS 13.46-13.50: XWS 13.72-13.92: XWZ 14.31-14.54: XWZ 15.24-15.27: CS 15.40: JT 85° PR RO OP Clay VN	
				16 17 18 19 20		42.10	Terminated at 15.90m. Target Depth Reached.				

This log should be read in conjunction with EI Australia's accompanying explanatory notes.

CORE PHOTOGRAPH OF BOREHOLE: BH104M

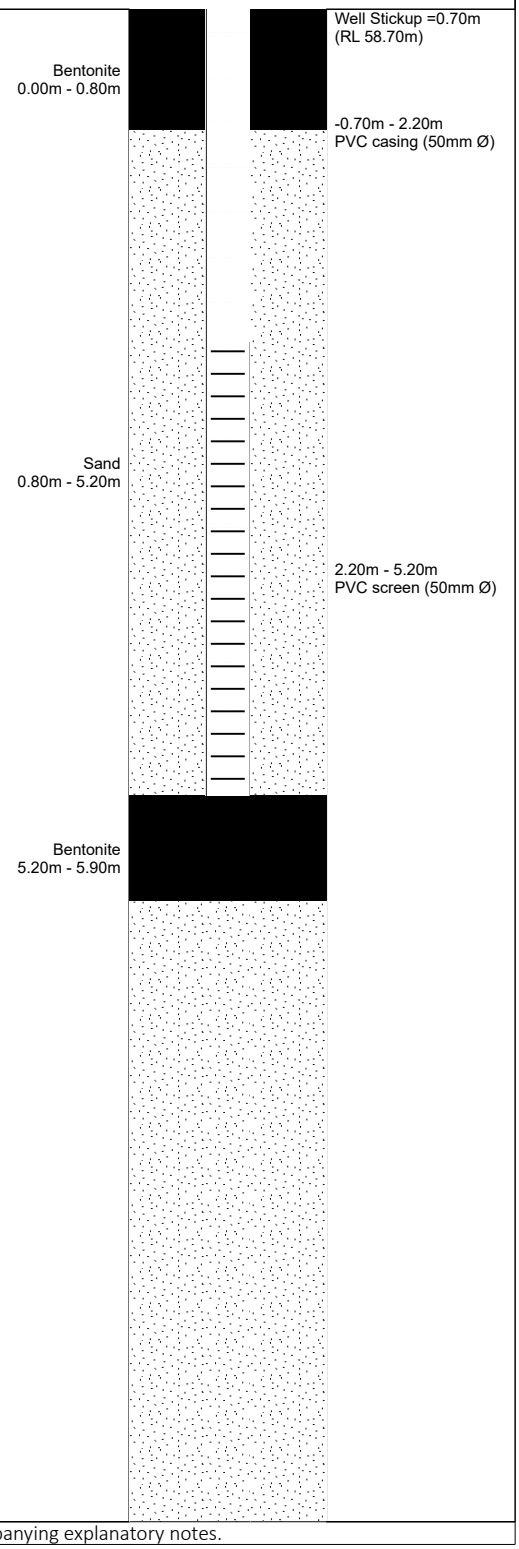
Project	Multiple Mixed-use Developments	**East**	6261028.8913	**Depth Range**	7.17 m to 15.90 m		
Location	Caddens Corner, 80 O'Connell St, Kingswood	**North**	290434.2929	**Contractor**	Geosense Drilling Engineers Pty Ltd		
Position	See Figure 2	**Surface RL**	58.00m	**Drill Rig**	Hanjin D&B 8D		
Job No.	E25834.G03 Rev3	**Inclination**	90°	**Logged**	SK	**Date**	03.06.2025
Client	Caddens Estate Development Pty Ltd	**Box**	1 of 2	**Checked**	OV	**Date**	01.08.2025

MONITORING WELL LOG

BH ID: BH104M

Location	68&80O'connell Street, Kingswood NSW	**Started**	05 June 2025
Client	Holdmark	**Completed**	05 June 2025
Job No.	E25834.G04	**Logged By**	SK **Date**
Sheets	1 of 2	**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈58.00 m (AHD)
Plant	Hanjin D&B 8-D	**Inclination**	90°
Northing	6261028.8913 (MGA 2020 Zone 56)		
Easting	290434.2929 (MGA 2020 Zone 56)		

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION
GWNE	BH104M_0.00-0.20 BH104M_0.50-0.95 SPT 0.50-0.95 5,5,4 N=9	0.00	58.00	FILL: Silty CLAY: low plasticity, dark grey, trace fine to medium grained igneous and ironstone gravels and roots	M > PL
	BH104M_1.50-1.95 SPT 1.50-1.95 4,7,11 N=18	1.00	57.00	Silty CLAY: medium to high plasticity, brown, trace fine to medium, sub-angular ironstone gravel.	M ≈ PL
	SPT 3.00-3.45 0,5,7 N=12				
	BH104M_4.50-4.85 SPT 4.50-4.85 5,13,8/50 mm HB N=R	4.00	54.00	From 4.00m to 5.20m, brown and grey, grading into weathered rock.	M < PL
		5.20	52.80	SHALE: brown and grey, very low strength with extremely weathered bands, distinctly weathered.	
		7.17	50.83	SHALE: grey and brown, with extremely weathered bands,thinly laminated.	
		9.00	49.00	SILTSTONE: dark grey, with interbedded fine grained sandstone bands, thinly bedded.	
		9.77	48.23	NO CORE: 170mm thick SILTSTONE: dark grey, with interbedded fine grained sandstone laminate, medium to thickly laminated.	
		10			



BACKFILL DETAILS

STANDPIPE DETAILS

MONITORING WELL LOG

BH ID: BH104M

Location	68&80O'connell Street, Kingswood NSW			**Started**	05 June 2025
Client	Holdmark			**Completed**	05 June 2025
Job No.	E25834.G04			**Logged By**	SK **Date**
Sheets	2 of 2			**Review By**	**Date**
Drilling Contractor	Geosense Drilling Engineers Pty Ltd	**Surface RL**	≈58.00 m (AHD)	**Northing**	6261028.8913 (MGA 2020 Zone 56)
Plant	Hanjin D&B 8-D	**Inclination**	90°	**Easting**	290434.2929 (MGA 2020 Zone 56)

WATER	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	RL (m AHD)	MATERIAL DESCRIPTION	MOISTURE CONDITION	BACKFILL DETAILS	STANDPIPE DETAILS
		9.94		48.06	SILTSTONE: dark grey, with interbedded fine grained sandstone laminate, medium to thickly laminated.		Sand 5.90m - 15.90m	
		11						
		12						
		13						
		14						
		15						
		16		42.10	Terminated at 15.90m. Target Depth Reached.			
		17						
		18						
		19						
		20						

EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT LOGS

DRILLING/EXCAVATION METHOD

HA	Hand Auger	**ADH**	Hollow Auger	**NQ**	Diamond Core - 47 mm
DT	Diatube Coring	**RT**	Rotary Tricone bit	**NMLC**	Diamond Core - 52 mm
NDD	Non-destructive digging	**RAB**	Rotary Air Blast	**HQ**	Diamond Core - 63 mm
AD*	Auger Drilling	**RC**	Reverse Circulation	**HMLC**	Diamond Core - 63 mm
***V**	V-Bit	**PT**	Push Tube	**EX**	Tracked Hydraulic Excavator
***T**	TC-Bit, e.g. AD/T	**WB**	Washbore	**HAND**	Excavated by Hand Methods

PENETRATION RESISTANCE

L	**Low Resistance**	Rapid penetration/ excavation possible with little effort from equipment used.
M	**Medium Resistance**	Penetration/ excavation possible at an acceptable rate with moderate effort from equipment used.
H	**High Resistance**	Penetration/ excavation is possible but at a slow rate and requires significant effort from equipment used.
R	**Refusal/Practical Refusal**	No further progress possible without risk of damage or unacceptable wear to equipment used.

These assessments are subjective and are dependent on many factors, including equipment power and weight, condition of excavation or drilling tools and experience of the operator.

WATER

Standing Water Level — **Partial water loss**

Water Seepage — **Complete Water Loss**

GWNO	GROUNDWATER NOT OBSERVED - Observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave-in of the borehole/ test pit.
GWNE	GROUNDWATER NOT ENCOUNTERED - Borehole/ test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/ test pit been left open for a longer period.

SAMPLING AND TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-2004
4,7,11 N=18	4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following a 150mm seating drive
30/80mm	Where practical refusal occurs, the blows and penetration for that interval are reported, N is not reported
RW	Penetration occurred under the rod weight only, N<1
HW	Penetration occurred under the hammer and rod weight only, N<1
HB	Hammer double bouncing on anvil, N is not reported
Sampling	
DS	Disturbed Sample
ES	Sample for environmental testing
BDS	Bulk disturbed Sample
GS	Gas Sample
WS	Water Sample
U50	Thin walled tube sample - number indicates nominal sample diameter in millimetres
Testing	
FP	Field Permeability test over section noted
FVS	Field Vane Shear test expressed as uncorrected shear strength (sv= peak value, sr= residual value)
PID	Photoionisation Detector reading in ppm
PM	Pressuremeter test over section noted
PP	Pocket Penetrometer test expressed as instrument reading in kPa
WPT	Water Pressure tests
DCP	Dynamic Cone Penetrometer test
CPT	Static Cone Penetration test
CPTu	Static Cone Penetration test with pore pressure (u) measurement

GEOLOGICAL BOUNDARIES

———— = Observed Boundary (position known)

– – – – – – – – – – = Observed Boundary (position approximate)

– –?– –?– –?– – = Boundary (interpreted or inferred)

ROCK CORE RECOVERY

TCR=Total Core Recovery (%)

$$= \frac{\textit{Length of core recovered}}{\textit{Length of core run}} \times 100$$

RQD = Rock Quality Designation (%)

$$= \frac{\sum \textit{Axial lengths of core} > 100mm}{\textit{Length of core run}} \times 100$$

METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT LOGS

	FILL		ORGANIC SOILS (OL, OH or Pt)		CLAY (CL, CI or CH)
	COUBLES or BOULDERS		SILT (ML or MH)		SAND (SP or SW)
	GRAVEL (GP or GW)	Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay			

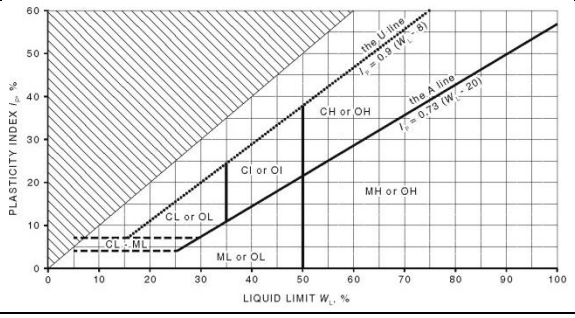
CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS 1726:2017, Section 6.1 – Soil description and classification.

PARTICLE SIZE CHARACTERISTICS

Fraction	Components	Sub Division	Size mm
Oversize	BOULDERS		>200
	COBBLES		63 to 200
Coarse grained soil	GRAVEL	Coarse	19 to 63
		Medium	6.7 to 19
		Fine	2.36 to 6.7
	SAND	Coarse	0.6 to 2.36
		Medium	0.21 to 0.6
		Fine	0.075 to 0.21
Fine grained soil	SILT		0.002 to 0.075
	CLAY		<0.002

PLASTICITY PROPERTIES



GROUP SYMBOLS

Major Divisions		Symbol	Description
COARSE GRAINED SOILS More than 65% of soil excluding oversize fraction is greater than 0.075mm	GRAVEL More than 50% of coarse fraction is >2.36mm	GW	Well graded gravel and gravel-sand mixtures, little or no fines, no dry strength.
		GP	Poorly graded gravel and gravel-sand mixtures, little or no fines, no dry strength.
		GM	Silty gravel, gravel-sand-silt mixtures, zero to medium dry strength.
		GC	Clayey gravel, gravel-sand-clay mixtures, medium to high dry strength.
	SAND More than 50% of coarse fraction is <2.36 mm	SW	Well graded sand and gravelly sand, little or no fines, no dry strength.
		SP	Poorly graded sand and gravelly sand, little or no fines, no dry strength.
		SM	Silty sand, sand-silt mixtures, zero to medium dry strength.
		SC	Clayey sand, sandy-clay mixtures, medium to high dry strength.
FINE GRAINED SOILS More than 35% of soil excluding oversized fraction is less than 0.075mm	Liquid Limit less < 50%	ML	Inorganic silts of low plasticity, very fine sands, rock flour, silty or clayey fine sands, zero to medium dry strength.
		CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, medium to high dry strength.
		OL	Organic silts and organic silty clays of low plasticity, low to medium dry strength.
	Liquid Limit > than 50%	MH	Inorganic silts of high plasticity, high to very high dry strength.
		CH	Inorganic clays of high plasticity, high to very high dry strength.
		OH	Organic clays of medium to high plasticity, medium to high dry strength.
Highly Organic soil		PT	Peat muck and other highly organic soils.

MOISTURE CONDITION

Symbol	Term	Description
D	Dry	Non- cohesive and free-running.
M	Moist	Soils feel cool, darkened in colour. Soil tends to stick together.
W	Wet	Soils feel cool, darkened in colour. Soil tends to stick together, free water forms when handling.

Moisture content of cohesive soils shall be described in relation to plastic limit (PL) or liquid limit (LL) for soils with higher moisture content as follows: Moist, dry of plastic limit (w < PL); Moist, near plastic limit (w ≈ PL); Moist, wet of plastic limit (w < PL); Wet, near liquid limit (w ≈ LL), Wet, wet of liquid limit (w > LL),

CONSISTENCY

Symbol	Term	Undrained Shear Strength (kPa)	SPT "N" #
VS	Very Soft	≤ 12	≤ 2
S	Soft	>12 to ≤ 25	>2 to ≤ 4
F	Firm	>25 to ≤ 50	>4 to 8
St	Stiff	>50 to ≤ 100	>8 to 15
VSt	Very Stiff	>100 to ≤ 200	>15 to 30
H	Hard	>200	>30
Fr	Friable	-	

DENSITY

Symbol	Term	Density Index %	SPT "N" #
VL	Very Loose	≤ 15	0 to 4
L	Loose	>15 to ≤ 35	4 to 10
MD	Medium Dense	>35 to ≤ 65	10 to 30
D	Dense	>65 to ≤ 85	30 to 50
VD	Very Dense	>85	Above 50

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.
SPT correlations are not stated in AS1726:2017, and may be subject to corrections for overburden pressure, moisture content of the soil, and equipment type.

MINOR COMPONENTS

Term	Assessment Guide	Proportion by Mass
Add 'Trace'	Presence just detectable by feel or eye but soil properties little or no different to general properties of primary component	Coarse grained soils: ≤ 5% Fine grained soil: ≤ 15%
Add 'With'	Presence easily detectable by feel or eye but soil properties little or no different to general properties of primary component	Coarse grained soils: 5 - 12% Fine grained soil: 15 - 30%
Prefix soil name	Presence easily detectable by feel or eye in conjunction with the general properties of primary component	Coarse grained soils: >12% Fine grained soil: >30%

TERMS FOR ROCK MATERIAL STRENGTH AND WEATHERING

CLASSIFICATION AND INFERRED STRATIGRAPHY

Rock is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS1726 – 2017, Section 6.2 – Rock identification, description and classification.

ROCK MATERIAL STRENGTH CLASSIFICATION

Symbol	Term	Point Load Index, $Is_{(50)}$ (MPa) #	Field Guide
VL	Very Low	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30 mm can be broken by finger pressure.
L	Low	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
H	High	1 to 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken with pick with a single firm blow; rock rings under hammer.
VH	Very High	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

 # Rock Strength Test Results

▼ Point Load Strength Index, $Is_{(50)}$, Axial test (MPa)

● Point Load Strength Index, $Is_{(50)}$, Diametral test (MPa)

Relationship between rock strength test result ($Is_{(50)}$) and unconfined compressive strength (UCS) will vary with rock type and strength, and should be determined on a site-specific basis. However UCS is typically 20 x $Is_{(50)}$.

ROCK MATERIAL WEATHERING CLASSIFICATION

Symbol		Term	Field Guide
RS		Residual Soil	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
XW		Extremely Weathered	Rock is weathered to such an extent that it has soil properties - i.e. it either disintegrates or can be remoulded, in water.
DW	HW	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 weathering products in pores. In some environments it is convenient to subdivide into Highly Weathered and Moderately Weathered, with the degree of alteration typically less for MW.
	MW		
SW		Slightly Weathered	Rock slightly discoloured but shows little or no change of strength relative to fresh rock.
FR		Fresh	Rock shows no sign of decomposition or staining.

ABBREVIATIONS AND DESCRIPTIONS FOR ROCK MATERIAL AND DEFECTS

CLASSIFICATION AND INFERRED STRATIGRAPHY
Rock is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS1726 – 2017, Section 6.2 – Rock identification, description and classification.

DETAILED ROCK DEFECT SPACING

Defect Spacing

Spacing/width (mm)	Descriptor	Symbol
<20	Extremely Close	EC
20-60	Very Close	VC
60-200	Close	C
200-600	Medium	M
600-2000	Wide	W
2000-6000	Very Wide	VW

Bedding Thickness (Stratification)

Term	Spacing (mm)
Thinly laminated	<6
Laminated	6 – 20
Very thinly bedded	20 – 60
Thinly bedded	60 – 200
Medium bedded	200 – 600
Thickly bedded	600 – 2,000
Very thickly bedded	> 2,000

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT TYPES

Defect Type	Abbr.	Description
Joint	JT	Surface of a fracture or parting, formed without displacement, across which the rock has little or no tensile strength. May be closed or filled by air, water or soil or rock substance, which acts as cement.
Bedding Parting	BP	Surface of fracture or parting, across which the rock has little or no tensile strength, parallel or sub-parallel to layering/ bedding. Bedding refers to the layering or stratification of a rock, indicating orientation during deposition, resulting in planar anisotropy in the rock material.
Contact	CO	The surface between two types or ages of rock.
Sheared Surface	SSU	A near planar, curved or undulating surface which is usually smooth, polished or slickensided.
Sheared Seam/ Zone (Fault)	SS/SZ	Seam or zone with roughly parallel almost planar boundaries of rock substance cut by closely spaced (often <50 mm) parallel and usually smooth or slickensided joints or cleavage planes.
Crushed Seam/ Zone (Fault)	CS/CZ	Seam or zone composed of disoriented usually angular fragments of the host rock substance, with roughly parallel near-planar boundaries. The brecciated fragments may be of clay, silt, sand or gravel sizes or mixtures of these.
Extremely Weathered Seam/ Zone	XWS/XWZ	Seam of soil substance, often with gradational boundaries, formed by weathering of the rock material in places.
Infilled Seam	IS	Seam of soil substance, usually clay or clayey, with very distinct roughly parallel boundaries, formed by soil migrating into joint or open cavity.
Vein	VN	Distinct sheet-like body of minerals crystallised within rock through typically open-space filling or crack-seal growth.

NOTE: Defects size of <100mm SS, CS and XWS. Defects size of >100mm SZ, CZ and XWZ.

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT SHAPE AND ROUGHNESS

Shape	Abbr.	Description	Roughness	Abbr.	Description
Planar	PR	Consistent orientation	Polished	POL	Shiny smooth surface
Curved	CU	Gradual change in orientation	Slickensided	SL	Grooved or striated surface, usually polished
Undulating	UN	Wavy surface	Smooth	SM	Smooth to touch. Few or no surface irregularities
Stepped	ST	One or more well defined steps	Rough	RO	Many small surface irregularities (amplitude generally <1mm). Feels like fine to coarse sandpaper
Irregular	IR	Many sharp changes in orientation	Very Rough	VR	Many large surface irregularities, amplitude generally >1mm. Feels like very coarse sandpaper

Orientation: **Vertical Boreholes –** The dip (inclination from horizontal) of the defect.
Inclined Boreholes – The inclination is measured as the acute angle to the core axis.

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT COATING

Coating	Abbr.	Description
Clean	CN	No visible coating or infilling
Stain	SN	No visible coating but surfaces are discoloured by staining, often limonite (orange-brown)
Veneer	VNR	A visible coating of soil or mineral substance, usually too thin to measure (< 1 mm); may be patchy

DEFECT APERTURE

Aperture	Abbr.	Description
Closed	CL	Closed.
Open	OP	Without any infill material.
Infilled	-	Soil or rock i.e. clay, silt, talc, pyrite, quartz, etc.

Appendix B – Laboratory Certificates

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Max Wang
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	max.wang@eiaustralia.com.au
Project	**E25834.G03 80 O'Connell St, Kingswood NS**
Order Number	**E25834.G03**
Samples	6

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE239414 R0**
Date Received	21/11/2022
Date Reported	28/11/2022

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Huong CRAWFORD
Production Manager

Soluble Anions (1:5) in Soil/Solids by Ion Chromatography [AN245] Tested: 24/11/2022

PARAMETER	UOM	LOR	BHA1M_1.5-1.95m SOIL - 11/11/2022 SE239414.001	BHA4_1.5-1.95 SOIL - 10/11/2022 SE239414.002	BHC1_4.5-4.95m SOIL - 14/11/2022 SE239414.003	BHG1M_0.5-0.95m SOIL - 16/11/2022 SE239414.004	BHH4_0.5-0.6m SOIL - 17/11/2022 SE239414.005
Chloride	mg/kg	0.25	68	150	590	27	59
Sulfate	mg/kg	5	100	32	54	67	71

PARAMETER	UOM	LOR	BHH7M_0.5-0.95m SOIL - 16/11/2022 SE239414.006
Chloride	mg/kg	0.25	2.8
Sulfate	mg/kg	5	26

pH in soil (1:5) [AN101] Tested: 24/11/2022

PARAMETER	UOM	LOR	BHA1M_1.5-1.95m SOIL - 11/11/2022 SE239414.001	BHA4_1.5-1.95 SOIL - 10/11/2022 SE239414.002	BHC1_4.5-4.95m SOIL - 14/11/2022 SE239414.003	BHG1M_0.5-0.95m SOIL - 16/11/2022 SE239414.004	BHH4_0.5-0.6m SOIL - 17/11/2022 SE239414.005
pH	pH Units	0.1	**9.6**	**9.9**	**8.3**	**8.9**	**7.2**

PARAMETER	UOM	LOR	BHH7M_0.5-0.95m SOIL - 16/11/2022 SE239414.006
pH	pH Units	0.1	**6.6**

Conductivity and TDS by Calculation - Soil [AN106] Tested: 24/11/2022

PARAMETER	UOM	LOR	BHA1M_1.5-1.95m SOIL - 11/11/2022 SE239414.001	BHA4_1.5-1.95 SOIL - 10/11/2022 SE239414.002	BHC1_4.5-4.95m SOIL - 14/11/2022 SE239414.003	BHG1M_0.5-0.95m SOIL - 16/11/2022 SE239414.004	BHH4_0.5-0.6m SOIL - 17/11/2022 SE239414.005
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	440	550	490	300	90

PARAMETER	UOM	LOR	BHH7M_0.5-0.95m SOIL - 16/11/2022 SE239414.006
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	22

Moisture Content [AN002] Tested: 23/11/2022

PARAMETER	UOM	LOR	BHA1M_1.5-1.95m SOIL - 11/11/2022 SE239414.001	BHA4_1.5-1.95 SOIL - 10/11/2022 SE239414.002	BHC1_4.5-4.95m SOIL - 14/11/2022 SE239414.003	BHG1M_0.5-0.95m SOIL - 16/11/2022 SE239414.004	BHH4_0.5-0.6m SOIL - 17/11/2022 SE239414.005
% Moisture	%w/w	1	**16.7**	**18.0**	**14.6**	**20.1**	**14.5**

PARAMETER	UOM	LOR	BHH7M_0.5-0.95m SOIL - 16/11/2022 SE239414.006
% Moisture	%w/w	1	**13.0**

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, sediments and sludges, an extract with water (or 0.01M CaCl2) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos /cm or µS/cm @ 25°C. For soils, an extract of as received sample with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.
AN245	Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Salah Khalifa
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	salah.khalifa@eiaustralia.com.au
Project	**E25834.G04 Caddens Corner, 80 O'Connell**
Order Number	**E25834.G04**
Samples	5

LABORATORY DETAILS

Manager	Shane McDermott
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE285106 R0**
Date Received	23/6/2025
Date Reported	30/6/2025

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Ying Ying ZHANG
Laboratory Technician

pH in soil (1:5) [AN101] Tested: 25/6/2025

PARAMETER	UOM	LOR	BH101M_0.2-0.4 SOIL - 2/6/2025 SE285106.001	BH101M_1.5-1.95 SOIL - 2/6/2025 SE285106.002	BH102_3.0-3.45 SOIL - 3/6/2025 SE285106.003	BH103M_0.5-0.95 SOIL - 4/6/2025 SE285106.004	BH104M_4.5-4.85 SOIL - 5/6/2025 SE285106.005
pH	pH Units	0.1	**9.8**	**7.9**	**9.0**	**8.4**	**9.3**

Conductivity and TDS by Calculation - Soil [AN106] Tested: 25/6/2025

PARAMETER	UOM	LOR	BH101M_0.2-0.4 SOIL - 2/6/2025 SE285106.001	BH101M_1.5-1.95 SOIL - 2/6/2025 SE285106.002	BH102_3.0-3.45 SOIL - 3/6/2025 SE285106.003	BH103M_0.5-0.95 SOIL - 4/6/2025 SE285106.004	BH104M_4.5-4.85 SOIL - 5/6/2025 SE285106.005
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	**200**	**100**	**140**	**250**	**230**

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) [AN122] Tested: 27/6/2025

PARAMETER	UOM	LOR	BH101M_0.2-0.4 SOIL - 2/6/2025 SE285106.001	BH101M_1.5-1.95 SOIL - 2/6/2025 SE285106.002	BH102_3.0-3.45 SOIL - 3/6/2025 SE285106.003	BH103M_0.5-0.95 SOIL - 4/6/2025 SE285106.004	BH104M_4.5-4.85 SOIL - 5/6/2025 SE285106.005
Exchangeable Calcium, Ca	mg/kg	2	8400	1000	1700	3500	3100
Exchangeable Calcium, Ca	meq/100g	0.01	42	5.1	8.3	18	15
Exchangeable Calcium Percentage*	%	0.1	95.5	25.8	41.0	69.9	56.6
Exchangeable Potassium, K	mg/kg	2	420	130	150	140	160
Exchangeable Potassium, K	meq/100g	0.01	1.1	0.32	0.39	0.36	0.40
Exchangeable Potassium Percentage*	%	0.1	2.5	1.6	1.9	1.4	1.5
Exchangeable Magnesium, Mg	mg/kg	2	27	1400	1100	580	1000
Exchangeable Magnesium, Mg	meq/100g	0.02	0.22	12	9.3	4.7	8.4
Exchangeable Magnesium Percentage*	%	0.1	0.5	58.8	45.5	18.8	30.8
Exchangeable Sodium, Na	mg/kg	2	150	620	540	570	700
Exchangeable Sodium, Na	meq/100g	0.01	0.66	2.7	2.3	2.5	3.0
Exchangeable Sodium Percentage*	%	0.1	1.5	13.8	11.6	9.9	11.1
Cation Exchange Capacity	meq/100g	0.02	44	20	20	25	27

Moisture Content [AN002] Tested: 24/6/2025

PARAMETER	UOM	LOR	BH101M_0.2-0.4 SOIL - 2/6/2025 SE285106.001	BH101M_1.5-1.95 SOIL - 2/6/2025 SE285106.002	BH102_3.0-3.45 SOIL - 3/6/2025 SE285106.003	BH103M_0.5-0.95 SOIL - 4/6/2025 SE285106.004	BH104M_4.5-4.85 SOIL - 5/6/2025 SE285106.005
% Moisture	%w/w	1	**7.3**	**5.9**	**4.2**	**9.8**	**5.5**

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, sediments and sludges, an extract with water (or 0.01M CaCl2) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos /cm or µS/cm @ 25°C. For soils, an extract of as received sample with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.
AN122	Exchangeable Cations, CEC and ESP: Soil sample is extracted in 1M Ammonium Acetate at pH=7 (or 1M Ammonium Chloride at pH=7) with cations (Na, K, Ca & Mg) then determined by ICP OES/ICP MS and reported as Exchangeable Cations. For saline soils, these results can be corrected for water soluble cations and reported as Exchangeable cations in meq/100g or soil can be pre-treated (aqueous ethanol/aqueous glycerol) prior to extraction. Cation Exchange Capacity (CEC) is the sum of the exchangeable cations in meq/100g.
AN122	The Exchangeable Sodium Percentage (ESP) is calculated as the exchangeable sodium divided by the CEC (all in meq/100g) times 100. ESP can be used to categorise the sodicity of the soil as below: ESP < 6% non-sodic ESP 6-15% sodic ESP >15% strongly sodic Method is referenced to Rayment and Lyons, 2011, sections 15D3 and 15N1.-

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		
***	Indicates that both * and ** apply.				

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

STATEMENT OF QA/QC PERFORMANCE

SE285106 R0

CLIENT DETAILS

Contact	Salah Khalifa
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	salah.khalifa@eiaustralia.com.au
Project	**E25834.G04 Caddens Corner, 80 O'Connell**
Order Number	**E25834.G04**
Samples	5

LABORATORY DETAILS

Manager	Shane McDermott
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE285106 R0**
Date Received	23 Jun 2025
Date Reported	30 Jun 2025

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	Conductivity and TDS by Calculation - Soil	5 items
	Moisture Content	5 items
	pH in soil (1:5)	5 items
Analysis Date	Conductivity and TDS by Calculation - Soil	5 items

SAMPLE SUMMARY

Sample counts by matrix	5 Soil	Type of documentation received	COC
Date documentation received	23/6/2025	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	22°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	None	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE285106 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.2-0.4	SE285106.001	LB352252	02 Jun 2025	23 Jun 2025	09 Jun 2025	25 Jun 2025†	09 Jun 2025	25 Jun 2025†
BH101M_1.5-1.95	SE285106.002	LB352252	02 Jun 2025	23 Jun 2025	09 Jun 2025	25 Jun 2025†	09 Jun 2025	25 Jun 2025†
BH102_3.0-3.45	SE285106.003	LB352252	03 Jun 2025	23 Jun 2025	10 Jun 2025	25 Jun 2025†	10 Jun 2025	25 Jun 2025†
BH103M_0.5-0.95	SE285106.004	LB352252	04 Jun 2025	23 Jun 2025	11 Jun 2025	25 Jun 2025†	11 Jun 2025	25 Jun 2025†
BH104M_4.5-4.85	SE285106.005	LB352252	05 Jun 2025	23 Jun 2025	12 Jun 2025	25 Jun 2025†	12 Jun 2025	25 Jun 2025†

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR)

Method: ME-(AU)-[ENV]AN122

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.2-0.4	SE285106.001	LB352613	02 Jun 2025	23 Jun 2025	30 Jun 2025	27 Jun 2025	30 Jun 2025	30 Jun 2025
BH101M_1.5-1.95	SE285106.002	LB352613	02 Jun 2025	23 Jun 2025	30 Jun 2025	27 Jun 2025	30 Jun 2025	30 Jun 2025
BH102_3.0-3.45	SE285106.003	LB352613	03 Jun 2025	23 Jun 2025	01 Jul 2025	27 Jun 2025	01 Jul 2025	30 Jun 2025
BH103M_0.5-0.95	SE285106.004	LB352613	04 Jun 2025	23 Jun 2025	02 Jul 2025	27 Jun 2025	02 Jul 2025	30 Jun 2025
BH104M_4.5-4.85	SE285106.005	LB352613	05 Jun 2025	23 Jun 2025	03 Jul 2025	27 Jun 2025	03 Jul 2025	30 Jun 2025

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.2-0.4	SE285106.001	LB352127	02 Jun 2025	23 Jun 2025	16 Jun 2025	24 Jun 2025†	29 Jun 2025	25 Jun 2025
BH101M_1.5-1.95	SE285106.002	LB352127	02 Jun 2025	23 Jun 2025	16 Jun 2025	24 Jun 2025†	29 Jun 2025	25 Jun 2025
BH102_3.0-3.45	SE285106.003	LB352127	03 Jun 2025	23 Jun 2025	17 Jun 2025	24 Jun 2025†	29 Jun 2025	25 Jun 2025
BH103M_0.5-0.95	SE285106.004	LB352127	04 Jun 2025	23 Jun 2025	18 Jun 2025	24 Jun 2025†	29 Jun 2025	25 Jun 2025
BH104M_4.5-4.85	SE285106.005	LB352127	05 Jun 2025	23 Jun 2025	19 Jun 2025	24 Jun 2025†	29 Jun 2025	25 Jun 2025

pH in soil (1:5)

Method: ME-(AU)-[ENV]AN101

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.2-0.4	SE285106.001	LB352252	02 Jun 2025	23 Jun 2025	09 Jun 2025	25 Jun 2025†	26 Jun 2025	25 Jun 2025
BH101M_1.5-1.95	SE285106.002	LB352252	02 Jun 2025	23 Jun 2025	09 Jun 2025	25 Jun 2025†	26 Jun 2025	25 Jun 2025
BH102_3.0-3.45	SE285106.003	LB352252	03 Jun 2025	23 Jun 2025	10 Jun 2025	25 Jun 2025†	26 Jun 2025	25 Jun 2025
BH103M_0.5-0.95	SE285106.004	LB352252	04 Jun 2025	23 Jun 2025	11 Jun 2025	25 Jun 2025†	26 Jun 2025	25 Jun 2025
BH104M_4.5-4.85	SE285106.005	LB352252	05 Jun 2025	23 Jun 2025	12 Jun 2025	25 Jun 2025†	26 Jun 2025	25 Jun 2025

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result
LB352252.001	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	0

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR)

Method: ME-(AU)-[ENV]AN122

Sample Number	Parameter	Units	LOR	Result
LB352613.001	Exchangeable Sodium, Na	mg/kg	2	0
	Exchangeable Potassium, K	mg/kg	2	0
	Exchangeable Calcium, Ca	mg/kg	2	0.3175
	Exchangeable Magnesium, Mg	mg/kg	2	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE285099.001	LB352252.021	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	69	73	33	5

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE285085.002	LB352127.011	% Moisture	%w/w	1	10.3	10.0	40	2
SE285085.004	LB352127.014	% Moisture	%w/w	1	6.8	7.8	44	15

pH in soil (1:5)

Method: ME-(AU)-[ENV]AN101

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE284566A.009	LB352252.021	pH	pH Units	0.1	6.1	6.1	32	0
SE285099.001	LB352252.023	pH	pH Units	0.1	5.5	5.2	32	6

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Conductivity and TDS by Calculation - Soil — Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB352252.002	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	NA	1015	85 - 115	106

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) — Method: ME-(AU)-[ENV]AN122

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB352613.002	Exchangeable Sodium, Na	meq/100g	0.01	0.17	0.188	80 - 120	91
	Exchangeable Potassium, K	meq/100g	0.01	0.12	0.141	80 - 120	89
	Exchangeable Calcium, Ca	meq/100g	0.01	1.9	2.17	80 - 120	87
	Exchangeable Magnesium, Mg	meq/100g	0.02	1.3	1.53	80 - 120	85

pH in soil (1:5) — Method: ME-(AU)-[ENV]AN101

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB352252.003	pH	pH Units	0.1	7.4	7.415	98 - 102	100

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spikes were required for this job.

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicates that both * and ** apply.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

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Atterberg Limits and Linear Shrinkage Report

Project: E25834.G03 80 O'CONNEL STREET, KINGSWOOD — Project No.: 31380

Client: EI AUSTRALIA — Report No.: 22/4156

Address: Suite 6.01, 55 Miller Street, Pyrmont NSW 2009 — Report Date: 28/11/2022

Test Method: AS1289.3.1.2,3.2.1,3.4.1,2.1.1 — Page: 1 OF 1

Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

STS / Sample No.	7137D-L/1	7137D-L/2	7137D-L/3	7137D-L/4		
Sample Location	BHA4	BHC1	BH04M	BHG1M		
Material Description	Silty Clay, grey/yellow/red	Sandy Silty Clay, orange brown	Gravelly Silty Clay, grey	Silty Clay, yellow brown/grey, trace of sand		
Depth (m)	3.0 - 3.45	7.5 - 7.95	3.0 - 3.45	1.5 - 1.95		
Sample Date	10-17/11/2022	10-17/11/2022	10-17/11/2022	10-17/11/2022		
Sample History	Oven Dried	Oven Dried	Oven Dried	Oven Dried		
Method of Preparation	Dry Sieved	Dry Sieved	Dry Sieved	Dry Sieved		
Liquid Limit (%)	**66**	**42**	**42**	**49**		
Plastic Limit (%)	**21**	**15**	**19**	**15**		
Plasticity Index	**45**	**27**	**23**	**34**		
Linear Shrinkage (%)	**16.0**	**12.0**	**11.0**	**15.0**		
Mould Size (mm)	250	250	250	250		
Crumbing	N	N	N	N		
Curling	Y	Y	N	Y		

Remarks:

Approved Signatory..... .....

Technician: DH

Orlando Mendoza - Laboratory Manager

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Moisture Content of Soil and Aggregate Samples

Project: E25834.G03 80 O'CONNEL STREET, KINGSWOOD — Project No.: 31380

Client: EI Australia Pty Ltd — Report No.: 22/4157

Address: Suite 6.01, 55 Miller Street, Pyrmont NSW 2009 — Report Date: 28/11/2022

Test Method: AS1289.2.1.1 — Page: 1 OF 1

Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

STS / Sample No.	7137D-L/1	7137D-L/2	7137D-L/3	7137D-L/4		
Sample Location	BHA4	BHC1	BH04M	BHG1M		
Material Description	Silty Clay, grey/yellow/red	Sandy Silty Clay, orange brown	Gravelly Silty Clay, grey	Silty Clay, yellow brown/grey, trace of sand		
Depth (mm)	3.0 - 3.45	7.5 - 7.95	3.0 - 3.45	1.5 - 1.95		
Sample Date	10-17/11/2022	10-17/11/2022	10-17/11/2022	10-17/11/2022		
Moisture Content (%)	**22.9**	**17.8**	**12.4**	**20.9**		

Remarks:

Approved Signatory.....

Technician: DH — Orlando Mendoza - Laboratory Manager

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Phone: (02)9756 2166 | Email: enquiries@smectesting.com.au

NATA Accredited for Compliance with ISO/IEC 17025 - Testing No. 2750

California Bearing Ratio Determination Report

Project: E25834.G03 80 O'CONNEL STREET, KINGSWOOD
Client: EI Australia Pty Ltd
Address: Suite 6.01, 55 Miller Street, Pyrmont NSW 2009
Test Method: AS1289.5.1.1,6.1.1,2.1.1
No. of Days Soaked: 4

Project No.: 31380
Report No.: 22/4236
Report Date: 7/12/2022
Page: 1 of 1
Compactive Effort: Standard
Target Compaction (%): 100
Surcharge (Kg): 9

Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

STS / Sample No.		7137D-L/1	7137D-L/2	7137D-L/3			
Sample Location		BHC1	BHD4M	BHG1M			
Material Description		Silty Clay, brown, trace of gravel	Gravelly Silty Clay, brown	Silty Clay, brown			
Depth of Sample (m)		Sampled by Client	Sampled by Client	Sampled by Client			
Sample Date		10-11-17/11/2022	10-11-17/11/2022	10-11-17/11/2022			
Oversize on Wet Basis +19mm (%)		0.1	0.1	0.0			
Field Moisture Content (%)		21.2	20.7	21.2			
Optimum Moisture Content (%)		20.5	18.8	17.9			
Maximum Dry Density (t/m³)		1.69	1.74	1.78			
Dry Density (t/m³)	Before Soaking	1.686	1.761	1.774			
	After Soaking	1.662	1.739	1.751			
Relative Compaction (%)	Before Soaking	99.8	101.2	99.7			
	After Soaking	98.3	99.9	98.4			
Moisture Content (%)	Before Soaking	20.3	18.4	18.1			
	After Soaking	22.4	20.2	19.2			
Moisture Ratio Before Soaking (%)		99.0	98.0	101.0			
Moisture Content after test (%)	Top 30mm	24.2	22.1	22.4			
	Entire Depth	22.1	21.1	19.8			
Swell after Soaking (%)		1.5	1.3	1.3			
CBR Value (%)		**6.0**	**3.0**	**4.5**			
Penetration (mm)		**2.5**	**2.5**	**2.5**			

Remarks: +19mm material excluded from test

Approved Signatory.....

Technician: AW

Orlando Mendoza - Laboratory Manager

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Phone: (02)9756 2166 | Email: enquiries@stsgeo.com.au

Point Load Strength Index Report

Project: E25834.G03 80 O'Connell Street, Kingswood, NSW
Client: EI AUSTRALIA
Address: SUITE 6.01, 55 MILLER STREET, PYRMONT NSW 2009
Test Method: AS4133.4.1
Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

Project No.: 31380/7137D-L
Report No.: 22/4048
Report Date: 21/11/2022

Borehole / Sample No.	Depth (m)	Date Sampled	Date Tested	Test Type	Is (MPa)	$Is_{(50)}$ (MPa)	Rock Type	Failure Type	Moisture
BHA1M	5.72	10-17/11/2022	22/11/2022	A	**0.22**	**0.25**	SS	4	M
BHA1M	5.94	10-17/11/2022	22/11/2022	A	**0.15**	**0.16**	SS	3	M
BHA1M	6.72	10-17/11/2022	25/11/2022	A	**0.98**	**1**	SS	3	D
BHA1M	7.39	10-17/11/2022	22/11/2002	A	**0.085**	**0.088**	SS	4	M
BHA1M	8.44	10-17/11/2022	22/11/2022	A	**0.24**	**0.25**	SS	3	D
BHA1M	9.44	10-17/11/2022	22/11/2022	A	**0.26**	**0.27**	SS	3	D
BHA4	4.65	10-17/11/2022	23/11/2022	A	**0.059**	**0.061**	TS	3	W
BHA4	5.38	10-17/11/2022	23/11/2022	A	**0.13**	**0.13**	TS	3	W
BHA4	6.08	10-17/11/2022	23/11/2022	A	**0.1**	**0.11**	TS	3	M
BHA4	7.65	10-17/11/2022	23/11/2022	A	**0.16**	**0.17**	TS	3	M
BHA4	8.38	10-17/11/2022	23/11/2022	A	**0.38**	**0.38**	TS	3	D
BHA4	9.18	10-17/11/2022	23/11/2022	A	**3.1**	**3.3**	TS	3	D
BHA4	10.10	10-17/11/2022	23/11/2022	A	**0.6**	**0.6**	TS	3	D
BHA7M	4.49	10-17/11/2022	22/11/2022	A	**0.13**	**0.13**	SS	3	D
BHA7M	5.40	10-17/11/2022	22/11/2022	A	**0.21**	**0.22**	SS	3	D
BHA7M	6.30	10-17/11/2022	22/11/2022	A	**0.23**	**0.24**	SS	3	D
BHA7M	7.27	10-17/11/2022	22/11/2022	A	**1.2**	**1.3**	SS	3	D
BHA7M	8.37	10-17/11/2022	23/11/2022	A	**0.36**	**0.38**	SH	1	M
BHA7M	9.56	10-17/11/2022	23/11/2022	A	**0.2**	**0.2**	SH	1	M
BHA7M	10.34	10-17/11/2022	23/11/2022	A	**0.46**	**0.49**	SH	3	D
BHC1	10.17	10-17/11/2022	22/11/2022	A	**0.26**	**0.28**	SH	3	D
BHC1	10.71	10-17/11/2022	22/11/2022	A	**0.15**	**0.15**	SH	3	D
BHC1	11.18	10-17/11/2022	22/11/2022	A	**0.048**	**0.048**	SH	3	M
BHC1	12.18	10-17/11/2022	22/11/2022	A	**1.3**	**1.3**	SH	3	D
BHC1	13.10	10-17/11/2022	22/11/2022	A	**0.7**	**0.73**	SS	3	D
BHC1	14.53	10-17/11/2022	22/11/2022	A	**0.24**	**0.25**	SH	3	D

Failure Type
1 = Fracture through bedding or weak plane
2 = Fracture along bedding
3 = Fracture through rock mass
4 = Fracture influenced by natural defect or drilling
5 = Partial fracture or chip (invalid result)

Test Type
A = Axial
D = Diametrial
I = Irregular
C = Cube

Moisure Condition
W = Wet
M = Moist
D = Dry

Rock Type
SS = Sandstone
ST = Siltstone
SH = Shale
YS = Claystone
IG = Igneous

Remarks:

Approved Signatory.....

Technician: L.S., F.V.

Orlando Mendoza - Laboratory Manager

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Point Load Strength Index Report

Project: E25834.G03 80 O'Connell Street, Kingswood, NSW
Client: EI AUSTRALIA
Address: SUITE 6.01, 55 MILLER STREET, PYRMONT NSW 2009
Test Method: AS4133.4.1
Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

Project No.: 31380/7137D-L
Report No.: 22/4048
Report Date: 21/11/2022

Borehole / Sample No.	Depth (m)	Date Sampled	Date Tested	Test Type	Is (MPa)	$Is_{(50)}$ (MPa)	Rock Type	Failure Type	Moisture
BHC6	6.87	10-17/11/2022	25/11/2022	A	**0.086**	**0.086**	TS	3	D
BHC6	7.38	10-17/11/2022	21/11/2022	A	**0.056**	**0.057**	TS	3	M
BHC6	7.73	10-17/11/2022	21/11/2022	A	**0.31**	**0.32**	SS	3	M
BHC6	8.47	10-17/11/2022	21/11/2022	A	**0.52**	**0.53**	SS	3	M
BHC6	9.23	10-17/11/2022	21/11/2022	A	**0.22**	**0.21**	TS	3	M
BHC6	10.43	10-17/11/2022	21/11/2022	A	**0.59**	**0.6**	SS	3	D
BHC6	11.37	10-17/11/2022	22/11/2022	A	**1.3**	**1.3**	SH	3	D
BHC6	12.35	10-17/11/2022	22/11/2022	A	**0.52**	**0.52**	SH	3	D
BHC6	13.49	10-17/11/2022	22/11/2022	A	**0.33**	**0.32**	SH	3	D
BHC6	14.45	10-17/11/2022	22/11/2022	A	**0.51**	**0.54**	SS	3	D
BHD4M	6.28	10-17/11/2022	21/11/2022	A	**0.46**	**0.46**	SS	3	M
BHD4M	8.72	10-17/11/2022	21/11/2022	A	**0.35**	**0.35**	TS	3	M
BHD4M	9.56	10-17/11/2022	21/11/2022	A	**0.28**	**0.28**	TS	3	M
BHD4M	9.79	10-17/11/2022	21/11/2022	A	**0.24**	**0.24**	TS	3	M
BHG1M	4.93	10-17/11/2022	21/11/2022	A	**0.033**	**0.034**	YS	3	M
BHG1M	5.64	10-17/11/2022	21/11/2022	A	**0.021**	**0.022**	YS	3	M
BHG1M	7.39	10-17/11/2022	21/11/2022	A	**0.032**	**0.032**	YS	3	M
BHG1M	8.14	10-17/11/2022	21/11/2022	A	**0.42**	**0.4**	SS	3	D
BHG1M	9.08	10-17/11/2022	21/11/2022	A	**0.44**	**0.46**	SS	3	M

Failure Type
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Test Type
A = Axial
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I = Irregular
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Moisure Condition
W = Wet
M = Moist
D = Dry

Rock Type
SS = Sandstone
ST = Siltstone
SH = Shale
YS = Claystone
IG = Igneous

Remarks:

Approved Signatory.....

Technician: L.S., F.V.

Orlando Mendoza - Laboratory Manager

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Point Load Strength Index Report

Project: E25834.G03 80 O'Connell Street, Kingswood, NSW
Client: EI AUSTRALIA
Address: SUITE 6.01, 55 MILLER STREET, PYRMONT NSW 2009
Test Method: AS4133.4.1
Sampling Procedure: Samples Supplied By Client (Not covered under NATA Scope of Accreditation)

Project No.: 31380/7137D-L
Report No.: 22/4048
Report Date:
Page: 3 0F 3

Borehole / Sample No.	Depth (m)	Date Sampled	Date Tested	Test Type	Is (MPa)	$Is_{(50)}$ (MPa)	Rock Type	Failure Type	Moisture
BHH4	2.80	10-17/11/2022	21/11/2022	A	**1.4**	**1.4**	SS	3	M
BHH4	4.53	10-17/11/2022	21/11/2022	A	**1.9**	**1.9**	SS	3	M
BHH4	5.60	10-17/11/2022	21/11/2022	A	**1.6**	**1.7**	SS	3	M
BHH4	6.96	10-17/11/2022	21/11/2022	A	**0.079**	**0.08**	TS	3	W
BHH4	7.05	10-17/11/2022	21/11/2022	A	**0.096**	**0.095**	TS	3	W
BHH7M	2.42	10-17/11/2022	22/11/2022	A	**1.1**	**1.1**	SS	3	D
BHH7M	3.28	10-17/11/2022	22/11/2022	A	**0.36**	**0.37**	SS	3	D
BHH7M	4.16	10-17/11/2022	22/11/2022	A	**1.2**	**1.2**	SS	3	D
BHH7M	5.58	10-17/11/2022	22/11/2022	A	**0.52**	**0.54**	SS/SH	3	D
BHH7M	6.41	10-17/11/2022	22/11/2022	A	**0.68**	**0.69**	SS	3	D
BHH7M	7.44	10-17/11/2022	22/11/2022	A	**0.58**	**0.57**	SS	3	D
BHH7M	8.49	10-17/11/2022	22/11/2022	A	**0.39**	**0.41**	SS	3	D
BHH7M	9.22	10-17/11/2022	22/11/2022	A	**0.66**	**0.66**	SS	3	D
BHH7M	9.84	10-17/11/2022	22/11/2022	A	**0.45**	**0.44**	SH	3	D

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Rock Type
SS = Sandstone
ST = Siltstone
SH = Shale
YS = Claystone
IG = Igneous

Remarks:

Approved Signatory. .....

Technician: L.S., F.V.

Orlando Mendoza - Laboratory Manager

Material Test Report

Report Number: **9882/8-1**
Issue Number: 1
Date Issued: 25/06/2025
Client: EI AUSTRALIA
55 MILLER STREET, PYRMONT NSW 2009
Project Number: 9882/8
Project Name: Kingswood
Project Location: 68-80 O'Connell Street, Kingswood
Client Reference: 9882/8
Work Request: 926
Sample Number: S-926C
Date Sampled: 17/06/2025
Dates Tested: 17/06/2025 - 23/06/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **BH104m, Depth: 1.0 - 2.0m**
Material: Silty Clay

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ABN 71 076 676 321

Geotech Testing Pty Ltd
Penrith Laboratory
34 Borec Road Penrith NSW 2750
Phone: (02) 4722 2744
Email: matthew@geotech.com.au

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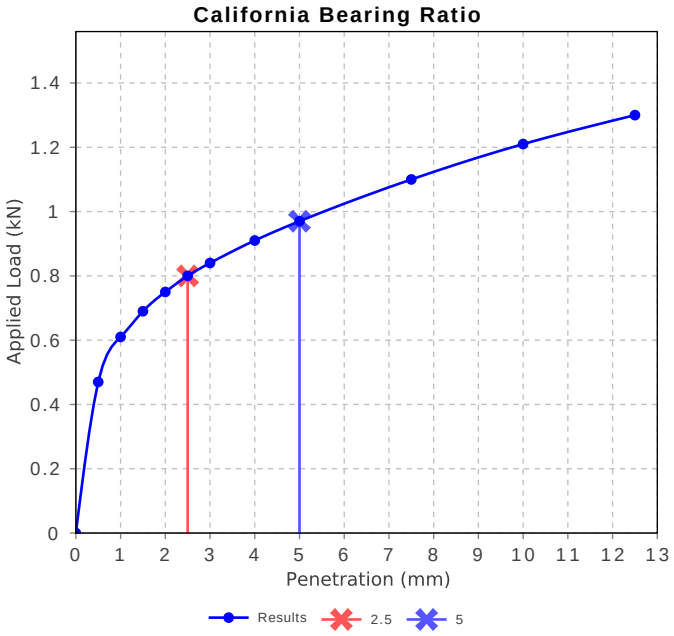
NATA WORLD RECOGNISED ACCREDITATION

Approved Signatory: Mathew Morley
Laboratory Manager
NATA Accredited Laboratory Number: 2734

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**6**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity			
Maximum Dry Density (t/m^3)	1.74		
Optimum Moisture Content (%)	18.0		
Laboratory Density Ratio (%)	98.5		
Laboratory Moisture Ratio (%)	97.5		
Dry Density after Soaking (t/m^3)	1.70		
Field Moisture Content (%)	16.1		
Moisture Content at Placement (%)	17.3		
Moisture Content Top 30mm (%)	21.5		
Moisture Content Rest of Sample (%)	20.7		
Mass Surcharge (kg)	9		
Soaking Period (days)	4		
Curing Hours (h)	52.2		
Swell (%)	0.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0.0		



Material Test Report

Report Number: **9882/8-1**
Issue Number: 1
Date Issued: 25/06/2025
Client: EI AUSTRALIA
55 MILLER STREET, PYRMONT NSW 2009
Project Number: 9882/8
Project Name: Kingswood
Project Location: 68-80 O'Connell Street, Kingswood
Client Reference: 9882/8
Work Request: 926
Sample Number: S-926D
Date Sampled: 17/06/2025
Dates Tested: 17/06/2025 - 23/06/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **BH 103m, Depth: 0.3 - 1.5m**
Material: Silty Clay

GEOTECH TESTING PTY LTD
ABN 71 076 676 321

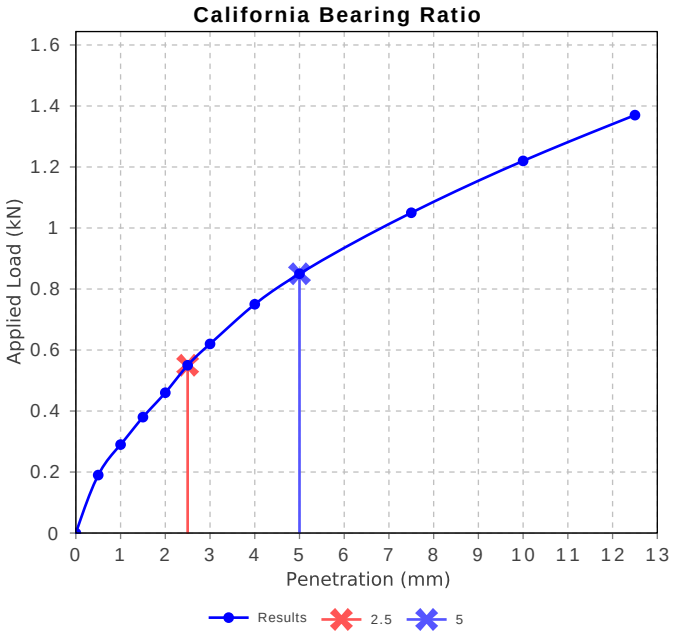
Geotech Testing Pty Ltd
Penrith Laboratory
34 Borec Road Penrith NSW 2750
Phone: (02) 4722 2744
Email: matthew@geotech.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

NATA WORLD RECOGNISED ACCREDITATION

Approved Signatory: Mathew Morley
Laboratory Manager
NATA Accredited Laboratory Number: 2734

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**4.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity			
Maximum Dry Density (t/m^3)	1.82		
Optimum Moisture Content (%)	15.5		
Laboratory Density Ratio (%)	99.5		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.75		
Field Moisture Content (%)	18.5		
Moisture Content at Placement (%)	15.6		
Moisture Content Top 30mm (%)	26.6		
Moisture Content Rest of Sample (%)	23.0		
Mass Surcharge (kg)	9		
Soaking Period (days)	4		
Curing Hours (h)	49.1		
Swell (%)	3.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0.0		



POINT LOAD TEST (T223)

(Valid to 16/07/2025)

Job No: E25834.G04
Client: EIAUSTRALIA
Project: 68 - 80 O'CONNELL STREET, KINGSWOOD

Tested by: SSB
Checked by: JC

Notes
1: To utilise this spreadsheet, insert values obtained from the point load test into the highlighted columns
2: D/W ratio should be between 0.3 & 1.0, preferably close to 1.0
3: For diametral test, L should be greater than 0.5D

			Diametral					Axial									
Borehole No	Depth (m)	POINT LOAD FOR LOGS	D (mm)	$P_{indicated}$ (kN)	P_{actual} (kN)	I_s	$I_{s(50)}$	W (mm)	D (mm)	$P_{indicated}$ (kN)	P_{actual} (kN)	D_e^2 (mm^2)	D_e (mm)	I_s	$I_{s(50)}$	Moisture Condition	Failure Mode
BH101M	9.92	**2.3**	52.00	0.14	0.11	0.04	0.04	52.00	23.00	0.31	0.28	1522.79	39.02	0.19	0.17	N	VF
BH101M	11.76	**1.3**	52.00	0.11	0.08	0.03	0.03	52.00	17.00	0.10	0.07	1125.54	33.55	0.06	0.05	N	VF
BH101M	12.98	**4.2**	52.00	1.50	1.47	0.54	0.55	52.00	23.00	2.51	2.47	1522.79	39.02	1.62	1.45	N	VF
BH101M	13.25	**5.3**	52.00	0.47	0.44	0.16	0.17	52.00	24.00	8.94	8.93	1589.00	39.86	5.62	5.08	N	VF
BH101M	15.29	**3**	52.00	0.15	0.12	0.05	0.05	52.00	34.00	0.73	0.70	2251.09	47.45	0.31	0.30	N	VF
BH101M	16.42	**2.6**	52.00	0.17	0.14	0.05	0.05	52.00	18.00	0.34	0.31	1191.75	34.52	0.26	0.22	N	VF
BH101M	17.89	**3.1**	52.00	0.52	0.49	0.18	0.18	52.00	24.00	0.79	0.76	1589.00	39.86	0.48	0.43	N	VF
BH101M	18.35	**3.2**	52.00	0.17	0.14	0.05	0.05	52.00	16.00	0.62	0.59	1059.34	32.55	0.56	0.46	N	VF
BH101M	20.09	**3.1**	52.00	0.42	0.39	0.14	0.15	52.00	16.00	0.50	0.47	1059.34	32.55	0.44	0.37	N	VF
BH102	7.58	**3.1**	52.00	0.50	0.47	0.17	0.18	52.00	24.00	0.77	0.74	1589.00	39.86	0.47	0.42	N	VF
BH102	12.65	**2.4**	52.00	0.32	0.29	0.11	0.11	52.00	29.00	0.38	0.35	1920.05	43.82	0.18	0.17	N	VF
BH102	13.86	**2.7**	52.00	0.52	0.49	0.18	0.18	52.00	23.00	0.43	0.40	1522.79	39.02	0.26	0.24	N	VF
BH102	14.53	**2.3**	52.00	0.20	0.17	0.06	0.06	52.00	22.00	0.29	0.26	1456.59	38.17	0.18	0.16	N	VF
BH102	15.36	**4.1**	52.00	0.89	0.86	0.32	0.32	52.00	24.00	2.31	2.27	1589.00	39.86	1.43	1.29	N	VF
BH102	16.42	**3**	52.00	1.36	1.33	0.49	0.50	52.00	20.00	0.54	0.51	1324.17	36.39	0.39	0.33	N	VF
BH103M	9.86	**3**	52.00	0.12	0.09	0.03	0.03	52.00	35.00	0.75	0.72	2317.30	48.14	0.31	0.31	N	VF
BH103M	11.22	**3.6**	52.00	0.73	0.70	0.26	0.26	52.00	22.00	1.29	1.26	1456.59	38.17	0.86	0.76	N	VF
BH103M	12.84	**3**	52.00	0.09	0.06	0.02	0.02	52.00	22.00	0.58	0.55	1456.59	38.17	0.38	0.33	N	VF
BH103M	14.52	**3.1**	52.00	0.38	0.35	0.13	0.13	52.00	24.00	0.68	0.65	1589.00	39.86	0.41	0.37	N	VF
BH103M	15.34	**3**	52.00	0.12	0.09	0.03	0.03	52.00	29.00	0.72	0.69	1920.05	43.82	0.36	0.34	N	VF
		#N/A															
		#N/A															
		#N/A															
		#N/A															

Form No W 0037 - 05/13 - issued by ER

Additional Notes:

N Natural Moisture (as received)
D Dry

VF Valid Failure
IF Invalid Failure

POINT LOAD TEST (T223)

(Valid to 16/07/2025)

Job No: E25834.G04
Client: EIAUSTRALIA
Project: 68 - 80 O'CONNELL STREET, KINGSWOOD

Tested by: SSB
Checked by:

Notes
1: **To utilise this spreadsheet, insert values obtained from the point load test into the highlighted columns**
2: **D/W ratio should be between 0.3 & 1.0, preferably close to 1.0**
3: **For diametral test, L should be greater than 0.5D**

			Diametral					Axial									
Borehole No	Depth (m)	POINT LOAD FOR LOGS	D (mm)	$P_{indicated}$ (kN)	P_{actual} (kN)	I_s	$I_{s(50)}$	W (mm)	D (mm)	$P_{indicated}$ (kN)	P_{actual} (kN)	D_e^2 (mm^2)	D_e (mm)	I_s	$I_{s(50)}$	Moisture Condition	Failure Mode
BH104M	9.40	**2.1**	52.00	0.11	0.08	0.03	0.03	52.00	20.00	0.20	0.17	1324.17	36.39	0.13	0.11	N	VF
BH104M	11.89	**2.4**	52.00	0.67	0.64	0.24	0.24	52.00	18.00	0.29	0.26	1191.75	34.52	0.22	0.19	N	VF
BH104M	12.43	**3**	52.00	0.18	0.15	0.06	0.06	52.00	17.00	0.47	0.44	1125.54	33.55	0.39	0.33	N	VF
BH104M	14.16	**3**	52.00	0.48	0.45	0.17	0.17	52.00	26.00	0.68	0.65	1721.42	41.49	0.38	0.35	N	VF
BH104M	15.68	**1.1**	52.00	0.09	0.06	0.02	0.02	52.00	18.00	0.09	0.06	1191.75	34.52	0.05	0.04	N	VF
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Form No W 0037 - 05/13 - issued by ER

Additional Notes:

N Natural Moisture (as received)
D Dry

VF Valid Failure
IF Invalid Failure

Appendix C – Vibration Limits

German Standard DIN 4150 – Part 3: 1999 provides guideline levels of vibration velocity for evaluating the effects of vibration in structures. The limits presented in this standard are generally considered to be conservative.

The DIN 4150 values (maximum levels measured in any direction at the foundation, OR, maximum levels measured in (x) or (y) directions, in the plane of the uppermost floor), are summarised in **Table A** below.

It should be noted that peak vibration velocities higher than the minimum figures in **Table A** for low frequencies may be quite 'safe', depending on the frequency content of the vibration and the actual conditions of the structures.

It should also be noted that these levels are 'safe limits', up to which no damage due to vibration effects has been observed for the particular class of building. 'Damage' is defined by DIN 4150 to include even minor non-structural cracking in cement render, the enlargement of cracks already present, and the separation of partitions or intermediate walls from load bearing walls. Should damage be observed at vibration levels lower than the 'safe limits', then it may be attributed to other causes. DIN 4150 also states that when vibration levels higher than the 'safe limits' are present, it does not necessarily follow that damage will occur. Values given are only a broad guide.

Table A DIN 4150 – Structural Damage – Safe Limits for Building Vibration

Group	Type of Structure	Peak Vibration Velocity (mm/s)			
		At Foundation Level at a Frequency of:			Plane of Floor of Uppermost Storey
		Less than 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz	All Frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Group 1 and 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

Note: For frequencies above 100 Hz, the higher values in the 50 Hz to 100 Hz column should be used.

Appendix D – Important Information

Important Information

SCOPE OF SERVICES

The geotechnical report ("the report") has been prepared in accordance with the scope of services as set out in the contract, or as otherwise agreed, between the Client And EI Australia ("EI"). The scope of work may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

RELIANCE ON DATA

EI has relied on data provided by the Client and other individuals and organizations, to prepare the report. Such data may include surveys, analyses, designs, maps and plans. EI has not verified the accuracy or completeness of the data except as stated in the report. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations ("conclusions") are based in whole or part on the data, EI will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to EI.

GEOTECHNICAL ENGINEERING

Geotechnical engineering is based extensively on judgment and opinion. It is far less exact than other engineering disciplines. Geotechnical engineering reports are prepared for a specific client, for a specific project and to meet specific needs, and may not be adequate for other clients or other purposes (e.g. a report prepared for a consulting civil engineer may not be adequate for a construction contractor). The report should not be used for other than its intended purpose without seeking additional geotechnical advice. Also, unless further geotechnical advice is obtained, the report cannot be used where the nature and/or details of the proposed development are changed.

LIMITATIONS OF SITE INVESTIGATION

The investigation programme undertaken is a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions. The data derived from the site investigation programme and subsequent laboratory testing are extrapolated across the site to form an inferred geological model, and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Despite investigation, the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. The engineering logs are the subjective interpretation of subsurface conditions at a particular location and time, made by trained personnel. The actual interface between materials may be more gradual or abrupt than a report indicates.

SUBSURFACE CONDITIONS ARE TIME DEPENDENT

Subsurface conditions can be modified by changing natural forces or man-made influences. The report is based on conditions that existed at the time of subsurface exploration. Construction operations adjacent to the site, and natural events such as floods, or ground water fluctuations, may also affect subsurface conditions, and thus the continuing adequacy of a geotechnical report. EI should be kept appraised of any such events, and should be consulted to determine if any additional tests are necessary.

VERIFICATION OF SITE CONDITIONS

Where ground conditions encountered at the site differ significantly from those anticipated in the report, either due to natural variability of subsurface conditions or construction activities, it is a condition of the report that EI be notified of any variations and be provided with an opportunity to review the recommendations of this report. Recognition of change of soil and rock conditions requires experience and it is recommended that a suitably experienced geotechnical engineer be engaged to visit the site with sufficient frequency to detect if conditions have changed significantly.

REPRODUCTION OF REPORTS

 Where information from the accompanying report is to be included in contract documents or engineering specification for the project, the entire report should be included in order to minimize the likelihood of misinterpretation from logs.

REPORT FOR BENEFIT OF CLIENT

The report has been prepared for the benefit of the Client and no other party. EI assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of EI or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own inquiries and obtain independent advice in relation to such matters.

OTHER LIMITATIONS

EI will not be liable to update or revise the report to take into account any events or emergent circumstances or fact occurring or becoming apparent after the date of the report.