IROS AUSTRALIA

30 AUBURN ROAD PTY. LTD.

Stage 3 - Proposed Residential Development

30-46 Auburn Road, Regents Park NSW 2143

Groundwater Impact Assessment (GIA)

Project number: IRP-01500

1 March 2025

Contamination + Hydrology & Groundwater + WHS + Ecology + Waste Classification + HAZ-MAT

DOCUMENT CONTROL & AUTHORISATION

Stage 3 Proposed Residential Development
30-46 Auburn Road, Regents Park NSW 2143
Groundwater Impact Assessment (GIA)

Prepared for: 30 Auburn Road Pty. Ltd.

Project Number: IRP-01500
1 March 2025

For and on behalf of
IROS AUSTRALIA – National Engineering Consultants

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DOCUMENT CONTROL

Revision Status

Rev	Date	Revision Details	Author	Reviewer	Signature
0	1/Mar/2025	DRAFT issue	Ryan O'Leary S.B. A.M.	Dr. Ilia Rostami	

Copies		Received By	Organisation
1	PDF Soft Copy – issued via email	Hugh Thornton	30 Auburn Road Pty. Ltd.
2	Digitally archived at IROS AUSTRALIA HQ	Dr. Ilia Rostami	IROS AUSTRALIA (Botany Rd. Alexandria, 2015)

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1. INTRODUCTION

1.1 General

"*30 Auburn Road Pty Ltd*" engaged IROS AUSTRALIA (IROS) to develop a Groundwater Impact Assessment (GIA) for construction works associated with the Stage 3 proposed development at 30-46 Auburn Road, Regents Park NSW 2143 (hereinafter referred to as 'the Site'). The site is legally identified as Lot 1 on DP656032 (#30) and Lot 2 on DP433938 (#46), located in the City of Canterbury Bankstown Local Government Area (LGA).

The site is located at within the industrial area of Regents Park. **Figure 1**, **Appendix A**, identifies the site location and surrounding features, and **Figure 2**, **Appendix A**, details the Stage 3 proposed development basement layout plan.

Based on the provided documents, it is understood that the proposed development plan at the site will consist of the construction of five buildings around a central park comprising Building - A (6-storey) and Building - B (7-story) with two level basement, Building C building (12-story) with three level basement and two 12-story buildings (i.e. buildings D and E) comprising three levels of basement parking. It is understood the construction will be undertaken in stages.

IROS has prepared the GIA for the construction stages related to Stage 2 which includes Buildings A and B and commissioned for this Stage 3 proposed development Building C, located in the southeastern corner of the site. It is understood that the stage 3 (Building C) excavation will be conducted subsequent to the excavation and construction of the two-level basement for Buildings A and B (to an elevation of 24.8 m RL). Based on the drawings presented in Appendix B, the Stage 3 proposed basement will extend close to the property boundary to the south and Buildings A and B to the north.

It is understood that as part of the construction documentation, a GIA and Dewatering Management Plan (DMP) are required. DMP for the Stage 3 proposed development is to be prepared by a suitable environmental consultant in accordance with the Environment Protection Act 1993 and Environment Protection (Water Quality) Policy 2015.

To facilitate the dewatering, a "*Temporary Dewatering Licence*'' will be required from the WaterNSW. In order to apply for a Temporary Dewatering Licence, mandatory information must be provided to WaterNSW for assessment in the form of a GIA. This GIA must be read in conjunction with the Dewatering Management Plan (DMP) and the Construction Environmental Management Plan (CEMP), which describe how activities undertaken during the construction phase of development will be managed to avoid or mitigate adverse environmental impacts on site and how those environmental management requirements will be implemented.

1.2 Objectives

The main objectives were to develop the groundwater model to assess groundwater inflow rates into the basement and the likely extent of groundwater table drawdown during construction of Building C, which may result from the permanent basement structure. The modelling result will be used to evaluate the groundwater impact assessment at the site and in the surrounding environment.

1.3 Scope of Works

The following scope of work was carried out to achieve the project objectives:

- A review of existing regional maps and reports relevant to the site, held within our files, including the documents provided by the Client.
- Conduct Site observation to assess existing site conditions.
- Develop a conceptual hydrogeological model (CHM) of the site for the proposed basement excavation including the previous IROS (IRP-0104-2023) report prepared for the Stage 2 development at the site.

- Carry out modelling analysis to assess potential groundwater inflows during construction and long-term dewatering.
- Carry out modelling analysis to assess potential drawdown impacts during construction and long-term dewatering.
- Engineering assessment and reporting.

This Report must be read in conjunction with the attached “Important Information about your Report” in **Appendix F.** Attention is drawn to the limitations inherent in site investigations and the importance of verifying the subsurface conditions inferred herein.

1.4 Roles & Responsibilities

As detailed in this document, the Principal Contractor will be responsible for implementing the appropriate management of the excavation-related activities, including the GIA and, consequently, dewatered groundwater. It must be noted that neither the GIA nor DMP are not inclusive of all conditions of consent in relation to dewatering and groundwater management and that the Principal Contractor is responsible for making itself aware of and complying with all relevant conditions of the permits, licenses, approvals and other state/LGA regulatory requirements.

1.5 Limitations

A detailed statement of limitations for this Report is provided in Section 18.

This Report is based on the Scope of Work outlined in Section 1.3. IROS AUSTRALIA prepared this Report in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession.

This Report relates only to the objectives stated and does not relate to any other work undertaken for the Client (**30 Auburn Road Pty Ltd**). It is a report based on the information reported in previous geotechnical/environmental assessments by other consultancies and data made available to IROS AUSTRALIA. These conditions stated in this Report may change with time and space before/during, and after the construction stage.

All conclusions regarding the property area are the professional opinions of IROS AUSTRALIA, subject to the qualifications in the Report. Whilst standard assessments of data reliability have been made, IROS AUSTRALIA assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of IROS AUSTRALIA, or developments resulting from situations outside the scope of this project. The Client acknowledges that this Report is for the Client's exclusive use.

2. RELEVANT DOCUMENT

2.1 Previous Environmental and Geotechnical Investigations

The following documents specific to the site were provided to IROS AUSTRALIA for the preparation of this GIA:

- IROS (2023). Groundwater Impact Assessment (GIA), Proposed Residential Development 30-46 Auburn Road, Regents Park NSW 2143, Report number: IRP-0104, dated 18 September 2023
- Alliance (2021). Geotechnical Report (prepared by: Alliance Geotechnical; report no 13087-GR-1-1; dated: 26 November 2021).
- Sullivan (2017) Sullivan Environmental Sciences Pty Ltd, Preliminary Contamination Investigation, 11 August 2017.
- Sullivan (2021) Sullivan Environmental Sciences Pty Ltd, Detailed Contamination Investigation, 28 June 2021.
- Sullivan (2021a) Sullivan Environmental Sciences Pty Ltd, Remedial Action Plan, 29 June 2021.

2.2 Regulatory Guidelines and Legislation

- GROUNDWATER ASSESSMENT TOOLBOX FOR SSD/SSI - Cumulative Groundwater Impact Assessment Approaches - Information paper - January 2022
- GROUNDWATER ASSESSMENT TOOLBOX PROJECT FOR SSD/SSI - Groundwater assessment toolbox for major projects in NSW - Overview document - Technical guideline - January 2022
- GROUNDWATER ASSESSMENT TOOLBOX FOR SSD/SSI - Guidelines for Groundwater Documentation for SSD/SSI Projects. Technical guideline - January 2022
- GROUNDWATER ASSESSMENT TOOLBOX FOR SSD/SSI - Minimum Groundwater Modelling Requirements for SSD/SSI Projects - Technical guideline - January 2022

3. STAGE 3 PROPOSED DEVELOPMENT

3.1 Development Details and Site Description

Stage 3 proposed development consists of constructing a multi storey Building C with three-level basements. The basement excavation reaching an elevation of 24 meters RL, is located to the southern part of the Building A and B two-level basement (to an elevation of RL 22.7 m RL). Excavation for the Building C basement will require excavation to depths ranging between about 26.8 m RL within the southern part of the building and partly to 24 m RL within the northern part of the building footprint.

The site is bounded by industrial properties to its north, Auburn Road to its east, and the T3 Bankstown Train line to its West and South. The shortest distance between the T3 Bankstown Train line and the site is 5.2 m. The site has an approximate total area of 21,170 m^2. Existing structures on site, including warehouses, cover approximately 30 % of the site. The site is predominantly flat with some batter slopes. The site survey indicates that the current surface levels vary by approximately 5.8 m over the site. The highest section of the site is at an RL 35.82 m on the southwestern side and varies to RL 31.0 m on the southeastern end. The site has a general slope to the north at an approximate 2.4 % gradient.

3.2 Basement Construction Methodology

The proposed Stage 3 basement construction comprises a three level '*tanked*' underground basement car park. IROS AUSTRALIA understands that a permanent drainage layer beneath and around the external perimeter of the basement will be installed to drain groundwater and avoid hydrostatic head on the basement walls and floor. The drainage layer should be of sufficient conductivity and capacity to maintain the natural flow of groundwater, ensuring that no unacceptable groundwater mounding occurs.

Temporary dewatering is to be provided by "*sump-and-pump*" methods, with a perimeter shallow drain and internal drains as required, flowing by gravity to a sump for dewatering.

From an environmental perspective, the proposed basement dewatering method is recommended based on its effectiveness in:

- Mitigating the risk of environmental impacts associated with drawdown of the water table and potential settlement of unconsolidated soils; and

- Reducing the volume of extracted groundwater to be discharged (typically) off-site, which often requires treatment and has the potential to impact the receiving environment adversely.

Irrespective of the method, the dewatering depth shall be minimised to the extent practicable to reduce the volume of water to be extracted and to limit groundwater drawdown. This will allow more effective treatment of the extracted water prior to discharge.

To maintain the water table at operational levels during the construction phase, dewatering may be required to operate 24 hours a day / seven days a week.

3.3 Dewatering Extraction Rate and Duration

The uncertainty around the final construction and dewatering methods prevents absolute quantitative assessment of the pumping rates and project volumes. The many variables involved in dewatering make predicting flow rates problematic. These variables include variations in recharge rates, effects of varying geology on hydraulic conductivity and soil porosity, and natural and built hydraulic barriers, etc.

The approximate duration to complete the necessary basement excavation works and construction has yet to be determined by the Client since it is a multi-variable task.

Dewatering is likely to be required continuously until the basement is constructed and there is sufficient built loading to neutralise hydrostatic pressure. To minimise interruptions to the project and unnecessary expenditure, it is recommended that the dewatering contractor use extraction pumps that can cater to model predicted low to high flow rates rather than mobilising multiple pumps that may not be required if lower flows are encountered. This could take up to nominally six months.

3.4 Discharge Method

The Council approval should be received prior to directing dewatered and treated groundwater to the stormwater network or any other potential/recommended outlets. If approved, dewatered groundwater is expected to be directed to the curb and guttering on Regents Park directly in front of the site. Direct connection to stormwater is the preferred option.

Treatment of extracted groundwater may be required during the proposed dewatering program to improve the water quality and minimise potential impacts on the receiving waters. The water quality of the extracted groundwater shall be assessed prior to discharge to the stormwater network and then weekly thereafter during its release to monitor the water's suitability for continuous discharge. This monitoring will guide the initial type and level of treatment required to minimise environmental risks associated with the water release and reassess the treatment measures during the dewatering program.

4. SITE CHARACTERISATION

4.1 Site Details

Site details are summarised in Table 1 below:

Table 1 Site Details

Item	Description
Physical Location	30 – 46 Auburn Road Regents Park 2143
Cadastral Description	1/-/DP656032 (#30) & 2/-/DP433938 (#46)
Local Government Authority	Canterbury-Bankstown Council
Local Environmental Plans	Canterbury-Bankstown Local Environmental Plan 2023 (pub. 23-6-2023)
Local Aboriginal Land Council	Gandangara
Regional Plan Boundary	Greater Sydney
Sydney Trains Infrastructure Protection zone	Clause 45/Referral
Sydney Trains Corridor Protection Zone – Infrastructure SEPP	Clause 86/Concurrence
Current Property Type	Industrial
Future Property Type	High Density Residential
General Condition	NA
Bedroom-WC-Car space	NA
Year Built	NA
Total Area	Approximately 21,000 m^2
Floor Area	NA
Minimum Lot Size	450 m^2
Site Current Land Zoning	R4 - High-Density Residential: (pub. 23-6-2023)
Neighbouring/area Zoning	IN2: North R4: South West: SP2 (Rail Infrastructure Facility) East: RE1, R3 & R2
Height of Buildings Map	13 m
Floor Space Ratio Map	0.6:1
Geographic Coordinates	-33.887390, 151.021942
Heritage	NA
Land Reservation Acquisition	NA
Foreshore Building Line	NA
Local Provisions	30 Km - Area 1
Site Location / Site Layout	Figures 1 and 2

This table provides general information only and does not replace a Section 10.7 Certificate (formerly Section 149).

Ref:

To: http://maps.six.nsw.gov.au/

To: https://www.planningportal.nsw.gov.au/

5. SUBSURFACE CONDITIONS

Based on the Alliance Geotechnical Report No.: 13087-GR-1-1, a generalised geotechnical model for the site, has been developed, as shown in Table 2 below.

Table 2 Geological Soil Profile

Unit	Origin	Consistency/ Strength	Description	Depth on top of the unit	Unit thickness
1	Concrete	Na	Pavement	0	0 – 0.2
2	Fill	Na	Sandy CLAY; appears moderately to well compacted.	0 – 0.1	0 – 2.4
3	Residual	stiff to very stiff	CLAY; medium to high plasticity	0.15 – 2.5	1.3 – 6.0
4	Shale	Very low to low	(Class V – IV); grey, extremely to highly weathered, very low to low strength	1.5 – 7.0	2.79 – 10.9
5	Shale	Low to medium	(Class III and better); dark grey, moderately weathered to fresh.	7.0 – 13.9	Not penetrated

Notes to Table:

1. The depths and unit thicknesses are based on the information from the test locations only and do not necessarily represent the maximum and minimum values across the site.

2. Rock classification to Pells, P.J.N., Mostyn, G. & Walker, B.F., Foundations on Sandstone and Shale in the Sydney Region, Australian Geomechanics Journal, December 1998.

5.1 Ecology and Hydrogeology

A review of the 1:100,000 Geological Series for the Sydney area (Sheet 9130 NSW Department of Minerals Resources, Edition 1 1983) shows that the site is situated on the Triassic period Bringelly Shales from the Wianamatta Group. Bringelly Shales consists of shale, carbonaceous claystone, laminite, fine to medium-grained lithic sandstone, with rare coal. The soil landscape map shows that the underlying soils at the site are of the Blacktown and Birrong soil landscapes (Sulivan, 2021). These soil groups have the following traits:

- Blacktown Soils: shallow to moderately deep (<100 cm) Red and Brown Podzolic Soils on crests, upper slopes, and well-drained areas; deep (150–300 cm) Yellow Podzolic Soils and Soloths on lower slopes and in areas of poor drainage.

- Birrong Soils: deep (>250 cm) Yellow Podzolic Soils and Yellow Solodic Soils on older alluvial terraces; deep (>250 cm) Solodic Soils and Yellow Solonetz on current floodplain.

Bringelly Shale is not a uniform rock type but comprises sequences of shale, claystone, interbedded sandstone, and siltstone, fine to medium-grained lithic sandstone, siltstone, rare coal, and tuff. Most discrete beds are typically between 1m and 3m thick, though sandstone beds are known to be up to 8m thick.

Bringelly Shale typically weathers to a plastic clayey soil referred to as residual soil. The depth of weathering is affected by the parent type (i.e., shale beds versus siltstone versus sandstone beds), jointing, defects, and local groundwater conditions. The depth of residual soils is expected to vary across the site, though it is typically deeper in the low-lying areas. Residual soils derived from the weathering of Bringelly Shale typically comprise medium to high-plasticity clays. The near-surface residual soil is generally of firm consistency, becoming stiff to very stiff with depth. California Bearing Ratios (CBR) for the residual soil are generally less than 3%. The residual soils derived from the Bringelly Shale typically have a moderate soil salinity potential.

The 1:100,000 Soil Landscapes of Sydney sheet indicates that the site is underlain by Blacktown (bt) and Birrong (bg) soil landscapes. Blacktown soil landscapes are a residual soil of Wianamatta Group-Ashfield Shale and are

susceptible to localised seasonal waterlogging, moderately reactive highly plastic soils, and have localised surface movement potential. Birrong soil landscapes consist of alluvial soil in the floodplains of Wianamatta Group shale. They are susceptible to flooding, seasonal waterlogging, and very low soil fertility.

5.2 Topography and Drainage

The site sits at approx. Thirty-five metres Australian Height Datum (m AHD). Blacktown topography is typified as "*Gently undulating rises on Wianamatta Shale with local relief 10 – 30 m and slopes generally < 5 %, but up to 10 %. Crests and ridges are broad (200–600 m) and rounded, with convex upper slopes grading into concave lower slopes. Rock outcrop is absent*".

Birrong topography is level to gently undulating alluvial floodplains with local relief <5 m and slope gradients <3 %. Broad concave valleys".

Most local drainage lines in the area have been converted to lined concrete and brick channels. Generally, site drainage is directed into the local stormwater network of Regents Park, which is believed to enter the upper reaches of Duck River, which flows north before entering the Parramatta River. Sullivan-ES, 2017 identified a small creek line to the north of the site from historical aerial photos (1943 – 1994) that drained west and connected with the upper reaches of Duck River. The creek was built in the early 1990s when the properties to the north were constructed.

5.3 Groundwater Boreholes

A search of the NSW Office of Water Registered Groundwater Bore database (accessed 22/02/2021) indicated four (4) registered groundwater bores within 500m of the site. Details are presented in **Table 3** below:

Table 3 Nearby/Off-Site GW Bores

Unit	Bore ID	Property	Direction From site	Installed date	Purpose	Depth	Standing water level (SWL)
1	GW113057	Sefton Junction Substation	Approx. 160m West	Dec 2007	Monitoring	7m	Not recorded
2	GW113058	Sefton Junction	Approx.	Dec 2007	Monitoring	6m	Not recorded
3	GW113059	Substation	160m West	Dec 2007	Monitoring	6m	Not recorded
4	GW113060	Sefton Junction	NA	Dec 2007	Monitoring	6m	Not recorded

During the Sullivan DSI investigation (June 2021), the depth to groundwater on the site was measured to be between approximately 3.0 m and 6.0 m, present within weathered shale and soft shale rock.

5.4 Potential for Disturbance of Acid Sulfate Soils (ASS)

To determine whether there is a potential for acid sulphate soils to be present at the site, a reference was made to the NSW Department of Land & Water Conservation (DLWC) Acid Sulfate Soil Risk Maps (Edition Two, December 1997, Scale 1:250,000). There is an extremely low probability of occurrence. 1 - 5 % chance of occurrence with occurrences in small, localised areas.

The Canterbury-Bankstown Local Environmental Plan 2023 (pub. 23-6-2023) does not include the Acid Sulfate Soils Map for this Site. The Acid Sulfate Soil Risk Assessment Map (NSW Department of Environment) does not indicate acid sulfate soils in the vicinity of the Site.

Acid sulfate soils are not typically found in Class 5 areas. Areas classified as Class 5 are located within 500 metres on adjacent Class 1, 2, 3, or 4 lands. Works in a class 5 area that are likely to lower the water table below 1 metre AHD1 on adjacent class 1, 2, 3 or 4 lands will trigger the requirement for assessment and may require management.

The document below must be referred to if any potential ASS was encountered during the dewatering process:

- *DCCEEW refer to Shand, P, Appleyard, S, Simpson, SL, Degens, B, Mosley, LM 2018, National Acid Sulfate Soils Guidance: Guidance for the dewatering of acid sulfate soils in shallow groundwater environments, Department of Agriculture and Water Resources, Canberra, ACT. CC BY 4.0.*

- *The DMP report/update regarding ASS should consider the above guidance document.*

5.5 Proximity to Sensitive Environments

The site is 400 m away from Duck Creek. There are no other creeks, streams, rivers, or wetlands in the vicinity of the site; therefore, the site will not significantly impact the riparian land.

6. METEOROLOGY INFORMATION

Meteorological variables particularly precipitation, have an impact on the rate of groundwater infiltration and consequently influence the effectiveness of dewatering efforts associated with groundwater level fluctuations. This management plan aims to integrate meteorological data into the decision-making process, enhancing the adaptability of the dewatering strategy to changing weather patterns. It is important to mention that meteorological data are subject to fluctuations.

Bureau of Meteorology (BOM) monitoring of rainfall trends has been reviewed and integrate the data for modelling simulation of groundwater recharge is presented in Section 8.1.

6.1 Local Meteorology

The monthly rainfall of the local area can be represented by the data collected by the BOM from the rainfall gauge located at Sydney Olympic Park (ID 066195), located approximately 3.5 km away from the site. The annual monthly rainfall data since 1995 indicated 912 mm, with the highest reported monthly rainfall of 109.8 in February and the lowest reported in September at 52.7 mm. Reference can be made to http://www.bom.gov.au/places/nsw/auburn/observations/sydney-olympic-park/ – Local Meteorology for more details.

7. GROUNDWATER INFORMATION

Alliance Geotechnical; report no 13087-GR-1-1 (Alliance, 2021) is referred to and summarised below.

7.1 Aquifer Parameters

7.1.1 Groundwater Level Monitoring

Based on the measured groundwater levels, there is an inferred moderate hydraulic gradient migrating west from the east boundary and then toward the northwest and off-site, as shown in **Figure 5** (**Appendix A**). Sulivan (2021) reported groundwater gauging from five wells on 8 June 2021, presented in **Table 4**.

Table 4 Groundwater Levels (Sulivan, 2021)

Well	Borehole Elevation (m)	Well Screen Depth (m)	Groundwater Depth (mRL) 8/06/2021
GW01	32.34	22.89	27.29
GW02	32.09	20.7	26.89
GW03	31.37	23.37	26.00
GW04	31.98	24.02	26.09m
GW05	31.31	22.54	27.86m
GW06	35.81	26.81	Dry (26.81m AHD at the base of the well)

GW06 was dry to the well depth of 9.0 m bgl. The adjoining rail corridor cutting to the south is relatively deep and may cause a lowering of groundwater levels along the southern site boundary. As such, a localised groundwater gradient is likely migrating to the south or southwest from #46 Auburn Road. Note that measured groundwater levels are indicative, given that only one round of groundwater levels was collected and there is limited spatial coverage across the site.

In addition, Alliance (2021) installed groundwater bores BH01, BH05, BH07 and BH11. The groundwater levels in the monitoring wells were recorded on 10 November and 24 November 2021 and are presented in Table 5.

Table 5 Groundwater Levels (Alliance, 2021)

Well	Borehole Elevation (m)	Well Screen Depth (m)	Groundwater Depth (mRL)	
			10/11/2021A	24/11/2021A
BH01	35.0	3.0 – 9.0	24.48	27.39
BH02	31.3	0.5 – 9.5	25.80	22.40
BH07	32.0	3.9 – 13.0	25.70	25.31
BH11	31.3	3.4 – 13.0	27.22	28.35

It should be noted that groundwater seepage conditions are subject to seasonal and climatic conditions and may vary across the site. It should be noted that groundwater seepage conditions are subject to seasonal and climatic conditions and may vary across the site. It is expected that groundwater seepage occurs through the interface of residual soil and bedrock.

7.1.2 Hydraulic Testing

Rising head tests were undertaken in two monitoring wells (BH5 and BH11) (Alliance, 2021). The groundwater seepage level in the monitoring wells was recorded one day before developing the wells and undertaking the tests (two weeks after the boreholes' completion).

The soil permeability value has been calculated using the rising head test results in accordance with the Hvorslev (1951) method, as provided in Table 6.

Table 6 Groundwater Rising Head Test Results

Monitoring Well	Test Duration	Hydraulic permeability (m/day)	Hydraulic permeability (m/s)
BH5	205.67	0.0013	$1.5x10^{-08}$
BH11	85	0.0029	$3.36x10^{-08}$

The permeability analysis indicates that the basement excavation intersected residual clay in a low hydraulic conductivity (permeability) with an average value of approximately 0.0029 m/day. The permeability surrounding the proposed basement will, however, vary in accordance with variations in the orientation and interconnection of secondary porosity features (joints/fractures or defects) that may be present in the weathered shale (Alliance, 2021).

7.2 Groundwater Quality Assessment

Groundwater was sampled by Sulivan (2021) on 8 June 2021, presented field water quality parameters and groundwater samples were analysed for contaminants of potential concern by Australian Laboratory Services Pty Ltd (ALS). Groundwater field water quality parameters have been compared to the adopted water quality objectives and are summarised in Table 7 below. Field sheets are presented in **Appendix E**.

The following observations were made while sampling groundwater:

- Groundwater yield was very low.
- Groundwater showed no signs of contamination by hydrocarbons (no odours, sheen, or staining).
- Given the high readings of electrical conductivity, the groundwater is characterised as non-potable (brackish/marine); however, potable (freshwater) levels were observed at GW05 in the northeastern corner of the site. Variable EC is a characteristic of groundwater embodied in shale formation, which is encountered across the site.
- pH readings show generally slightly to moderately acidic conditions across the site.

Table 7 Field Water Quality Parameters

Analysis	GW01	GW02	GW03	GW04	GW05	Adopted Water Quality Objectives	
						ANZG (2018)	NSW
pH	6.11	6.92	6.75	5.49	4.88	7.0 – 8.0	-
EC (µs/cm)	25,433	1,001	21,174	22,763	2,126	-	-

7.2.1 Groundwater Water Quality Discharge Criteria

To discharge extracted groundwater to the surface waters network, groundwater quality should meet the water quality objectives set for the receiving surface water, in this case, Duck Creek and Paramatta River, where ultimately, the water will be discharged. The water quality objectives and groundwater investigation level (GILs) used to assess various physical and chemical indicators of groundwater for this project were compared against ANZG (2018) default guideline values (DGV) for marine aquatic ecosystems were applied to assess analytical data for chemical toxicants in groundwater at the site presented in the Table 7 and 8.

Indicative groundwater quality has been assessed based on the groundwater sample from GW01 to GW05 on 08 June 2021 (Sulivan, 2021). Laboratory results have been compared to the adopted water quality objectives and are summarised in Table 8 below. Laboratory reports are attached (**Appendix D**).

Table 8 Groundwater Analytical Results (Ug/L)

Analyte	GW01	GW02	GW03	GW04	GW05	Adopted Water Quality Objectives
						ANZG (2018) Eco (fresh 95% protection)
Cadmium	**0.8**	**0.2**	**0.2**	**0.3**	<0.1	0.2
Chromium	**3**	**6**	**6**	**14**	**1**	1
Copper	**2**	1	**2**	1	**6**	1.4
Nickel	**24**	**15**	**15**	7	**54**	11
Zinc	**59**	**15**	**18**	**19**	**180**	8
Iron	-	-	-	-	-	-
Lead	-	-	-	-	-	-
Hydrocarbon Compounds						
Total TRH	<LOR	530 (F3)	<LOR	<LOR	<LOR	-
BTEXN	<LOR	<LOR	<LOR	-	-	-
Sum of PFAS	-	0.027	-	0.042	-	-

The exceedances of the adopted GILs for 95 % level of protections for heavy metals above are considered inconsequential at these locations and do not represent a health risk; however, they exceed criteria for ecological risk to the receiving waters of Duck Creek, located at 370m west of the site.

Further consideration of groundwater associated with health and environmental risk includes:

- The heavy metal concentrations in groundwater do not indicate a potential point source is present onsite (i.e., similar levels are observed both up and down-hydraulic gradient). No corresponding heavy metal exceedances in soil onsite contribute to a potential source of groundwater contamination, suggesting impacts, particularly cadmium and chromium, are likely to be endemic to groundwater in the local area.

- The site is situated above Bringelly Shales, within the Wianamatta Group, where it is not uncommon for groundwater to show elevated background concentrations of copper, nickel, and zinc within urbanised areas.

- The adopted GIL criterion for chromium relates to its hexavalent form, whereas results are for Total Cr; therefore, there is negligible risk regardless.

- Further groundwater sampling and analysis for nutrient concentrations is recommended during pre-construction monitoring from the existing monitoring wells.

- Additional groundwater analysis for the iron, aluminium, and lead should be conducted as part of pre-construction monitoring from the existing monitoring wells.

- PFAS in groundwater was not reported above the adopted GILs for Ecological Freshwater 90% or 95% species protection values, and PFOA was not detected onsite above the 99% species protection value, representing a negligible risk to off-site ecological receptors.

- As stated in the Sullivan's Report: "PFOS was detected marginally exceeding the draft NEPM freshwater 99% species protection value; however, site history in an industrial setting and similar PFOS concentrations recorded at opposite site boundaries suggest levels are most likely ambient background concentrations in the area".

In summary, groundwater will require treatment to reduce the concentrations of dissolved Copper and Zinc. Additional sampling analysis for the concentration of nutrients, Iron, Lead, and Aluminium prior to any off-site discharge into local stormwater infrastructure and/or local waterways is recommended. Ongoing groundwater quality monitoring will be required before and during the dewatering operation.

8. GROUNDWATER MODELLING

A three-dimensional groundwater flow model was developed to assess the potential inflow into the Building C basement excavation during construction and long-term pumping requirement to drain basement system, and the resultant drawdown (or cone of depression) likely to be induced by dewatering.

Groundwater model simulations were conducted using visual MODFLOW, developed by the United States Geological Survey (McDonald & Harbaugh, 1988)[1]. This model was constructed based on site-specific data when available and parameter estimates from similar environments, with the assistance of the Visual MODFLOW program. The model was based on site-specific data where possible, as well as estimates of unknown parameters based on experience in similar environments and values from literature (Fetter, 2001)[2].

8.1 Conceptual Hydrogeological Model and Numerical Model Geometry

The aquifer beneath the proposed basement was simulated as a multi-layer model representing the subsurface conditions at the site and surrounding area.

The recharge boundary condition of 2 mm/year is assigned to the modelled area. As the site land use is currently high-density urban, minimal recharge of the groundwater table due to rainfall infiltration has been assumed across the surface area of the aquifer. Recharge could also possibly be occurring from anthropogenic sources, such as seepage from leaking water mains. Water loss from the aquifer may occur due to extraction activities from nearby properties or drained basements, together with natural discharge into Duck Creek and Paramatta River. Water loss from the aquifer to the atmosphere through evapotranspiration (e.g., vegetation at the surface, above the aquifer) is considered negligible.

The length of the model domain from the site boundaries was extended approximately 200 m in an upstream (easterly) direction, 400 m in a downstream (westerly) direction, and 700 m from north to south to simulate the estimated groundwater catchment domain.

The subsurface conditions encountered during drilling and site observations have been used to summarise the subsurface profile in Table 9. Reference to the individual borehole log sheets should be made for a full description of the subsurface conditions encountered at each borehole.

Table 9 Summary of Subsurface Profile (Alliance, 2021)

Ground Profile	Consistency / Strength	Depth to top of unit (mRL)	Depth to top of unit (m bgl)	Thickness (m)
Pavement: Concrete	-	30.8 – 36.0	0	0 – 0.2
Fill Sandy Clay appears Moderately to well compacted.	-	30.7 – 32.0	0. - 0.1	0 – 2.4
Residual: Clay, Medium to high plasticity	Stiff to very stiff	28.3 – 35.7	0.15 – 2.5	1.3 – 6.0
SHALE (Class V – IV): grey, extremely to highly weathered, very low to low strength	Very low to low	24.3 32.2	1.5 -7.0	2.79 – 10.9
SHALE (Class III and better): dark grey, moderately weathered to fresh	Low to medium	18.8 – 26.7	7.0 - 13.9	Not penetrated

The site subsurface profile comprises concrete pavement underlain by stiff to very stiff residual clay (up to 6.0m thick). Uncontrolled fill (0 to 2.4m thick) overlays the residual clay in some areas. The residual clay is underlain by extremely to highly weathered shale (2.79m to 10.9m thick), which is underlain by moderately weathered to fresh shale (thickness not proven).

[1] McDonald, M.G., & Harbaugh, A.W. (1988), MODFLOW, a modular three-dimensional finite difference groundwater flow model. U.S. Geological Survey, Open-file report 83-875, Chapter A1.
[2] Fetter, C.W., (2001), Applied Hydrogeology, Fourth Edition. Prentice Hall, New Jersey.

8.2 Model Boundary Conditions and Aquifer Parameters

Boundaries of the model were extended far enough such that the boundary conditions did not affect model outcomes. The eastern and western boundaries were set as constant head boundaries coinciding with the alignment of the groundwater flow directions, while the southern and northern boundaries were set as no-flow boundaries.

The groundwater seepage is expected to be encountered below 29.48 mRL (Table 2). The long-term groundwater level predicted in the previous Modflow model for Stage 2 DMP was applied to the model as the initial hydraulic head. The model Layers were set uniformly to approximate the current surface of the site at approximately 32 mRL. The model's base was set uniformly to 15 mRL to represent the base of the shale.

Natural variations in the permeability of sub-surface materials are likely to occur due to the variations in the orientation and interconnection of secondary porosity features (joints/fractures or defects) present in the shale formations. For this reason, the model was run using both site-tested and higher permeability estimates to assess the potential range of inflow rates to the proposed excavation. The vertical hydraulic conductivity was assumed to be 33% of the horizontal hydraulic conductivity for the residual clay units and was generally assumed to be 100% of the horizontal hydraulic conductivity in weathered shale.

Based on Alliance (2021), the subsurface conditions are expected to encounter stiff to very stiff clay to an average depth of 5 m overlying extremely weathered to highly weathered, very low to low strength siltstone (Class V and IV). Some excavations may also encounter moderately to slightly weathered, medium to high-strength siltstone (Class III and better). Most of the basement slab and footings are expected to be found in siltstone (Class V and IV).

The calculated values from the in-situ permeability testing encountered in Borehole BH05 (0.0013 m/day) and BH11 (0.0029 m/day) were adopted in the model for Layer 1 and Layer 2, respectively, as presented in Table 10 below. To ensure that the modelling is not overly optimistic, the vertical conductivity was set as equal to the horizontal hydraulic conductivity for this layer.

Table 10 Model Layer Summary (Horizontal Permeability)

Model Layer	Layer# Subsurface Represents	Base of Layer (mRL)	Specific yield (Sy)	Total Porosity	Horizontal permeability (m/day)	
					Measured (m/s)	Worst case (m/s) (1.5Kd)
1	Sandy CLAY	32 to 28	0.2	0.3	5.0E-05	6.5E-05
2	Residual Clay	24.3	0.2	0.3	1.5E-08	2.25E-08
3	Weathered Shale	18.8	0.02	0.2	3.36E-08	5.04E-08

The constant head 'far-end' boundary conditions were calibrated to generate a hydraulic gradient in a westerly direction while matching the measured groundwater levels at various monitoring points at the site. For simplicity, the groundwater model was calibrated against the groundwater table of the shale layer, as it gives a more accurate prediction of both groundwater inflow and drawdown.

The initial model was calibrated to match existing groundwater levels at the site, with the groundwater level (or potentiometric head) ranging between about RL28.5 m to RL29.5 m. These values were uniformly applied to the model as the initial hydraulic head. This calibration confirmed that the model parameters chosen for the model appeared to be realistic and considered to be adequate. The calibrated initial (existing) groundwater levels and model calibration output are illustrated in Drawing 2 in **Appendix B**.

The predicted hydraulic head from the model run for Stage 2 (Buildings A and B) was used as an initial hydraulic head for this inflow assessment of Stage 3 (Building C) basement excavations.

8.3 Basement Dewatering – Drain Cells

The MODFLOW drain package can be used to simulate water loss from the groundwater system, which occurs due to dewatering operations. Drain cells set with a high conductance of 500 m^2/day simulated the dewatering during and construction of the basements. The drain cells represent the sub-floor drainage and sumps/pumps located within the basement, which dewater the site during construction. The basement will be tanked and permanent drainage is not required in the long term.

Basement inflows for the Stage 3 (Building C) excavation were simulated assuming the adjacent drained basements for Building A and B are active. The construction phase for the proposed Building C is assumed to commence following the completion of the construction of the Building A and B basements and is considered here as an existing drained basement. The proposed positions of the drain cells have been set at the proposed bulk excavation levels of the Building A and B, and the proposed Stage 3 building C at the site, as indicated in Table 11.

Table 11 Tanked Basements Adjacent to The Site

No.	Building	Drain Elevation (RL m, AHD)
1	Existing Basement of (Stage 2, Building A and B)	Drain Cells @ 22.7 m RL
2	Proposed Stage 3 Building C Basement*	Drain Cells @ 24 m RL

Inflows into the drain cells were monitored, representing basement inflow, using MODFLOW's zone budget module during simulations to assess groundwater inflow rates into the basement and their impact on the water table.

8.4 Cut-off Wall

According to Alliance (2021), it is recommended that a shoring system be installed along the northern and southern boundaries and other areas where there is not sufficient setback from the site boundaries. For modelling purposes, a shoring system is considered around the basement excavation for Buildings A and B and Building C (Figure 1 below). The shoring system could take the form of a soldier pile wall with reinforced shotcrete infill panels. The shoring system piles must be extended below the proposed excavation base level. The minimum depth below the embedment of the piles is recommended to be 0.5m.

As part of the proposed Stage 3 construction plan, the construction of Building C was simulated in this report. During some of the model simulations, an excavation wall was simulated (as a groundwater inflow control) by applying a horizontal flow barrier (HFB) to the cells around the proposed Building C basement excavation. Modelled scenarios include soldier pile wall to lowest basement C3 with bulk excavation level (BEL) between 22.5 mRL with no shotcrete infill to 0.5 m below the BEL. Groundwater modelling results are included in the Appendix E. The Figure 1 below illustrates the Model Scenario: Soldier pile wall with shotcrete infill around the basement excavation for Stage 2 and Stage 3 basement construction.

Figure 1 Model Scenario Stage 3, Building C

8.5 Groundwater Model Simulation

A series of model runs were completed to evaluate the field scenarios during construction and simulate inflow estimates into excavation. The model simulations comprised:

1. Run one simulating inflow to the lowest basement C3 during construction, with an open soldier pile wall (i.e., no shotcrete infill), using site-measured permeability estimate.

2. Run two simulating inflows to the lowest basement C3 during construction, with an open soldier pile wall with shotcrete infill around the basement excavation for building C, , using site-measured permeability estimate.

3. Run three simulating inflows to the lowest basement C3 during construction, with an open soldier pile wall (i.e., no shotcrete infill), assuming a worst-case /higher permeability estimate.

4. Run four simulating inflows to the lowest basement C3 during construction, with an open soldier pile wall with shotcrete infill around the basement excavation for buildings C, assuming a worst-case /higher permeability estimate.

The simulated groundwater inflows were monitored throughout model Runs 1 to 4. Results are reported in Table 12.

Table 12 Estimated Inflow Rates to Stage 3 (Building C Basement) Excavation

Model Run	Basement Design / Parameter Change	Inflow Rate /Dewatering Flow Rate (L/s)	Long-term Cumulative Inflow (ML/year)	
		Initial	(Cumulative during the first year)	Long-term*
1	Open excavation (No HFB), Site-measured Permeability value	1.80	14.5	-
2	Soldier pile wall with shotcrete (HFB) infill around the basement excavation for building C, Site-measured Permeability value	1.70	8.7	-
3	Open excavation (No HFB), with a worst-case/high permeability	1.82	14.5	-
4	Soldier pile wall with shotcrete (HFB) infill around the basement excavation for buildings C, with a worst-case/high permeability	1.80	14.2	-

Note: The proposed Stage 3 basement construction will be 'tanked,' therefore no long-term inflow assessment estimates are required.

Based on the modelled scenarios, the results show that the estimated initial inflow rates to the basement during construction/excavation (without soldier piles) are expected to be between approximately 1.8 to 1.7 L/s.

In the long-term with the completed soldier pile wall and shotcrete to 0.5 m below excavation level (BEL), and the proposed Stage 3 basement construction will be 'tanked,' therefore no long-term inflow assessment estimates are required.

The soldier pile wall and shotcrete contributed only to a small level of inflow reduction into the excavation to upward seepage from the clay beneath the wall. However, soldier pile walls and shotcrete were simulated (primarily as a retention system for the alluvial clay, but also as permanent groundwater inflow control) during the model simulations by applying an HFB to the walls around the proposed basement excavation. Groundwater inflow is, therefore, only expected to be significant during construction.

It should be noted that the actual dewatering rates (and observed drawdown) will be dependent on the dewatering scheme adopted for the site during construction. If, for instance, deeper sumps and pumps are used as part of the dewatering strategy or the walls are installed to shallower depths (than those modelled), then the actual dewatering rates experienced onsite may differ from those simulated by modelling in this investigation.

8.5.1 Groundwater Drawdown Extent and Dewatering Contours

Based on the modelling, a long-term groundwater level of RL 29.5 m is to consider the inflow rates and resulting drawdown contours from this depth.

For Stage 3 of the project comprising excavation for construction of Building C basement open excavations, the drawdown of 0.5 m depth would be expected to extend to between 15 m (Run 1) beyond the basement wall to downgradient in the western direction, as shown in Drawing four respectively presented in **Appendix E**. The drawdown for 0.1 m depth would be expected to extend up to 22 m, and the 0.5m drawdown extends up to and 13 m for Run 1 to the south of the basement towards the railway line, as shown in the Drawing 4 presented in **Appendix E**.

Post-construction of Stage 3 of the project comprising constructions of Building C basement with soldier pile wall with shotcrete infill around the basement excavation simulated in model Run 2 and 4. During construction stage a drawdown of 0.5 m depth would be expected to extend to between 10 m (Run 2) on the western and southern sides of the excavation (Drawing 5), with approximately 0.1 m of drawdown predicted up to 20 m beyond the southern sides. Drawdown to 0.5 m depth would be anticipated to extend between 10 m beyond the basement wall, as shown in Drawing 7 in **Appendix E.**

Ground settlement due to dewatering has been estimated for the predicted drawdown contours and is discussed below. It should be noted that actual settlements around the site are likely to be lower, as the predicted drawdown contours are higher than the recorded groundwater levels.

Based on the modelling results, the following could be expected:

- During Stage 3 excavation and dewatering of a three-level basement for building C, ground settlements due to water table drawdown would be estimated to be less than 10 mm at the edge of the excavation where the 0.5 m contour is located, and Drawing is presented in **Appendix E**.

9. UNCERTAINTY AND SENSITIVITY OF THE INVESTIGATIONS

9.1 General Data Reliability and Model Sensitivity

The integrity of all groundwater models is subject to several uncertainties, which arise due to the nature of the parameter uncertainty and conceptual uncertainty.

Conceptual uncertainty in the model arises because of the limitations necessary to simplify complex hydrogeology to construct the most practical model. Parameter uncertainty arises because the modelling adopts physical and hydraulic parameters that have not been thoroughly tested in the field or are subject to regular changes and/or fluctuations.

The approach undertaken for this project was deterministic, and actual parameters may vary from those adopted. Based on the geological, hydrogeological, and meteorological information available during reporting, the model parameters adopted are considered reasonable but do not necessarily represent a unique solution. Other interpretations are possible. Accordingly, the modelling results and predictions made in this Report should be considered indicative and subject to interpretation.

Sensitivity analysis involves quantifying the variation in the value of one or more output variables (e.g., hydraulic heads) due to changes in the value of one or more inputs to a groundwater flow model (e.g., hydraulic properties or boundary conditions).

This section discusses sensitivity in the historic groundwater modelling through a systematic variation of model input values.

The sensitivities are determined from the relative change in the inflow rate due to a 50% change in the hydraulic conductivity parameter value (for both the aquifer and HFB), presented in **Table 9**. The sensitivity analysis indicates that the groundwater levels are more sensitive to the assumed hydraulic conductivity of the aquifer than to the hydraulic conductivity of the HFB. The result is presented in **Table 12**.

All of the above parameters were completed through previous geotechnical investigations by other consultants but not IROS AUSTRALIA.

9.2 Mathematical Modelling

Sensitivity analysis reviews the variation in model predictions with changes in model input. This is relevant to understanding the potential effects of uncertainties in the data, as not all factors required to calculate the groundwater inflow with a high degree of certainty are known (and/or approximate actual site conditions). Therefore, reasonable but conservative (worst-case) estimates must be used to address these gaps in the data.

The model will be sensitive to all parameters to some degree. In order to account for this sensitivity, conservative (but realistic) assumptions have been made where site data is unavailable.

In particular, groundwater volume estimates are sensitive to hydraulic conductivity, which is used to calculate the drawdown extent at a defined groundwater level iteratively. The larger the radius of the drawdown (primarily defined by the hydraulic conductivity through iteration calculations), the more exponentially the estimated amount of groundwater inflow will increase. The model prediction was analysed for site-specific hydraulic conductivity, and the worst-case scenarios and groundwater inflow estimates are presented in **Table 12**.

9.3 Meteorological Data Reliability

Floods are often defined according to their likelihood of occurring in any given year. The most commonly used definition in planning is the '1 in 100-year flood'. This refers to a flood level or peak with a one in a hundred, or 1%, chance of being equalled or exceeded in any year. In other words, A '1-in-100-year flood' refers to a flood height that has a long-term likelihood of occurring once every 100 years (also called a 100-year recurrence interval). Generally, the high-value structure is designed to sustain the 1 in a 100-year flood event robustly. With recent severe weather changes in Australia, especially NSW and QLD, some states received 3 - 6 (1 in 100-year

rainfall/flood event) within less than a year. Considering this factor during groundwater modelling assessment is crucial, source: http://www.bom.gov.au/.

9.4 Safety Margin

The construction contractor should ensure the basement designer/engineer's advice and recommendations are taken in relation to the margin of safety and at what point during construction the dewatering/depressurisation system can be safely decommissioned.

We advise that the groundwater modelling conducted neither evaluates nor implies a margin of safety nor that risk of heave or slope failure is not present. A suitably qualified engineer should interpret the results.

10. REGULATION AND MANAGEMENT

To facilitate the proposed development, the following statutory requirements must be met to address the Water NSW regulations in relation to the impacts of groundwater resources.

Most of NSW groundwater is covered by statutory Water Sharing Plans (WSP) and the NSW Aquifer Interference Policy (AIP).

Given that the development basement intercepts the intermittent perched groundwater within the soils above the rock and the intermittent groundwater within fractures of the Ashfield Shale and is intended to continue to intercept this aquifer by way of a drained basement, this is generally identified as aquifer interference activity in accordance with the definition under the Water Management Act 2000 and the NSW AIP. We note that the AIP approval provisions of the Water Management Act 2000 are not yet active, and as such, licensing of these activities is currently administered under the Water Act 1912.

10.1 Water Sharing Plans (WSP)

WSPs are being progressively developed for rivers and groundwater systems across NSW following the introduction of the Water Management Act 2000. WSPs made under the WMA are being prepared as the Minister's plans under Section 50 of the Act. These plans protect the health of our rivers and groundwater while providing water users with perpetual access licences, equitable conditions, and increased opportunities to trade water through the separation of land and water.

WSPs provide a legislative basis for sharing water between the environment and consumptive purposes. Under the WMA, a plan for the sharing of water must protect each water source and its dependent ecosystems and must protect fundamental landholder rights.

The Project Site is located within the following WSP for the Greater Metropolitan Region Groundwater Sources (2011) – Sydney Basin Central Groundwater Source.

10.1.1 Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources (2011) – Sydney Basin Central Groundwater Source

The Sydney Central Basin Groundwater Source is bounded by the main arm of the Hawkesbury River to the north and the Nepean River to the west and south. Much of Sydney's population is within this groundwater source (with a total area of 3,757.59 square kilometres), and bores are evenly distributed across the area. The geology consists of sedimentary shale, sandstone, and siltstone formations with intervening coal seams. The long-term average annual extraction limit (LTAAEL) for the Sydney Basin Central Groundwater Source, which determines the amount of groundwater that can be potentially made available for annual extraction, is 45,915ML per year. Water trading is permitted within the Sydney Basin Central Groundwater Source zone.

Based on a review of the WSP, there are no high-priority Groundwater Dependent Ecosystems (GDEs) within 20km of the site (including springs, geothermal springs, wetlands, and karst) associated with the fractured rock groundwater source.

10.2 NSW Aquifer Interference Policy (2012)

The NSW Aquifer Interference Policy 2012 aims to explain the role and requirements of the Minister administering the WMA in the water licensing and assessment processes for aquifer interference activities under the WMA and other relevant legislative frameworks. The NSW Aquifer Interference Policy 2012:

- Clarifies the requirements for obtaining water licences for aquifer interference activities under NSW water legislation and

- Establishes and objectively defines considerations in assessing and advising on whether more than minimal impacts might occur to a key water-dependent asset.

The proposed development will result in aquifer interference under the NSW Aquifer Interference Policy (2012), as groundwater will be removed from at least one aquifer. Accordingly, groundwater licensing may be required.

10.2.1 Licensing of Water Taken Through Aquifer Interference

A water licence is required under the WMA (unless an exemption applies, or water is being taken under a fundamental landholder right) where any act by a person carrying out an aquifer interference activity causes:

- The removal of water from a water source; or
- The movement of water from one part of an aquifer to another part of an aquifer or
- The movement of water from one water source to another water source, such as:
- From an aquifer to an adjacent aquifer; or
- From an aquifer to a river/lake; or
- From a river/lake to an aquifer.

A licence for removing water from a water source will be required to develop under a drained basement scenario and water will also be removed in the temporary / construction stage.

10.2.2 Aquifer Impact Assessment

The WMA includes the concept of ensuring "*no more than minimal harm*" for both the granting of water access licences and aquifer interference approvals. Aquifer interference approvals are not to be granted unless the Minister is satisfied that adequate arrangements are in force to ensure that no more than minimal harm will be done to any water source or its dependent ecosystems as a consequence of its being interfered with in the course of the activities to which the approval relates.

Whilst aquifer interference approvals are not required to be granted, the minimal harm test under the WMA is not activated for the assessment of impacts. Therefore, this Policy establishes and objectively defines minimal impact considerations as they relate to water-dependent assets, and these considerations will be used as the basis for providing advice to the Minister.

11. WATER QUALITY OBJECTIVES (WQOs)

11.1 Receiving Environment

The site is located within a residential/industrial area, which is proposed for mixed-use commercial and residential use. The extracted groundwater will be treated and discharged to the stormwater network via a connection to an approved location by the Council (dewatering contractor to confirm the exact location).

The site is 400m away from Duck Creek. There are no other creeks, streams, rivers, or wetlands in the vicinity of the site; therefore, the site will not have any impact on the riparian land.

11.2 Water Quality Objectives for Dewatering

The details of this subject fit into the scope of a Dewatering Management Plan (DMP). A suitably qualified environmental consultant will be required to prepare the report as part of the Construction documentation. Environmental contamination must always be considered during dewatering; see the section below for more information.

12. POTENTIAL CONTAMINATION- ADDITIONAL CHEMICALS

The details of this section will fit into the scope of a groundwater Dewatering Management Plan (DMP). Please engage a suitable environmental consultant to prepare a DMP in this case.

Some dewatering situations may encounter groundwater/soil contaminated by previous activity. Appropriate preparation and planning should be done to prevent dewatering activities that intersect with known site contamination. Hence, the intersection of the dewatering process with any potential contamination is unknown. At a minimum, this will identify groundwater prohibition areas or known site contamination at the site and within a 500-m buffer zone (if it existed).

Additional chemicals can be considered for screening of dewatering discharge if there is an apparent reason (e.g., in the vicinity of an industrialised area, a specific PCA, known site contamination or an agricultural setting).

- Volatile chemicals − including monocyclic aromatic hydrocarbons, oxygenated compounds, sulfonated compounds, fumigants, halogenated aliphatic compounds, halogenated aromatic compounds, trihalomethanes and naphthalene.

- Semi-volatile chemicals − including phenolic compounds, polycyclic aromatic hydrocarbons, phthalate esters, nitrosamines, nitroaromatics & and ketones, haloethers, chlorinated hydrocarbons, PFAS, analines and benzidines, organochlorine pesticides and organophosphorus pesticides.

13. POTENTIAL DEWATERING IMPACTS

13.1 Impact on Water Supply Works & Groundwater Dependant Ecosystem (GDE)

As detailed in Section 11.1 above, the temporary dewatering works will not adversely impact any water supply works high-priority GDEs and are not expected to change water quality.

Based on the above assessment, the temporary dewatering activities are considered to have Minimal impacts under the NSW DPI (2012) AIP and WMA 2000.

13.2 Noise, Vibration & Odour

Noise and vibrations are generated by vacuum pumps, generators, and treatment systems, which typically operate 24 hours a day during dewatering operations. Offensive odours, such as hydrogen sulfide, can also be liberated through the excavation of sand and/or soils with high organic content; however, this is unlikely due to the non-existence of acid sulfate soils in the local area. Other odours from volatile organic compounds can occur from sites contaminated with petroleum hydrocarbons.

It is also common for diesel fumes to emanate from dewatering pumps and generators where electric systems cannot be used.

Excessive noise, vibrations, and odour will potentially cause a public nuisance, particularly in dense residential areas (which does not apply to this site) and may also impact the natural movements or behaviour of wildlife.

14. MONITORING PROGRAM

The details of this section will fit into the scope of a groundwater Dewatering Management Plan (DMP). Please engage a suitable environmental consultant to prepare a DMP in this case.

Monitoring of the discharge water will be completed for the estimated 6-month duration of the dewatering activities in accordance with the monitoring schedules below. All water quality monitoring will be completed by a suitably qualified person, using calibrated equipment to collect samples that are representative of the discharge.

14.1 Contingencies

Given the lack of buildings in close proximity to the proposed basement excavation, there is no credible risk of drawdown causing damage to such assets. However, infrastructure assets include railroads, pavements, and buried services. Whilst the risk of damage to such assets is considered to be low, it is considered prudent to establish a contingency in the event that a drawdown exceeding 1.0m is identified in the monitoring points outside the shoring wall. We recommend this involves:

- Review of actual drawdown depths and discharge volumes from the dewatering.
- Assessment of the condition of external pavements and infrastructure assets, including a survey to check for possible settlement if deteriorating conditions are observed or suspected, and
- Obtain further advice from the geotechnical engineer on possible measures to reduce drawdown, which could include installing cut-off structures in critical locations (we note that the likelihood of this being required is considered to be extremely low to barely credible, but it is mentioned for completeness of the management plan).

If unexpected monitoring results indicate that the discharge water quality has changed, treatment before discharge must be implemented.

Implementation/adjustment of physical and/or treatment processes and/or installation of larger retention structures should be completed as an initial procedure to mitigate unacceptable water quality readings.

Where implemented contingencies prove ineffective at mitigating risks to the receiving waterway, ceasing dewatering may be the only option until such time that other management techniques can be applied. To avoid potential damage to the constructed basement in such a situation, consideration should be given to obtaining a permit to discharge to sewer with Sydney Water.

15. GENERAL DATA GAP

No significant data gap was identified for this work. However, it is essential to consider the items below:

- This document must be read in conjunction with future GIA reports regarding other project phases/stages, i.e., other basement excavations.
- This Report and/or future GIA reports must be read in conjunction with a Dewatering Management Plan (DMP).
- Local government authorities and/or state government have yet to advise on the recommended/approved dewatering discharge destination.
- The most recent groundwater monitoring results of the existence of site wells must be conducted to update the current dataset.
- The current GW inflow calculations are a multifaceted/multifactorial process and calculations depending on several variables. If, for any reason, the design details of the future budling /excavation have changed or modified, the modelling system's output is yet to be updated.
- IROS AUSTRALIA prepared this document and entirely relied on the data presented in previous environmental and geotechnical reports by other consultancies.
- Municipal stormwater system information is to be provided to compare water quality targets if it is ultimately agreed to be discharged in the nearby waterways.
- Target water quality criteria for dewatering discharge will be set based on the final receiving water body, which is yet to be determined by authorities.
- Groundwater analytical results, as per Table 8 within this Report, must be completed following the most recent GW monitoring results update since DWMP NSW EPA requires it.
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) consider that a dewatering management plan is required to treat and manage any potential discharged groundwater.

16. DISCUSSIONS & RECOMMENDATIONS

Based on the findings of this assessment, we provide the following recommendations:

- Based on hydrogeological modelling, the low groundwater inflows predicted within the excavation (0.071–0.688 ML/year), it is considered that a 'drained' basement is feasible without a significant impact on surrounding groundwater systems or property, subject to review and approval from Council and relevant authorities;

- Approval should be obtained from WaterNSW for temporary extraction during construction of up to 1ML/year of groundwater from the Greater Metropolitan Region Groundwater Sources – Sydney Basin Central Groundwater Source. Consequently, approval for construction and long-term dewatering for the project is likely to be required;

- Temporary construction dewatering should be carried out in accordance with a Dewatering Management Plan (DMP). On-going groundwater contamination testing and long-term on-site treatment may be required prior to discharge and

- Whilst the estimated groundwater inflow and impacts do not exceed the 'no more than minimal harm' criteria in the Aquifer Interference Policy, there is still a responsibility to assess and monitor groundwater take and other impacts of dewatering and to advise Water NSW if this volume is unexpectedly exceeded.

16.1 CLOSURE

The findings contained within this Report result from limited discrete investigations conducted in accordance with normal practices and standards. To the best of our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances can it be considered that these findings represent the actual state of the ground conditions away from previous geotechnical investigation locations.

If the ground conditions encountered during construction significantly differ from those described in this Report and on which the conclusions and recommendations were based, we must be notified immediately.

This Report has been prepared for use by 30 Auburn Road Pty Ltd by IROS AUSTRALIA based on a desktop study and computer/mathematical modelling only in relation to the Mixed-Use Development at the site mentioned earlier in accordance with generally accepted consulting practice. It is essential to mention that IROS did not conduct any physical/remedial work on this site; the accuracy of the data gathered/presented based on fieldwork investigation by previous environmental and geotechnical companies is out of the scope of this work. No other warranty, expressed or implied, is made regarding the professional advice in this Report. Use of this Report by parties other than 30 Auburn Road Pty Ltd and their respective consultants and contractors is at their risk as it may not contain sufficient information for any other purposes.

17. CONCLUSION

Based on the investigations, groundwater within the residual Clay soils by the excavation is likely to be relatively continuous. The predicted groundwater inflow volumes during construction dewatering will likely be those estimated for the 'most likely' and 'worst-case scenarios of 0.071, 0.688 ML/year, and 0.688 ML/year.

The interception of this groundwater flow is considered to have a minimal impact on groundwater users or the environment. As such, a temporary dewatered basement design during construction is considered to be low-risk and appropriate for the development. The permanent basement is to be designed as a drained basement.

WaterNSW criteria for the drained basement under the Integrated Development Referral process and Water Management Act provided that all the following conditions are satisfied:

- The recommended works are completed, and the detailed analysis conforms with the relevant water; Sharing Plan rules for approval;
- The works can be demonstrated to be of 'Minimal Impact' under the Aquifer Interference Policy;
- Inflows are considered low (e.g., <3ML/yr.), and appropriate management of any drained water can be implemented in perpetuity; and
- Sufficient water allocations are purchased.

Based on the groundwater inflow assessment completed above, it is our opinion that the proposed development meets WaterNSW criteria for a temporary drainage during the construction of the basement and a drained basement design for the permanent dewatering system.

18. LIMITATIONS

This Report, including associated documents such as Appendices, Attachments, etc., was based on the Scope of Work outlined in the section above earlier in this Report. IROS AUSTRALIA prepared this Report in a manner consistent with the level of care and expertise practised by members of the environmental profession.

This Report relates only to the objectives stated and does not relate to any other work undertaken for the Client. Site conditions upon which inferences in this Report are drawn may change with time and space.

This Report and the modelling work solely relied on the field investigation completed by Alliance Geotechnical and Sullivan Environmental Sciences Pty Ltd; hence, IROS does not take responsibility for the accuracy of the field test results.

Also, regarding potential chemical/contaminants in groundwater, the absence of any identified hazardous or toxic materials/chemicals on the subject property (the Site) must not be interpreted as a guarantee that such materials/chemicals do not exist on the Site or neighbouring environment. The results of this site investigation only apply to sampling locations for all media, including soil, water, and air; hence, the potential chemical extent of the remainder of the Site is unknown.

All conclusions and recommendations regarding the site are the professional opinions of IROS AUSTRALIA and are subject to the details in this Report. IROS AUSTRALIA accepts no liability where our recommendations are not followed or are only partially followed. While assessments of data reliability have been made, IROS AUSTRALIA assumes no responsibility or liability for errors in any data obtained from regulatory agencies, governing bodies, statements from sources outside of IROS AUSTRALIA, or developments resulting from situations outside the scope of this project. The Client acknowledges that this Report is for the exclusive use of (**30 Auburn Road Pty Ltd**) only.

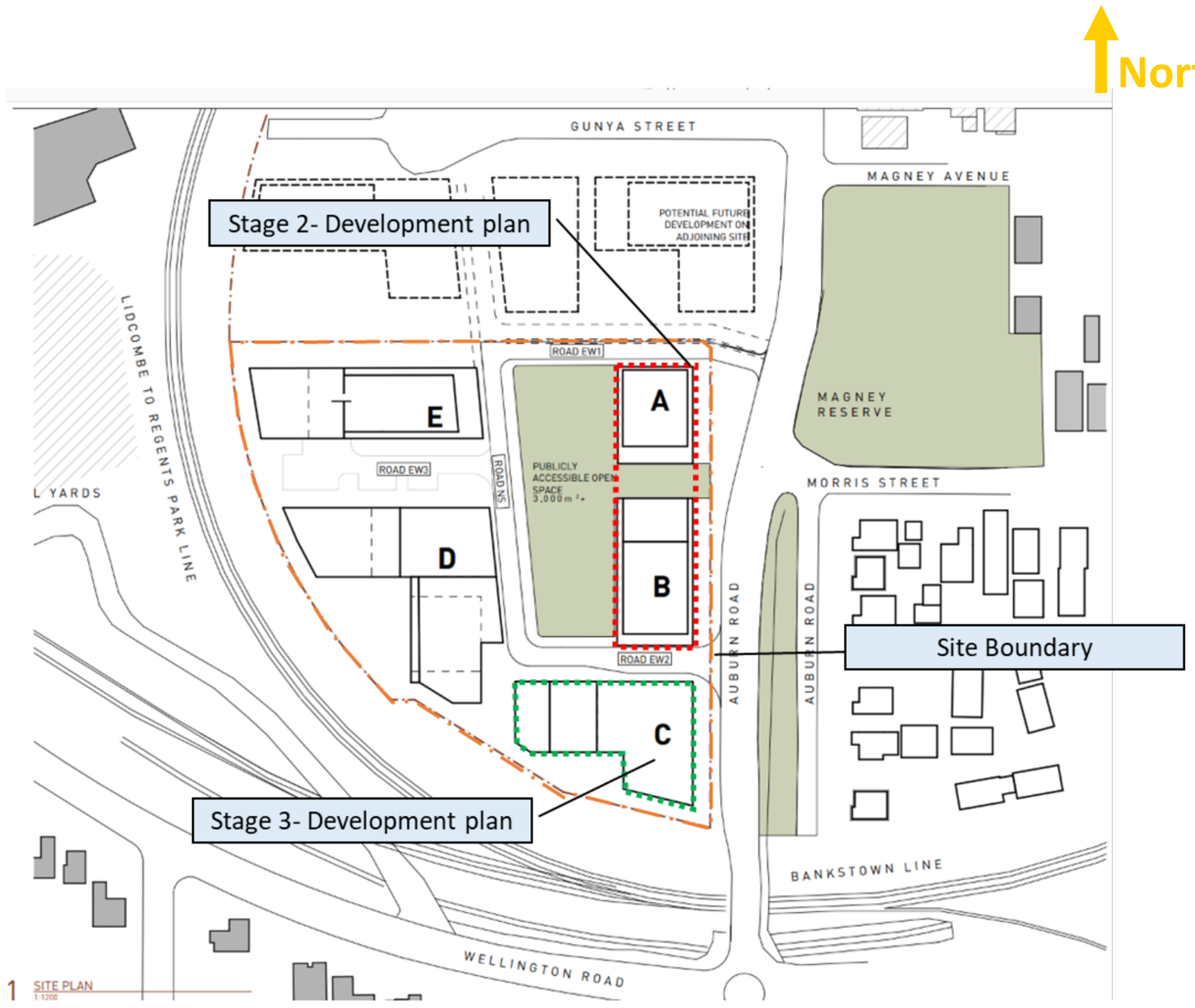
In addition to the limitations inherent in site investigations (refer to the attached Information Sheets), it must be pointed out that the recommendations in this Report are based on assessed subsurface conditions from limited investigations by other companies (see section 2 – relevant documents). To confirm the assessed soil/rock/groundwater properties in this Report, further investigation would be required, such as in-situ permeability, detailed hydraulic conductivity measurements and aquifer testing and should be carried out if the scale of the development warrants or if any of the properties are critical to the design, construction, or performance of the development.

This report and details for the proposed development should be submitted to relevant regulatory authorities interested in the property (e.g., Council, WaterNSW) for their review.

IROS AUSTRALIA accepts no liability where our recommendations are not followed or are only partially followed. The document “Important Information about your Geotechnical Report” in **Appendix F** provides additional information about the uses and limitations of this Report.

APPENDIX A

Site Figures + Proposed Development Map



LEGEND

Site Boundary

PROJECT DETAILS	Proposed Residential Development (Stage 3 , Building C)		DRAWING DETAILS Drawing 1. Site Location and Development Plan			
Project Title	Groundwater Impact Assessment (GIA)		**Appendix A**	1	Rev No.	0
Project No.	IRP- 104		Scale	NA	Size	A4
Client	City of Canterbury Bankstown		Produce by	RO	Date	15/02/2024
Site Address	30-46 Auburn Road, Regents Park NSW 2143		Authorize to release by	IR	Date	26/02/2024

APPENDIX B

Bore Log Details And Permeability Testing

N

Site boundary

New groundwater monitoring well

Existing groundwater monitoring well

Soil sample location

Added locations are approximate

Not to scale Date: 17/06/2021

Source: Nearmaps™ 2021

SULLIVAN environmental sciences

Project #: **SES_590**

Title: **Detailed Phase 2 Contamination Investigation**

Figure 3: **Sampling Locations**

Address: **30 - 46 Auburn Road, Regents Park NSW**

ENVIRONMENTAL BOREHOLE BH01

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 07/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	No odours observed No staining observed No ACM observed
							FILL: Reworked Clay, medium plasticity, brown and grey, firm to stiff, very moist	
		1.3	BH01_0.2-0.3 (QA01)					
0.5				PT			Natural CLAY: high plasticity, brown and grey, stiff, moist	
1							Grading to, Weathered zone clay/soft shale rock, dry	
1.5							End of borehole at 1.5m	

Disclaimer This log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 08 Jun 2021

ENVIRONMENTAL BOREHOLE BH02

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 07/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	No odours observed No staining observed No ACM observed
							FILL: Very thin layer of ashy gravels then; Reworked Clay, medium plasticity, brown and grey, firm to stiff, very moist	
		1.2	BH02_0.3-0.4					
0.5				PT			Natural CLAY: high plasticity, brown and grey, stiff, moist	
1							Grading to, Weathered zone clay/soft shale rock, dry	
1.5							End of borehole at 1.5m	

Disclaimer This log is intended for environmental not geotechnical purposes.

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ENVIRONMENTAL BOREHOLE BH03

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 07/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	
		0.8	BH03_0.15-0.25				FILL: Ash gravels, black coarse	No odours observed No staining observed No ACM observed
							Natural CLAY: high plasticity, brown and grey, stiff, moist	
0.5				PT				
							Grading to, Weathered zone clay/soft shale rock, dry	
1								
1.5							End of borehole at 1.5m	

Disclaimer This log is intended for environmental not geotechnical purposes.

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ENVIRONMENTAL BOREHOLE BH04

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 07/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.1m)	
		0.9	BH04_0.1-0.2				FILL: Ash gravels, black coarse	No odours observed No staining observed No ACM observed
							Natural CLAY: high plasticity, red brown and grey, very stiff, moist	
0.5				PT				
1							Grading to, Weathered zone clay/soft shale rock, dry	
1.5							End of borehole at 1.5m	

ENVIRONMENTAL BOREHOLE BH05

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 07/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.1m)	
							FILL: Ash gravels, black coarse	No odours observed No staining observed No ACM observed
		0.8	BH05_0.2-0.3				Natural CLAY: high plasticity, red brown and grey, very stiff, moist	
0.5				PT				
							Grading to, Weathered zone clay/soft shale rock, dry	
1								
1.5							End of borehole at 1.5m	

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ENVIRONMENTAL BOREHOLE BH06

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 07/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.3m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.1m)	No odours observed No staining observed No ACM observed
							FILL: Very thin layer of ash gravels, black coarse	
							Natural CLAY: high plasticity, red brown and grey, very stiff, moist	
		1.2	BH06_0.2-0.3					
							Grading to, Weathered zone clay/soft shale rock, dry	
0.5				PT				
1								
							End of borehole at 1.3m	
1.5								

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ENVIRONMENTAL BOREHOLE BH07

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 07/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.2m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	Very faint hydrocarbon odours observed No staining observed No ACM observed
							FILL: Very thin layer of crushed rock roadbase	
							Natural CLAY: high plasticity, red brown and grey, very stiff, moist	
		1.3	BH07_0.3-0.4					
0.5				PT				
							Grading to, Weathered zone clay/soft shale rock, dry	
1								
							Refusal - End of borehole at 1.2m	
1.5								

ENVIRONMENTAL BOREHOLE BH08

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 07/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
		0.8	BH08_0.0-0.2	HA			Ballast gravels and fines, dry	
							Natural CLAY: high plasticity, predominantly grey, stiff, moist	No odours observed No staining observed No ACM observed
0.5				PT				
		-	BH08_0.8-1.0					
							Grading to, Weathered zone clay/soft shale rock, dry	
1								
1.5							End of borehole at 1.5m	

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BOREHOLE & GROUNDWATER LOG BH09/GW01

PROJECT NUMBER SES_590	**TOTAL DEPTH** 10.0m	**COORDINATES**
CLIENT 30 Auburn Rd Pty Ltd	**DIAMETER** 50mm	**COORD SYS** m AHD
ADDRESS 30-46 Auburn Rd, Regents Park NSW	**CASING** uPVC	**SURFACE ELEVATION**
PROJECT NAME Data Gap Investigation	**SCREEN** uPVC Factory Slotted	**WELL TOC**
LICENCE NO.	**DATE** 07/06/2021	

COMMENTS HA = Hand Auger, SS = Solid Auger, PT = Push Tube

LOGGED BY A.S.
CHECKED BY S.G.

Depth (m)	PID	Samples	Drilling Method	Graphic Log	Moisture	Material Description	Well Diagram	Additional Observations
0			HA			Asphalt (50mm) Roadbase gravels (150mm)	Gatic cover	
0.5	0.9	BH09_0.4-0.5 (QA02)			M	FILL: Silty gravelly Clay; high plasticity, brown, firm to stiff		No odours observed No staining observed No ACM observed
1			PT		M	Natural CLAY: high plasticity, red brown and grey, very stiff		
1.5	0.8	BH09_1.7-1.8						
2			SS			Grading to weathered zone SHALE; soft shale rock, light brown	Grout	
2.5								
3								
3.5								
4							Bentonite plug	
4.5						Dark brown, soft		
5						Black colours, soft		
5.5								
6								
6.5						Various bands coloured shale, soft, easy drilling conditions	Fine grained sand filter pack	
7								
7.5								
8								
8.5						Signs of moisture		
9								
9.5						Signs of moisture	Backfill	
10						End of borehole at 10.0m		

Disclaimer This bore log is intended for environmental not geotechnical purposes.

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ENVIRONMENTAL BOREHOLE BH10

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 07/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	No odours observed No staining observed No ACM observed
							FILL: Roadbase gravels	
							FILL: Gravelly Clay; brownish, firm, high gravel content, moist	
0.5		0.9	BH10_0.5-0.6	PT				
1							Natural CLAY: high plasticity, predominantly grey, stiff, moist	
1.5							End of borehole at 1.5m	

ENVIRONMENTAL BOREHOLE BH11

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 07/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	
							FILL: Gravelly Clay; high plasticity, brown with some greeny hues, firm, moist to wet	No odours observed No staining observed No ACM observed
0.5				PT				
		1.3	BH11_0.6-0.7					
							Natural CLAY: high plasticity, grey and red browns, very stiff, moist.	
1								
							Grading into weathered zones of soft shale rock	
1.5							End of borehole at 1.5m	

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ENVIRONMENTAL BOREHOLE BH12

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 08/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.4m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	
							FILL: SAND; uniform, brown tan, wet, loose	Slight hydrocarbon odours observed No staining observed No ACM observed
							Seepage water entering borehole	
0.5		1.2	BH12_0.5-0.6					
							Natural CLAY: high plasticity, red/grey mottles, very stiff, moist.	
				PT				
1							Grading into weathered zones of soft shale rock	
		-	BH12_1.3-1.4					
1.5							End of borehole at 1.4m	

ENVIRONMENTAL BOREHOLE BH13

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 08/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.9m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube, SS = Solid Auger

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	
							FILL: SAND; uniform with coarse gravels, grey green colours, loose, wet. Strong hydrocarbon odours with black staining	
		1.4	BH13_0.2-0.4					No ACM observed
0.5				PT			Natural CLAY: high plasticity, red/grey mottles, very stiff, moist. Hydrocarbon odours and black staining in top 10cm of layer.	
							Grading into weathered zones of soft shale rock	
1		-	BH13_1.0-1.2 (QA03)					No groundwater well installed. Broke open adjacent existing groundwater well installed (c) mid 1990's.
				SS			Hard shale rock with ironstone noted at 1.2m - Push tube refusal changed to Solid Augers	Measured: SWL at 5.54mbtoc Depth at 11.5mbtoc Re-labelled existing groundwater well as GW02
1.5								
							End of borehole at 1.9m	

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BOREHOLE & GROUNDWATER LOG BH14/GW03

PROJECT NUMBER SES_590	**TOTAL DEPTH** 8.5m	**COORDINATES**
CLIENT 30 Auburn Rd Pty Ltd	**DIAMETER** 50mm	**COORD SYS** m AHD
ADDRESS 30-46 Auburn Rd, Regents Park NSW	**CASING** uPVC	**SURFACE ELEVATION**
PROJECT NAME Data Gap Investigation	**SCREEN** uPVC Factory Slotted	**WELL TOC**
LICENCE NO.	**DATE** 08/06/2021	

COMMENTS HA = Hand Auger, SS = Solid Auger, PT = Push Tube

LOGGED BY A.S.
CHECKED BY S.G.

Depth (m)	PID	Samples	Drilling Method	Graphic Log	Moisture	Material Description	Well Diagram	Additional Observations
0			HA		M / W	Concrete rubble over FILL: Silty gravelly Clay; low plasticity, dark brown, firm, moist, large shaley gravels with wet plastic pockets	Gatic cover	No odours observed No staining observed No ACM observed
0.5	1.0	BH14_0.3-0.5	PT					
1					M	Natural CLAY: high plasticity, red grey mottling with some yellowing very stiff		
1.5						Grey colours dominant		
2						CLAY, low to medium plasticity, grey, moist	Grout	
2.5			SS		D	Grading to weathered zone SHALE; soft shale rock, light brown with harder layer bands		
3								
3.5								
4						Brown, soft	Bentonite plug	
4.5						Darker brown shales		
5						Brown shales		
5.5						Positive signs of moisture in cuttings		
6							Fine grained sand filter pack	
6.5								
7								
7.5								
8							Backfill	
8.5						End of borehole at 8.5m		

Disclaimer This bore log is intended for environmental not geotechnical purposes.

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BOREHOLE & GROUNDWATER LOG BH15/GW04

PROJECT NUMBER SES_590	**TOTAL DEPTH** 8.5m	**COORDINATES**
CLIENT 30 Auburn Rd Pty Ltd	**DIAMETER** 50mm	**COORD SYS** m AHD
ADDRESS 30-46 Auburn Rd, Regents Park NSW	**CASING** uPVC	**SURFACE ELEVATION**
PROJECT NAME Data Gap Investigation	**SCREEN** uPVC Factory Slotted	**WELL TOC**
LICENCE NO.	**DATE** 08/06/2021	

COMMENTS HA = Hand Auger, SS = Solid Auger, PT = Push Tube

LOGGED BY A.S.
CHECKED BY S.G.

Depth (m)	PID	Samples	Drilling Method	Graphic Log	Moisture	Material Description	Well Diagram	Additional Observations
0			HA		M	Surface ballast and crushed rock over FILL: Gravelly Clay; low plasticity, brown grey, firm, moist.	Gatic cover	
0.5			SS					
1	1.1	BH15_1.0-1.2				Slight hydrocarbon odour Clay fill, faint hydrocarbon odours		No staining observed No ACM observed
1.5								
2	1.3	BH15_2.2-2.3			M	Natural CLAY: high plasticity, red grey mottling with some yellowing, very stiff, moist.	Grout	
2.5								
3								
3.5								
4							Bentonite plug	
4.5						Grading to weathered zone SHALE; soft shale rock, grey with harder layer bands		
5					D	SHALE: brown		
5.5						Positive signs of moisture in cuttings		
6							Fine grained sand filter pack	
6.5								
7								
7.5								
8							Backfill	
8.5						End of borehole at 8.5m		

Disclaimer This bore log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 10 Jun 2021

BOREHOLE & GROUNDWATER LOG BH16/GW05

PROJECT NUMBER SES_590	**TOTAL DEPTH** 8.5m	**COORDINATES**
CLIENT 30 Auburn Rd Pty Ltd	**DIAMETER** 50mm	**COORD SYS** m AHD
ADDRESS 30-46 Auburn Rd, Regents Park NSW	**CASING** uPVC	**SURFACE ELEVATION**
PROJECT NAME Data Gap Investigation	**SCREEN** uPVC Factory Slotted	**WELL TOC**
LICENCE NO.	**DATE** 08/06/2021	

COMMENTS HA = Hand Auger, SS = Solid Auger, PT = Push Tube

LOGGED BY A.S.
CHECKED BY S.G.

Depth (m)	PID	Samples	Drilling Method	Graphic Log	Moisture	Material Description	Well Diagram	Additional Observations
-0.5							Monument	
0	1.6	BH16_0.0-0.2	HA		M	Surface ballast and crushed rock over FILL: Gravelly Silty Clay; low plasticity, dark brown, firm, moist.		
0.5			SS			Natural CLAY: high plasticity, red grey mottling with some yellowing, very stiff, moist.		No staining observed No ACM observed
1								
1.5							Grout	
2					M			
2.5						Evidence of water at 2.5m		
3								
3.5							Bentonite plug	
4						Dry cuttings at 4m		
4.5								
5						Moist cuttings at 4.8m		
5.5					D			
6						Clay with minor gravels	Fine grained sand filter pack	
6.5						Grading to weathered zone SHALE; soft shale rock, grey with harder layer bands		
7								
7.5						SHALE: brown		
8							Backfill	
8.5						End of borehole at 8.5m		
9								

produced by ESlog.ESdat.net on 10 Jun 2021

ENVIRONMENTAL BOREHOLE BH17

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 08/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 2.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
0				HA			FILL: Silty Clay and gravel mixture, brown, dense material, dry to moist.	No odours observed No staining observed No ACM observed
				PT				
0.5							Layer of crushed shale rock	
1		-	BH17_1.0-1.2					
							Natural CLAY: high plasticity, red/grey mottles, very stiff, moist.	
1.5								
2								
2.5							End of borehole at 2.5m	

Disclaimer This log is intended for environmental not geotechnical purposes.

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ENVIRONMENTAL BOREHOLE BH18

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 08/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 2.7m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
0				HA			FILL: Silty Clay and gravel mixture, brown, dense material, dry to moist.	No odours observed No staining observed No ACM observed
0.5				PT				
1								
1.5		-	BH18_1.3-1.5 (QA04)				Natural CLAY: high plasticity, red/grey mottles, very stiff, moist.	
2								
2.5								
							End of borehole at 2.7m	

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ENVIRONMENTAL BOREHOLE BH19

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 08/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 3.9m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
0				HA			FILL: Gravelly Silty Clay mixture, brown, dense material, dry to moist with some rock and layers of plastic clays.	No odours observed No staining observed No ACM observed
0.5				PT				
1								
1.5								
2							Varying layers of clay and gravel mixture	
		-	BH19_2.1-2.3					
2.5								
3								
3.5							Natural? Former topsoil - silty material, wet layer	
							Natural CLAY: high plasticity, red/grey mottles, very stiff, moist.	
							End of borehole at 3.9m	

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BOREHOLE & GROUNDWATER LOG BH20/GW06

PROJECT NUMBER SES_590	**TOTAL DEPTH** 10m	**COORDINATES**
CLIENT 30 Auburn Rd Pty Ltd	**DIAMETER** 50mm	**COORD SYS** m AHD
ADDRESS 30-46 Auburn Rd, Regents Park NSW	**CASING** uPVC	**SURFACE ELEVATION**
PROJECT NAME Data Gap Investigation	**SCREEN** uPVC Factory Slotted	**WELL TOC**
LICENCE NO.	**DATE** 09/06/2021	

COMMENTS HA = Hand Auger, SS = Solid Auger, PT = Push Tube

LOGGED BY A.S.
CHECKED BY S.G.

Depth (m)	PID	Samples	Drilling Method	Graphic Log	Moisture	Material Description	Well Diagram	Additional Observations
0	-	BH20_0.3-0.4	HA			Concrete (0.2m)	Gatic cover	No staining observed No ACM observed
0.5			SS		M	FILL: Gravel Clay mixture Natural CLAY: high plasticity, red grey mottling, very stiff, moist.	Grout	
1								
1.5								
2							Bentonite plug	
2.5					D	Grading to weathered zone SHALE; soft shale rock, brown		
3								
3.5								
4								
4.5								
5								
5.5							Fine grained sand filter pack	
6								
6.5								
7								
7.5						Dark grey/black shale		
8								
8.5						Hard drilling conditions		
9								
9.5							Backfill	
10						End of borehole at 10.0m - Refusal		

Disclaimer This bore log is intended for environmental not geotechnical purposes.

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ENVIRONMENTAL BOREHOLE BH21

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 09/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.18m) with 2x plastic underlay	
							FILL: Sandy Gravels over clay	No odours observed No staining observed No ACM observed
		-	BH21_0.4-0.6 (QA05)				Natural CLAY: high plasticity, red/grey mottles, very stiff, moist.	
0.5				PT				
1								
1.5							End of borehole at 1.5m	

ENVIRONMENTAL BOREHOLE BH22

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 09/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	
							FILL: Gravelly Clay; with some coarse gravel	
		-	BH22_0.2-0.4					No odours observed No staining observed No ACM observed
							Natural CLAY: high plasticity, red/grey mottles, very stiff, moist.	
0.5				PT				
1								
1.5							End of borehole at 1.5m	

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ENVIRONMENTAL BOREHOLE BH23

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 09/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.2m)	
							FILL: Gravelly Clay; with some coarse gravel	No odours observed No staining observed No ACM observed
							Natural CLAY: high plasticity, red/grey mottles, very stiff, moist.	
		-	BH23_0.4-0.5					
0.5				PT				
							Some weathered layers evident	
1								
1.5							End of borehole at 1.5m	

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ENVIRONMENTAL BOREHOLE BH24

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 09/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.1m)	No odours observed No staining observed No ACM observed
							FILL: Gravel roadbase, coarse	
							Natural: Thin Silty CLAY layer then CLAY: high plasticity, red/grey mottles, very stiff, moist.	
0.5		-	BH24_0.5-0.7	PT				
							Some weathered layers evident	
1								
1.5							End of borehole at 1.5m	

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ENVIRONMENTAL BOREHOLE BH25

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 09/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.15m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.19m)	No odours observed No staining observed No ACM observed
							FILL: Base course underlay, very coarse gravels	
							FILL: Silty Clay and gravel mixture, soft, dark brown to black, wet	
0.5		1.0	BH25_0.5-0.7					
1				PT				
1.5							End of borehole at 1.15m - Refusal on metallic object, assumed to be water pipe approx 1 Inch diameter	

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ENVIRONMENTAL BOREHOLE BH26

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 09/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 0.55m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.2m)	
							FILL: Blue metal base course gravels	
		-	BH26_0.3-0.5	PT			FILL: Gravelly clay mixture	No odours observed No staining observed No ACM observed
0.5								
							End of borehole at 0.55m - Refusal on concrete (pipe?)	
1								
1.5								

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ENVIRONMENTAL BOREHOLE BH27

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 09/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 0.9m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.18m)	No odours observed No staining observed No ACM observed
							Roadbase Gravels then FILL: Gravelly Clay mixture	
		0.9	BH27_0.4-0.5				0.4m Concrete pipe encountered	
0.5				PT				
		-	BH27_0.7-0.8				CLAY: high plasticity, red/grey mottles, very stiff, moist.	
1							End of borehole at 0.9m	
1.5								

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produced by ESlog.ESdat.net on 10 Jun 2021

ENVIRONMENTAL BOREHOLE BH28

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 09/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 1.5m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.2m)	
			F01				Ballast and crushed rock, 3x fibre cement fragments observed	
0.5		-	BH28_0.5-0.6				FILL: Gravelly Clay and rock mixture	No staining observed
		0.9	BH28_0.7-0.8	PT			Unknown odour observed at 0.7m	
1							CLAY: high plasticity, red/grey mottles, very stiff, moist.	
1.5							End of borehole at 1.5m	

Disclaimer This log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 10 Jun 2021

ENVIRONMENTAL BOREHOLE BH29

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 09/06/2021
DRILLING COMPANY Epoca Environmental P/L
DRILLING METHOD Hand Auger & Geoprobe

BORE SIZE 100mm
TOTAL DEPTH 2.7m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	No odours observed No staining observed No ACM observed
							FILL: Gravel and Clay mixture, some layers of re-worked natural clays (Potentially old UST pit?)	
0.5								
1		1.0	BH29_1.0-1.1	PT				
1.5								
		1.0	BH29_1.8-2.0 (QA06)					
2							CLAY: high plasticity, red/grey mottles, very stiff, moist.	
2.5								
							End of borehole at 2.7m	

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produced by ESlog.ESdat.net on 10 Jun 2021

ENVIRONMENTAL BOREHOLE HA01

PROJECT NUMBER SES_590
CLIENT 30 Auburn Rd. Pty Ltd
LOCATION 30-46 Auburn Rd, Regents Park NSW
PROJECT NAME Data Gap Investigation

DRILLING DATE 09/06/2021
DRILLING COMPANY N/A
DRILLING METHOD Hand Auger

BORE SIZE 100mm
TOTAL DEPTH 0.6m
LOGGED BY A.S.
CHECKED BY S.G.

COMMENTS HA = Hand Auger, PT = Push Tube

Depth (m)	Penetration Resistance	PID	Samples	Method	Graphic Log	USCS	Material Description	Additional Observations
				HA			Concrete (0.15m)	No odours observed No staining observed No ACM observed
							FILL: Road base gravels, some black gravels	
0.5		-	HA01_0.5-0.6				Silty CLAY: medium plasticity, reddish brown, firm, dry.	
1							End of borehole at 0.6m	

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Site Investigation Plan

Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	13087-GR-1-B
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

APPENDIX C – Borehole Logs & Explanatory Notes

alliance

Explanatory Notes
Drill & Excavation Logs

General

Information obtained from site investigations is recorded on log sheets. Soils and very low strength rock are commonly drilled using a combination of solid-flight augers with a Tungsten-Carbide (TC) bit. Descriptions of these materials presented on the “Borehole Log” are based on a combination of regular sampling and in-situ testing. Rock coring techniques commences once material is encountered that cannot be penetrated using a combination of solid-flight augers and Tungsten-carbide bit. The "Cored Borehole Log" presents data from drilling where a core barrel has been used to recover material - commonly rock.

The "Excavation - Geological Log" presents data and drawings from exposures of soil and rock resulting from excavation of pits or trenches.

The heading of the log sheets contains information on Project Identification, Hole or Test Pit Identification, Location and Elevation. The main section of the logs contains information on methods and conditions, material description and structure presented as a series of columns in relation to depth below the ground surface which is plotted on the left side of the log sheet. The scale is presented in the depth column as metres below ground level.

As far as is practicable the data contained on the log sheets is factual. Some interpretation is included in the identification of material boundaries in areas of partial sampling, the location of areas of core loss, description and classification of material, estimation of strength and identification of drilling induced fractures, and geological unit. Material description and classifications are based on Australian Standard Geotechnical Site Investigations: AS 1726 - 2017 with some modifications as defined below.

These notes contain an explanation of the terms and abbreviations commonly used on the log sheets.

Drilling

Drilling, Casing and Excavating

Drilling methods deployed are abbreviated as follows

Abbreviation	Method
AS	Auger Screwing
ADV	Auger Drilling with V-Bit
ADT	Auger Drilling with TC Bit
BH	Backhoe
E	Excavator
HA	Hand Auger
HQ	HQ core barrel (~63.5 mm diameter core) *
HMLC	HMLC core barrel (~63.5 mm diameter core) *
NMLC	NMLC core barrel (~51.9 mm diameter core) *
NQ	NQ core barrel (~47.6 mm diameter core) *
RR	Rock Roller
WB	Wash-bore drilling

* Core diameters are approximate and vary due to the strength of material being drilled.

Drilling Fluid/Water

The drilling fluid used is identified and loss of return to the surface estimated as a percentage. It is introduced to assist with the drill process, in particular, when core drilling. The introduction of drill fluid/water does not allow for accurate identification of water seepages.

Drilling Penetration/Drill Depth

Core lifts are identified by a line and depth with core loss per run as a percentage. Ease of penetration in non-core drilling is abbreviated as follows:

Abbreviation	Description
VE	Very Easy
E	Easy
F	Firm
H	Hard
VH	Very Hard

Groundwater Levels

Date of measurement is shown.


Standing water level measured in completed borehole


Level taken during or immediately after drilling


Groundwater inflow water level

Samples/Tests

Samples collected and testing undertaken are abbreviated as follows

Abbreviation	Test
ES	Environmental Sample
DS	Disturbed Sample
BS	Bulk Sample
U50	Undisturbed (50 mm diameter)
C	Core Sample
SPT	Standard Penetration Test
N	Result of SPT (*sample taken)
VS	Vane Shear Test
IMP	Borehole Impression Device
PBT	Plate Bearing Test
PZ	Piezometer Installation
HP	Hand Penetrometer Test
HB	Hammer Bouncing

Excavation Logs

Explanatory notes are provided at the bottom of drill log sheets. Information about the origin, geology and pedology may be entered in the "Structure and other Observations" column. The depth of the base of excavation (for the logged section) at the appropriate depth in the "Material Description" column. Refusal of excavation plant is noted should it occur. A sketch of the exposure may be added. Photos are recommended.

Material Description – Soil

Material Description - In accordance with AS 1726-2017

Classification Symbol - In accordance with the Unified Classification System (AS 1726-2017).

Abbreviation	Typical Name
GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
GP	Poorly graded gravels and gravel-sand mixtures, little or no fines, uniform gravels
GM	Silty gravels, gravel-sand-silt mixtures
GC	Clayey gravels, gravel-sand-clay mixtures.
SW	Well graded sands, gravelly sands, little or no fines.
SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands.
SM	Silty sand, sand-silt mixtures.
SC	Clayey sands, sand-clay mixtures.
ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
OL	Organic silts and organic silty clays of low plasticity. *
MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, clastic silts.
CH	Inorganic clays of high plasticity, fat clays
OH	Organic clays of medium to high plasticity, organic silts. *
Pt	Peat and other highly organic soils. *

* Additional details may be provided in accordance with the Von Post classification system (1922).

Organic Soils - Identification using laboratory testing:

Material	Organic Content - % of dry mass
Inorganic	<2
Organic Soil	<2 ≤ 25
Peat	> 25

Organic Soils - Descriptive terms for the degree of decomposition of peat:

Term	Decomposition	Remains	Squeeze
Fibrous	Little or none	Clearly recognizable	Only water No solid
Pseudo-fibrous	Moderate	Mixture of fibrous and amorphous	Turbid water < 50% solids
Amorphous	Full	Not recognizable	Paste > 50% solids

Particle Characteristics– Definitions are as follows:

Fraction	Component (& subdivision)		Size (mm)
Oversize	Boulders		> 200
	Cobbles		> 63 ≤ 200
Coarse grained soils	Gravel	Coarse	> 19 ≤ 63
		Medium	> 6.7 ≤ 19
		Fine	> 2.36 ≤ 6.7
	Sand	Coarse	> 0.6 ≤ 2.36
		Medium	> 0.2 ≤ 0.6
		Fine	> 0.075 ≤ 0.21
Fine grained soils	Silt		0.002 ≤ 0.075
	Clay		< 0.002

Secondary and minor soil components

In coarse grained soils – The proportions of secondary and minor components are generally estimated from a visual and tactile assessment of the soils. Descriptions for secondary and minor soil components in coarse grained soils are as follows.

Designation of components	Percentage fines	Terminology (as applicable)	Percentage accessory coarse fraction	Terminology (as applicable)
Minor	≤ 5	Trace clay / silt	≤ 5	Trace sand / gravel
	> 5 ≤12	With clay / silt	> 5 ≤12	With sand / gravel
Secondary	> 12	Silty or clayey	> 30	Sandy or gravelly

Descriptions for secondary and minor soil components in fine grained soils are as follows.

Designation of components	Percentage coarse grained soils	Terminology (as applicable)
Minor	≤ 5	Trace sand / gravel / silt / clay
	> 5 ≤12	With sand / gravel / silt / clay
Secondary	> 30	Sandy / gravelly / silty / clayey

Plasticity Terms – Definitions for fine grained soils are as follows:

Descriptive Term	Range of Liquid Limit for silt	Range of Liquid Limit for clay
Low Plasticity	≤ 50	≤ 35
Medium Plasticity	N/A	> 35 ≤50
High Plasticity	> 50%	> 50

Particle Characteristics

Particle shape and angularity are estimated from a visual assessment of coarse-grained soil particle characteristics. Terminology used includes the following:

Particle shape – spherical, platy, elongated,

Particle angularity –angular, sub-angular, sub-rounded, rounded.

Moisture Condition – Abbreviations are as follows:

D	Dry, looks and feels dry
M	Moist, No free water on remoulding
W	Wet, free water on remoulding

Moisture content of fine-grained soils is based on judgement of the soils moisture content relative to the plastic and liquid limit as follows:

MC < PL	Moist, dry of plastic limit
MC ≈ PL	Moist, near plastic limit
MC > PL	Moist, wet of plastic limit
MC ≈ LL	Wet, near liquid limit
MC > LL	Wet of liquid limit

Consistency - of cohesive soils in accordance with AS 1726-2017, Table 11 are abbreviated as follows:

Consistency Term	Abbreviation	Indicative Undrained Shear Strength Range (kPa)
Very Soft	**VS**	< 12
Soft	**S**	12 ≤ 25
Firm	**F**	25 ≤ 50
Stiff	**St**	50 ≤ 100
Very Stiff	**VSt**	100 ≤ 200
Hard	**H**	≥ 200
Friable	**Fr**	-

Density Index (%) of granular soils is estimated or is based on SPT results. Abbreviations are as follows:

Description	Abbreviation	Relative Density	SPT N
Very Loose	VL	< 15%	0 - 4
Loose	L	15 - 35%	4 - 10
Medium Dense	MD	35 - 65%	10 - 30
Dense	D	65 - 85%	30 - 50
Very Dense	VD	> 85%	> 50

Structures - Fissuring and other defects are described in accordance with AS 1726-2017 using the terminology for rock defects

Origin - Where practicable an assessment is provided of the probable origin of the soil, e.g., fill, topsoil, alluvium, colluvium, residual soil.

MATERIAL DESCRIPTION - ROCK

Material Description

Descriptions of rock for geotechnics and engineering geology in civil engineering

Identification of rock type, composition and texture based on visual features in accordance with AS 1726-2017.

Rock Naming – Where possible conventional geological names are used within the logs. Engineering properties cannot be inferred directly from the rock names in the table, but the use of a particular name provides an indicative range of characteristics to the reader. Lithological identification of rock is provided to appreciate the geology of an area, to correlate geological profiles seen in boreholes or to distinguish boulders from bedrock.

Grain Size – Grain size is done in accordance with AS1726-2017 as follows:

Coarse grained	Mainly 0.6 to 2 mm
Medium grained	0.2 to 0.6 mm
Fine grained	0.06 to 0.2 mm

Colour – Rock colour is described in the moist condition.

Texture and Fabric - Frequently used terms include:

Sedimentary Rock	Metamorphic Rock	Igneous
Bedded	Cleaved	Massive
Interbedded	Foliated	Flow banded
Laminated	Schistose	Folded
Folded	Banded	Lineated
Massive	Lineated	Porphyritic
Graded	Gneissose	Crystalline
Cross-bedded	Folded	Amorphous

Bedding and Laminated – AS 1726 – 2017 bedding and laminated rock descriptions are provided below with additional detail from BS EN ISO 14689-1 as guidance.

Description	Spacing (mm)
Very Thickly Bedded	> 2000
Thickly Bedded	> 600 ≤ 2000
Medium Bedded	> 200 ≤ 600
Thinly Bedded	> 60 ≤ 200
Very Thinly Bedded	> 20 ≤ 60
Thickly Laminated	> 6 ≤ 20
Thinly Laminated	< 6

Features, inclusions and minor components – Features, inclusions and minor components within the rock material shall be described where those features could be significant such as gas bubbles, mineral veins, carbonaceous material, salts, swelling minerals, mineral inclusions, ironstone or carbonate bands, cross-stratification or minerals the readily oxidise upon atmospheric exposure.

Moisture content – Where possible descriptions are made by the feel and appearance of the rock using one according to following terms:

Dry	Looks and feels dry.
Moist	Feels cool, darkened in colour, but no water is visible on the surface
Wet	Feels cool, darkened in colour, water film or droplets visible on the surface

The moisture content of rock cored with water may not be representative of its in-situ condition.

Durability – Descriptions of the materials durability such as tendency to develop cracks, break into smaller pieces or disintegrate upon exposure to air or in contact with water are provided where observed.

Rock Material Strength – The strength of the rock material is based on uniaxial compressive strength (UCS). The following terms are used:

Rock Strength Class	Abbreviation	UCS (MPa)	Point Load Strength Index, $I_{s\,(50)}$ (MPa)
Very Low	VL	> 0.6 ≤ 2	> 0.03 ≤ 0.1
Low	L	> 2 ≤ 6	> 0.1 ≤ 0.3
Medium	M	> 6 ≤ 20	> 0.3 ≤ 1
High	H	> 20 ≤ 60	> 1 ≤ 3
Very High	VH	> 60 ≤ 200	> 3 ≤ 10
Extremely High	EH	> 200	> 10

Strengths are estimated and where possible supported by Point Load Index Testing of representative samples. Test results are plotted on the graphical logs as follows:

D	Diametral Point Load Test
A	Axial Point Load Test

Where the estimated strength log covers more than one range it indicates the rock strength varies between the limits shown. Point Load Strength Index test results are presented as $I_{s\,(50)}$ values in MPa.

Weathering - Weathering classification assists in identification but does not imply engineering properties. Descriptions are as follows:

Term (Abbreviation)	Description
Fresh (FR)	No signs of mineral decomposition or colour change.
Slightly Weathered (SW)	partly stained or discoloured. Not or little change to strength from fresh rock.
Moderately Weathered (MW)	material is completely discoloured, little or no change of strength from fresh rock.
Highly Weathered (HW)	material is completely discoloured, significant decrease in strength from fresh rock.
Extremely Weathered (EW)	Material has soil properties. Mass structure, material texture and fabric of original rock are still visible.
Residual Soil (RS)	Material has soil properties. Mass structure and material texture and fabric of original rock not visible, but the soil has not been significantly transported.

Alteration – Physical and chemical changes of the rock material due to geological processes by fluids at depth at pressures and temperatures above atmospheric conditions. Unlike weathering, alteration shows no relationship to topography and may occur at any depth. When altered materials are recognized, the following terms are used:

Term		Abbreviation		Definition
Extremely Altered		XA		Material has soil properties. Structure, texture and fabric of original rock are still visible. The rock name is replaced with the name of the parent material, e.g. Extremely Altered basalt. Soil descriptive terms are used.
Highly Altered	Distinctly altered	HA	DA	The whole of the rock material is discoloured. Rock strength is changed by alteration. Some primary minerals are altered to clay minerals. Porosity may be higher or lower due to loss of minerals or precipitation of secondary minerals in pores.
Moderately Altered	Distinctly altered	MA	DA	The whole of the rock material is discoloured Little or no change of strength from fresh rock. The term 'Distinctly Altered' is used where it is not practicable to distinguish between 'Highly Altered' and 'Moderately Altered'. Distinctly Altered is defined as follows: The rock may be highly discoloured; Porosity may be higher due to mineral loss; or may be lower due to precipitation of secondary minerals in pores; and Some change of rock strength.
Slightly Altered		SA		Rock is slightly discoloured Little or no change of strength from fresh rock.

Alteration is only described in the context of the project where it has relevance to the civil and structural design.

Defect Descriptions

General and Detailed Descriptions – Defect descriptions are provided to suit project requirements. Generalized descriptions are used for some projects where it is unnecessary to describe each individual defect in a rock mass, or where multiple similar defects are present which are too numerous to log individually. The part of the rock mass to which this applies is delineated.

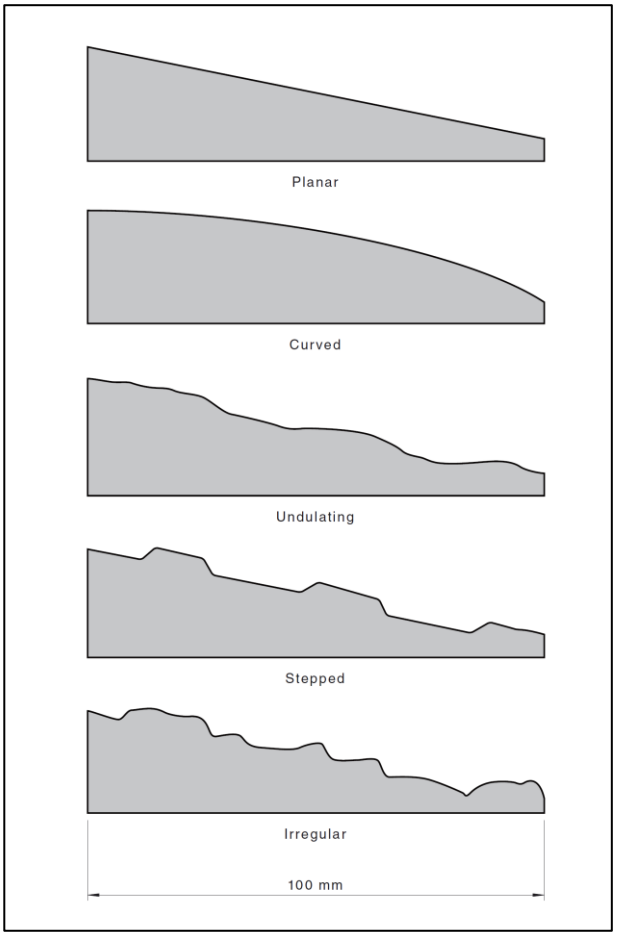
Detailed descriptions are given of defects judged to be particularly significant in the context of the project. For example, crushed seams in an apparently unstable slope. As a minimum, general descriptions outlining the number of defect sets within the rock mass and their broad characteristics are provided where it is possible to do so.

Defect Type – Defect abbreviations are as follows:

BP	Bedding Parting	**FL**	Foliation	**SP**	Shear Plane
CL	Cleavage	**FZ**	Fracture Zone	**SZ**	Shear Zone
CS	Crushed Seam	**HB**	Handling break	**VN**	Vein
DB	Drilling break	**JT**	Joint		
DL	Drill Lift	**SM**	Seam		

Defect Orientation – The dip and dip direction are recorded as a two-digit and three-digit number separated by a slash, e.g., 50/240 only when orientated core are collected and there is not core loss that could obscure core orientation. If alternative measurements are made, such as dip and strike or dip direction relative to magnetic north this shall be documented.

Surface Shape –At the medium scale of observation, description of the roughness of the surface shall be enhanced by description of the shape of the defect surface using the following terms, as illustrated below:



Defect Coatings and Seam Composition – Coatings are described using the following terms:

(a) *Clean* No visible coating.
(b) *Stained* No visible coating but surfaces are discoloured.
(c) *Veneer* A visible coating of soil or mineral, too thin to measure; may be patchy.
(d) *Coating* A visible coating up to 1 mm thick. Soil in-fill greater than 1 mm shall be described using defect terms (e.g. infilled seam). Defects greater than 1 mm aperture containing rock material great described as a vein.

Defect Spacing, Length, Openness and Thickness – described directly in millimetres and metres. In general descriptions, half order of magnitude categories are used, e.g. joint spacing typically 100 mm to 300 mm, sheared zones 1 m to 3 m thick.

Depending on project requirements and the scale of observation, spacing may be described as the mean spacing within a set of defects, or as the spacing between all defects within the rock mass. Where spacing is measured within a specific set of defects, measurements shall be made perpendicular to the defect set.

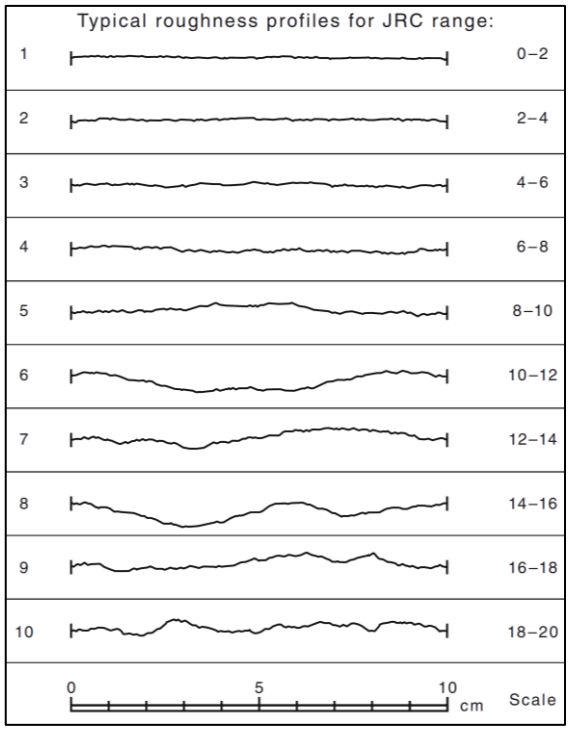
Defect spacing and length (sometimes called persistence), shall be described directly in millimetres and metres.

Stratigraphic Unit - Geological maps related to the project are used for the designation of lithological formation name and, where possible geological unit name, e.g. Bringelly Shale, Potts Hill Sandstone Member.

Defect Roughness and Shape – Defect surface roughness is described as follows:

Very rough	Many large surface irregularities with amplitude generally more than 1 mm.
Rough	Many small surface irregularities with amplitude generally less than 1 mm.
Smooth	Smooth to touch. Few or no surface irregularities.
Polished	Shiny smooth surface
Slickensided	Grooved or striated surface, usually polished.

Where applicable Joint Roughness Range (JRC) is provided as follows:



Joint roughness profiles and corresponding JRC range based on Barton, N and Choubey, V. The Shear Strength of Rock Joints in Theory and Practice. *Rock Mechanics.* Vol. 10 (1977), pp. 1–54.

Where possible the mineralogy of the coating is identified.

Defect Infilling - Abbreviated as follows:

CA	Calcite	**KT**	Chlorite
CN	Clean	**MS**	Secondary Mineral
Cy	Clay	**MU**	Unidentified Mineral
CS	Crushed Seam	**Qz**	Quartz
Fe	Iron Oxide	**X**	Carbonaceous

Parameters Related to Core Drilling

Total Core Recovery – T

Defect Spacing or Fracture Index – T

Rock Quality Designation – Y

Core Loss – Core loss occurs when material is lost during the drilling process It is shown at the bottom of the run unless otherwise indicated where core loss is known.

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC
RL Surface: 36.0m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	No Groundwater Encountered During Augering					-	PAVEMENT: 140mm.				PAVEMENT
						-	FILL(200mm): CLAY: low to medium plasticity, dark grey, with organics, MC<PL, appears poorly compacted.		M	St	
			35.5	0.5		CL-CI	CLAY: low to medium plasticity, red brown, MC < PL.		M	St	RESIDUAL
			35.0	1.0							
			34.5	1.5		CI	CLAY: medium plasticity, pale grey, MC < PL.	SPT 8, 8, 10 N=18	M	VSt	
			34.0	2.0							
						CL	CLAY: low plasticity, pale grey, MC < PL.		M	VSt	
			33.5	2.5		CL	CLAY: low plasticity, pale grey, MC < PL.		M	VSt	
			33.0	3.0		CL	CLAY: low plasticity, pale yellow, MC < PL.	SPT 16, HB	M	H	
			32.5	3.5							
						-	SHALE: extremely weathered, recovered as CLAY, low plasticity, pale yellow.		D	H	EXTREMELY WEATHERED SHALE
			32.0	4.0							
			31.5	4.5							
			31.0	5.0		-	SHALE: extremely weathered, recovered as CLAY, low plasticity, dark grey.		D	H	

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Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D | **Hole Location:** Refer Drawing: 13087-GR-1-B | **Driller:** KN | **Logged:** AC
RL Surface: 36.0m | **Contractor:** BG Drilling | **Bearing:** --- | **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT			30.5	5.5		-	SHALE: extremely weathered, recovered as CLAY, low plasticity, dark grey. *(continued)*		D	H	
			30.0	6.0							
			29.5	6.5							
			29.0	7.0							
			28.5	7.5							
			28.0	8.0							
			27.5	8.5							
			27.0	9.0			Borehole BH01 continued as cored hole				
			26.5	9.5							
			26.0	10.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D | **Hole Location:** Refer Drawing: 13087-GR-1-B | **Driller:** KN | **Logged:** AC
RL Surface: 36.0m | **Contractor:** BG Drilling | **Bearing:** --- | **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
			30.5	5.5								
			30.0	6.0								
			29.5	6.5								
			29.0	7.0								
			28.5	7.5								
			28.0	8.0								
			27.5	8.5		Continued from non-cored borehole						
NMLC				9.0		Core Loss: 700mm.	EW					Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been descriped. 8.50-9.20 - CORE LOSS.
			27.0									
						SHALE (70%) interbedded with SILTSTONE (30%): shale is dark grey, laminated; siltstone is pale grey, massive.	MW		D A 0.07 0.1	54		9.21-9.24 - JT, 80°, Planar, Rough, Coating. 9.34 - JT, 0°, Undulating, Rough, Coating. 9.58 - JT, 0°, Planar, Rough, Coating. 9.76 - JT, 0°, Planar, Rough, Coating. 9.82 - JT, 0°, Planar, Rough, Coating.
			26.5	9.5								
			26.0	10.0								

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

RL Surface: 36.0m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
NMLC	Full Returns		25.5	10.5		SILTSTONE (70%) interbedded with SHALE (30%): siltstone is pale grey; shale is dark grey, laminated at ~0°.	HW-MW		D A 0.25 0.19			10.00 - JT, 45°, Planar, Rough, Coating. 10.09-10.13 - JT, 0°, Planar, Rough, Coating. 10.27 - JT, 0°, Planar, Rough, Coating. 10.66 - JT, 0°, Planar, Rough, Coating. 10.71 - JT, 0°, Planar, Rough, Coating.
			25.0	11.0					D A 0.15 0.15	74		11.10-11.20 - JT, 45°, Planar, Rough, Coating. 11.24-11.34 - Crushed Seam. 11.30-11.43 - Crushed Seams.
			24.5	11.5								11.4-11.46 - JT, 90°, Planar, Rough, Clean.
						SILTSTONE (70%) interbedded with SHALE (30%): siltstone is pale grey; shale is dark grey, laminated at ~0°.	MW					11.57-11.66 - JT, 60°, Planar, Rough, Clean. 11.67-11.74 - JT, 80°, Planar, Rough, Clean.
			24.0	12.0					D A 0.49 0.4			11.89-11.9 - JT, 0°, Undulating, Rough, Clean.
			23.5	12.5								12.50-12.59 - JT, 60°, Planar, Rough, Clean.
												12.77-12.83 - JT, 60°, Planar, Rough, Clean.
			23.0	13.0						70		13.07-13.1 - JT, 50°, Planar, Rough, Clean. 13.20 - JT, 0°, Undulating, Rough, Clean.
			22.5	13.5					D A 0.36 0.45			
			22.0	14.0								14.00-14.05 - JT, 40°, Planar, Rough, Clean. 14.20-14.39 - Crushed Seams.
			21.5	14.5					D A 0.27 0.45	33		
			21.0	15.0								14.86-15.20 - Fractured Zone.

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

RL Surface: 36.0m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral; EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	$Is_{(50)}$ MPa (D- diametral, A- axial)	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
NMLC			20.5	15.5		SILTSTONE (70%) interbedded with SHALE (30%): siltstone is pale grey; shale is dark grey, laminated at ~0°. *(continued)*	MW		D 0.14 A 0.81	<<		15.25-15.28 - JT, 0°, Undulating, Rough, Clean. 15.32-15.33 - JT, 0°, Undulating, Rough, Clean. 15.43-15.45 - JT, 0°, Planar, Rough, Clean. 15.48 - JT, 0°, Planar, Rough, Clean. 15.54 - JT, 0°, Planar, Rough, Clean. 15.54-15.57 - JT, 40°, Planar, Rough, Clean. 15.68-15.76 - JT, 40°, Planar, Rough, Clean. 15.88-15.89 - JT, 0°, Planar, Rough, Clean.
			20.0	16.0						33		16.00-17.00 - Crushed Seams, 1000mm thickness.
						SHALE (50%) interbedded with SILTSTONE (50%): shale dark grey; siltstone is pale grey.	HW					
			19.5	16.5								
			19.0	17.0			MW					17.00- JT, 40°, Planar, Rough, Clean. 17.05 - JT, 0°, Undulating, Rough, Clean. 17.10-17.14 - Crushed Seams. 17.16-17.18 - JT, 40°, Planar, Rough, Clean. 17.18 - JT, 0°, Planar, Rough, Clean. 17.23-17.26 - JT, 0°, Undulating, Rough, Clean. 17.26-17.32 - JT, 80°, Planar, Rough, Clean.
			18.5	17.5					D 0.36 A 0.47	34		17.54-17.57 - JT, 0°, Undulating, Rough, Clean. 17.7-17.8 - JT, 80°, Planar, Rough, Clean. 17.8-17.85 - Crushed Seams. 17.90 - JT, 0°, Planar, Rough, Clean.
			18.0	18.0								18.00-18.31 - Crushed Seam, 300mm thickness.
			17.5	18.5								18.31-18.33 - JT, 80°, Planar, Rough, Coating. 18.41-18.48 - JT, 80°, Planar, Rough, Coating. 18.50 - JT, 30°, Planar, Rough, Coating. 18.51-18.58 - Crushed Seams.
						SHALE (80%) interbedded with SILTSTONE (20%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive.	MW-SW		D 0.62 A 0.78		
			17.0	19.0								18.94-19.04 - Crushed Seams.
										51		19.12 - JT, 0°, Undulating, Rough, Clean. 19.16 - JT, 0°, Undulating, Rough, Clean. 19.2-19.29 - JT , 60°, Planar, Rough, Clean. 19.29-19.34 - JT, 40°, Planar, Rough, Clean.
			16.5	19.5					D 0.69 A 1.23			19.39-19.44 - Crushed Seams. 19.65 - JT, 0°, Undulating, Rough, Clean. 19.77 - JT, 0°, Undulating, Rough, Clean. 19.89 - JT, 0°, Undulating, Rough, Clean. 19.93 - JT, 0°, Planar, Rough, Clean.
			16.0	20.0								

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Cored Borehole Log

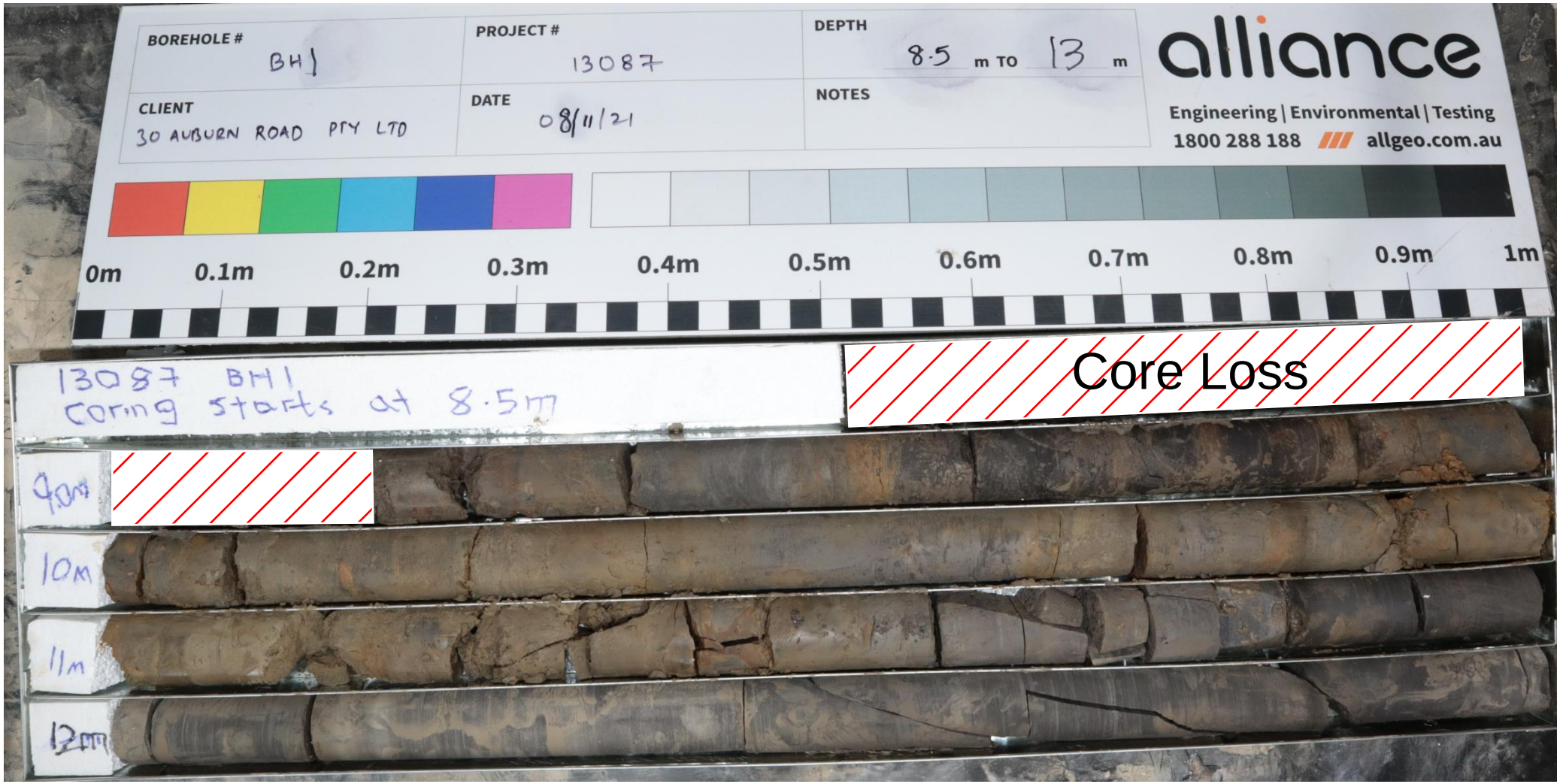
Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

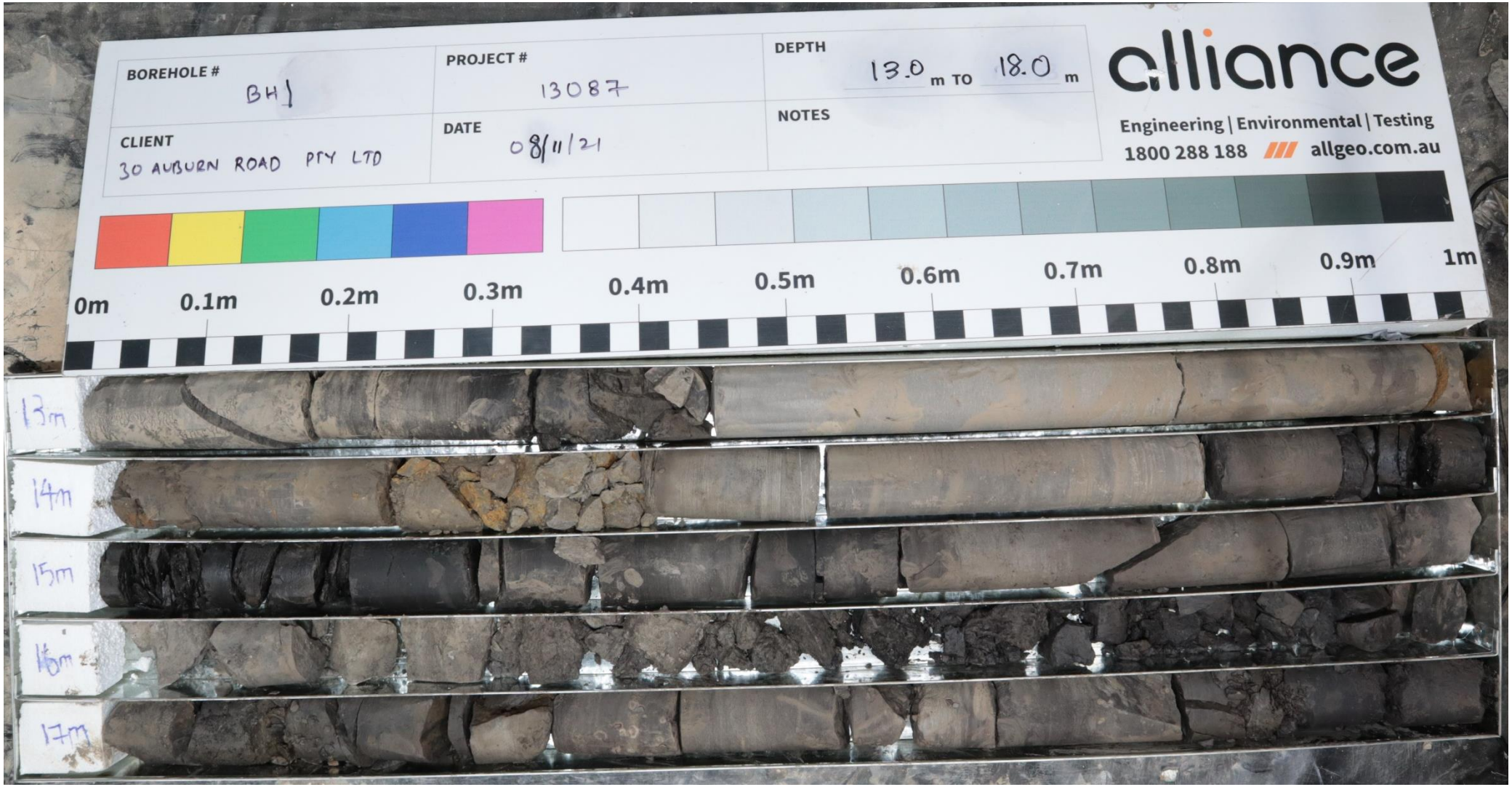
Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

RL Surface: 36.0m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
NMLC			15.5	20.5		SHALE (80%) interbedded with SILTSTONE (20%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive. *(continued)*	MW-SW		D 0.56 A 0.53	51		20.10 - JT, 40°, Planar, Rough, Clean. 20.20 - JT, 0°, Undulating, Rough, Clean. 20.24 - JT, 0°, Undulating, Rough, Clean. 20.28-20.34 - JT, 45°, Planar, Rough, Clean. 20.33-20.35 - Crushed Seams. 20.35-20.43 - JT, 90°, Planar, Rough, Clean.
						BH01 terminated at 20.53m						End of Borehole.
			15.0	21.0								
			14.5	21.5								
			14.0	22.0								
			13.5	22.5								
			13.0	23.0								
			12.5	23.5								
			12.0	24.0								
			11.5	24.5								
			11.0	25.0								



Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1



alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

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BH No: BH02
PAGE 1 OF 6
Job No: 13087

Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 4/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

RL Surface: 35.6m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	No Groundwater Encountered During Augering	35.5	0.0		-	PAVEMENT: 160mm thick.				PAVEMENT
					CH	CLAY: high plasticity, red-brown, MC > PL.		W	St	RESIDUAL
		35.0	0.5				SPT 2, 3, 5 N=8			
		34.5	1.0							
			1.5		CH	CLAY: high plasticity, pale grey, MC < PL.	SPT 3, 8, 10 N=18	M	VSt	
		34.0	2.0		CL-CI	CLAY: low to medium plasticity, red, MC < PL.		M	VSt	
		33.5	2.5							
		33.0	3.0		CL-CI	CLAY: low to medium plasticity, brown, MC < PL.	SPT 12, 17/100mm	M	VSt	
		32.5	3.5		-	SHALE: highly weathered, low to medium strength.		-	-	BEDROCK
		32.0	4.0		-	SHALE: extremely weathered, recovered as SILT, low plasticity, MC < PL, pale grey.		D	H	EXTREMELY WEATHERED SHALE
		31.5	4.5							
		31.0	5.0							

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 4/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC
RL Surface: 35.6m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT		30.5	5.5		-	SHALE: extremely weathered, recovered as SILT, low plasticity, MC < PL, pale grey. *(continued)*		D	H	
		30.0	6.0							
		29.5	6.5							
		29.0	7.0							
		28.5	7.5							
		28.0	8.0							
		27.5	8.5							
		27.0	9.0			Borehole BH02 continued as cored hole				
		26.5	9.5							
		26.0	10.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 4/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

RL Surface: 35.6m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
		30.5	5.5								
		30.0	6.0								
		29.5	6.5								
		29.0	7.0								
		28.5	7.5								
		28.0	8.0								
		27.5	8.5		Continued from non-cored borehole						
NMLC		27.0	9.0		SHALE: dark grey.	EW			<		Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been descriped. 8.50-8.60 - Clay Seam, 100mm thickness. 8.60-9.00 - EW Material (not competent rock)
		26.5	9.5		SHALE (80%) interbedded with SILTSTONE (20%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive.	MW		D 0.38 A 0.13 D 0.57 A 0.42	75		9.30-9.41 - Fractured Zone, JT, 0°, 30-50mm spacing.
		26.0	10.0								

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 4/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

RL Surface: 35.6m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30 100 300 1000 3000)	Additional Data
NMLC	Full Returns	25.5	10.5		SHALE (80%) interbedded with SILTSTONE (20%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive. *(continued)*	MW		D 0.49 A 0.63			10.51 - JT, 0°, Planar, Rough, Clean.
		25.0	11.0						75		10.89 - JT, 0°, Planar, Rough, Clean.
		24.5	11.5								11.35 - JT, 0°, Undulating, Rough, Clean. 11.45 - JT, 0°, Planar, Rough, Clean.
		24.0	12.0					D 0.47 A 0.55			
		23.5	12.5					D 0.66 A 0.34			
		23.0	13.0					D 0.72 A 0.75	61		12.61-12.64 - Crushed Seam. 12.72-12.86 - Sheared Zone, JT, 0°, 30-50mm spacing.
		22.5	13.5		SILTSTONE (70%) interbedded with SHALE (30%): siltstone is pale grey, massive; shale is dark grey, thinly laminated at ~0°.			D 0.07 A 0.22			13.10 - JT, 0°, Planar, Rough, Clean. 13.39 - JT, 0°, Planar, Rough, Clean. 13.50-13.53 - JT, 20°, Planar, Rough, Clean.
		22.0	14.0								
		21.5	14.5			HW					14.08 - JT, 0°, Undulating, Rough, Clean. 14.08-14.23 - Crushed Seams. 14.25-14.27 - JT, 0°, Undulating, Rough, Clean. 14.28 - JT, 0°, Planar, Rough, Clean. 14.32-14.33 - JT, 0°, Undulating, Rough, Clean. 14.32 - JT, 10°, Planar, Rough, Clean. 14.35 - JT, 0°, Undulating, Rough, Clean. 14.38 - JT, 10°, Planar, Rough, Clean. 14.40 - JT, 0°, Planar, Rough, Clean. 14.45 - JT, 0°, Planar, Rough, Clean. 14.50 - JT, 0°, Planar, Rough, Clean. 14.54 - JT, 0°, Planar, Rough, Clean. 14.58 - JT, 0°, Planar, Rough, Clean. 14.73-14.81 - Crushed Seams. 14.87-14.92 - JT, 50°, Planar, Rough, Clean. 14.92 - JT, 20°, Planar, Rough, Clean.
		21.0	15.0			MW			70		

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 4/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC
RL Surface: 35.6m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30 100 300 1000 3000)	Additional Data
NMLC		20.5			SILTSTONE (70%) interbedded with SHALE (30%): siltstone is pale grey, massive; shale is dark grey, thinly laminated at ~0°. *(continued)*	MW		D A 0.57 0.58			15.19 - JT, 0°, Undulating, Rough, Clean.
			15.5								15.45 - JT, 0°, Undulating, Rough, Clean.
		20.0									15.62 - JT, 10°, Planar, Rough, Clean.
											15.75 - JT, 0°, Undulating, Rough, Clean.
			16.0								
		19.5									16.04-16.05 - JT, 40°, Planar, Rough, Clean.
											16.12-16.16 - JT, 80°, Planar, Rough, Clean.
									70		16.20 - JT, 0°, Planar, Rough, Clean.
			16.5								16.38-16.44 - JT, 45°, Planar, Rough, Clean.
		19.0						D A 0.19 0.19			
											16.90 - JT, 0°, Undulating, Rough, Clean.
			17.0								17.00 - JT, 40°, Planar, Rough, Clean.
		18.5									17.12 - Crushed Seam.
								D A 0.25 0.69			
			17.5								17.38-17.55, Fractured Zone, JT, 30-50mm spacing.
		18.0									17.74 - JT, 80°, Planar, Rough, Clean.
			18.0		SHALE (60%) interbedded with SILTSTONE (40%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive.						18.00-18.08 - Crushed Seams.
		17.5									18.16 - JT, 0°, Planar, Rough, Clean.
								D A 0.63 0.77			
			18.5								18.40 - JT, 0°, Undulating, Rough, Clean.
		17.0									18.50 - JT, 0°, Undulating, Rough, Clean.
									66		18.68 - JT, 0°, Planar, Rough, Clean.
											18.84-18.86 - Crushed Seams.
			19.0								19.04 - JT, 0°, Undulating, Rough, Clean.
		16.5									19.12-19.2 - Crushed Seams.
											19.24 - JT, 0°, Undulating, Rough, Clean.
			19.5								19.42 - JT, 30°, Planar, Rough, Clean.
		16.0						D A 0.56 0.75			
			20.0								19.90-19.94 - JT, 90°, Planar, Rough, Clean. 19.95-20.06 - Crushed Seams.

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

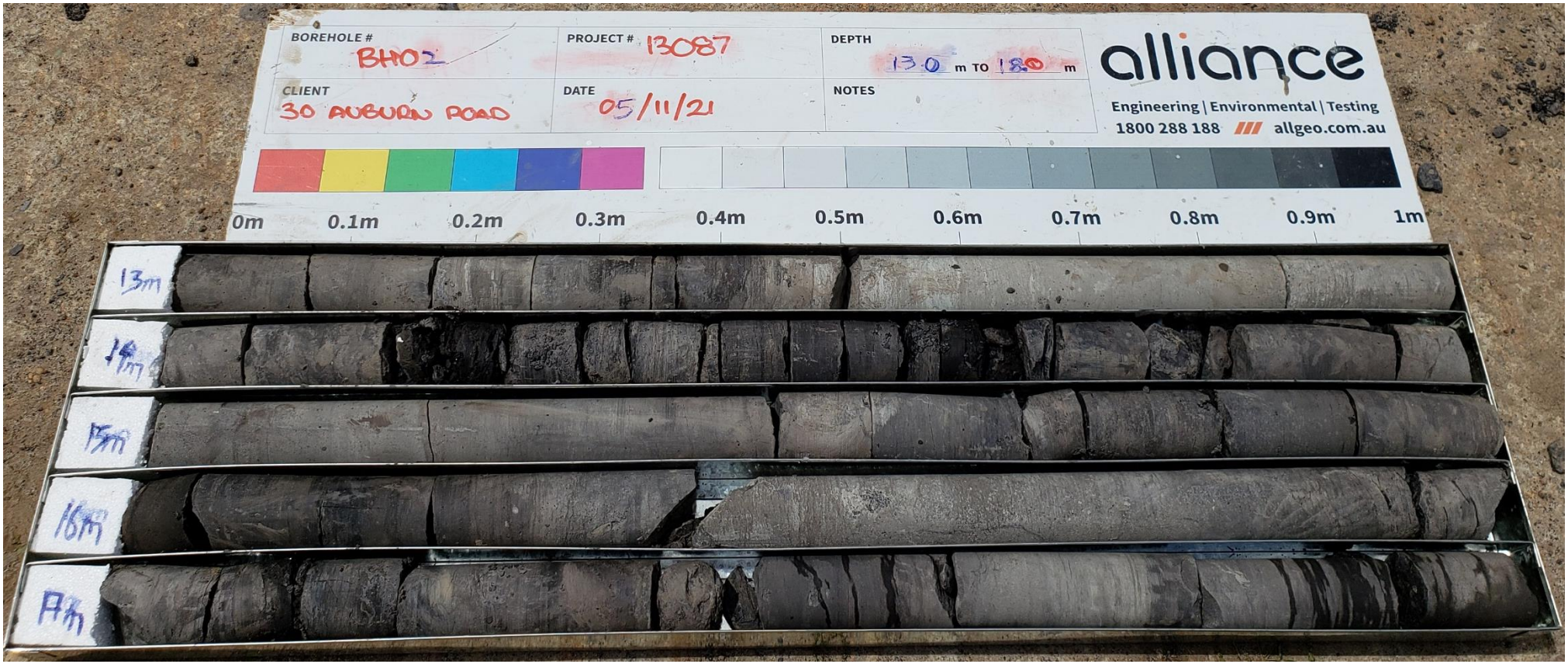
Started: 4/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

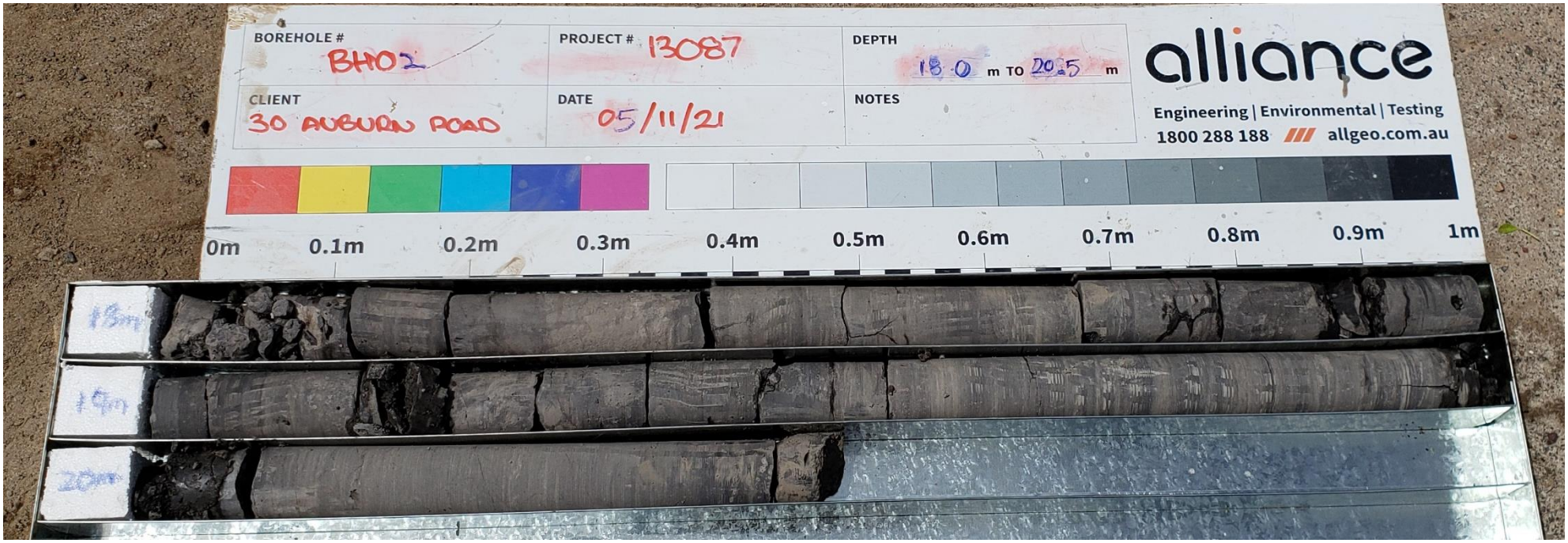
RL Surface: 35.6m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
NMLC		15.5	20.5		SHALE (60%) interbedded with SILTSTONE (40%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive. *(continued)*	MW		D 0.88 A 0.79	66		20.10 - JT, 0°, Undulating, Rough, Clean. 20.45 - JT, 0°, Undulating, Rough, Clean.
		15.0	21.0		BH02 terminated at 20.5m						End of Borehole.
		14.5	21.5								
		14.0	22.0								
		13.5	22.5								
		13.0	23.0								
		12.5	23.5								
		12.0	24.0								
		11.5	24.5								
		11.0	25.0								

alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1



alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1



Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

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BH No: BH03
PAGE 1 OF 6
Job No: 13087

Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

RL Surface: 33.8m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	No Groundwater Encountered During Augering	33.5	0.0		-	PAVEMENT: 120mm thick.		-	-	PAVEMENT
			0.5		CI	CLAY: medium plasticity, pale grey, MC < PL, 200mm.		M	St	RESIDUAL
		33.0	1.0		CL	CLAY: low plasticity, red brown, MC < PL.	SPT 5, 11, 18 N=29	M	VSt	
		32.5	1.5		CL	CLAY: low plasticity, pale yellow, MC < PL.		M	VSt	
		32.0	2.0		-	SHALE: extremely weathered, recovered as CLAY, low plasticity, pale yellow, MC < PL.		D	H	EXTREMELY WEATHERED SHALE
		31.5	2.5							
		31.0	3.0		-	SHALE: extremely weathered, recovered as Gravelly CLAY, low plasticity, grey, MC < PL.		D	H	
		30.5	3.5							
		30.0	4.0							
		29.5	4.5							
		29.0	5.0							

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC
RL Surface: 33.8m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT		28.5	5.5		-	SHALE: extremely weathered, recovered as Gravelly CLAY, low plasticity, grey, MC < PL. *(continued)*		D	H	
		28.0	6.0							
		27.5	6.5							
		27.0	7.0							
		26.5	7.5							
		26.0	8.0							
		25.5	8.5							
		25.0	9.0			Borehole BH03 continued as cored hole				
		24.5	9.5							
		24.0	10.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

RL Surface: 33.8m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
		28.5	5.5								
		28.0	6.0								
		27.5	6.5								
		27.0	7.0								
		26.5	7.5								
		26.0	8.0								
		25.5	8.5		Continued from non-cored borehole						
NMLC		25.0	9.0		SHALE: brown-grey.	EW		D 0.06 A 0.06			Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been descriped. 8.50-8.55 - Clay Seams, 50mm thickness. 8.55-9.20 - EW Material (not competent rock).
		24.5	9.5		SHALE (70%) interbedded with SILTSTONE (30%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive.	MW		D 0.4 A 0.39	70		9.2-9.22 - JT, 0°, Undulating, Rough, Coating.
		24.0	10.0								

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

RL Surface: 33.8m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30 100 300 1000 3000)	Additional Data
NMLC	Full Returns	23.5	10.5		SHALE (70%) interbedded with SILTSTONE (30%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive. *(continued)*	MW		D 0.18 A 0.18			10.06-10.07 - JT, 0°, Undulating, Rough, Coating. 10.25 - JT, 0°, Undulating, Rough, Coating. 10.45-10.46 - Crushed Seams. 10.50 - JT, 0°, Planar, Rough, Clean. 10.62-10.64 - JT, 10°, Planar, Rough, Coating.
		23.0	11.0						70		10.9-10.91 - JT, 0°, Undulating, Rough, Coating.
		22.5	11.5					D 1.15 A 1.5			11.58 - JT, 0°, Undulating, Rough, Coating.
		22.0	12.0								11.78-11.8 - JT, 0°, Undulating, Rough, Clean. 11.84-12.05 - Crushed Seams.
		21.5	12.5								12.27-12.31 - JT, 70°, Planar, Rough, Clean. 12.35-12.46 - Crushed Seams.
		21.0	13.0					D 0.06 A 0.15			12.58 - JT, 5°, Planar, Rough, Clean. 12.81 - JT, 0°, Planar, Rough, Clean. 12.90-12.920 - JT, Undulating, Rough, Clean.
		20.5	13.5		SHALE (60%) interbedded with SILTSTONE (40%): shale is dark grey; siltstone is pale grey, massive.			D 0.22 A 0.17	~72		13.19-13.21 - EW Seam. 13.43 - JT, 0°, Undulating, Rough, Clean. 13.47 - JT, 0°, Undulating, Rough, Clean. 13.54 - JT, 0°, Planar, Rough, Clean. 13.56 - JT, 0°, Planar, Rough, Stained. 13.65 - JT, 30°, Undulating, Rough, Stained.
		20.0	14.0								
		19.5	14.5					D 0.2 A 0.32			14.50 - JT, 0°, Undulating, Rough, Stained. 14.63 - JT, 0°, Undulating, Rough, Stained. 14.73 - JT, 0°, Undulating, Rough, Stained.
		19.0	15.0			HW			81		14.83-15.06 - Crushed Seams.

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

RL Surface: 33.8m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30 100 300 1000 3000)	Additional Data
NMLC		18.5	15.5		SHALE (60%) interbedded with SILTSTONE (40%): shale is dark grey; siltstone is pale grey, massive. *(continued)*	HW					15.08 - JT, 0°, Planar, Rough, Coating. 15.10 - JT, 0°, Planar, Rough, Coating. 15.16-15.18 - Crushed Seam.
						MW					
		18.0	16.0					D A 0.08 0.79			15.41 - JT, 0°, Planar, Rough, Coating. 15.66 - JT, 0°, Undulating, Rough, Clean. 15.86-15.88 - JT, 0°, Undulating, Rough, Clean. 16.04-16.1 - JT, 0°, Planar, Rough, Clean.
		17.5	16.5						80		16.38 - JT, 0°, Undulating, Rough, Clean. 16.42-16.44 - Clay Seams. 16.50-16.66 - JT, 70°, Planar, Rough, Clean.
		17.0	17.0					D A 0.11 0.52			16.66 - JT, 0°, Undulating, Rough, Clean. 16.75 - JT, 0°, Undulating, Rough, Clean.
		16.5	17.5					D A 0.41 0.56			17.3-17.33 - Crushed Seams.
		16.0	18.0		SHALE: dark grey, finely laminated at ~0°.	SW		D A 1.2 1.7			17.50-17.52 - Crushed Seam. 17.58-17.60 - Crushed Seam. 17.67 - JT, 0°, Undulating, Rough, Coating. 17.70 - JT, 0°, Undulating, Rough, Coating. 17.82 - JT, 0°, Planar, Rough, Coating. 17.89 - JT, 0°, Undulating, Rough, Coating. 17.92 - JT, 0°, Undulating, Rough, Coating.
		15.5	18.5								18.20 - JT, 0°, Planar, Rough, Coating. 18.30 - JT, 10°, Planar, Rough, Coating.
		15.0	19.0						68		18.43 - JT, 0°, Planar, Rough, Coating. 18.53 - JT, 0°, Undulating, Rough, Coating. 18.59 - JT, 0°, Undulating, Rough, Coating. 18.68-18.80 - JT, 85°, Planar, Coating.
		14.5	19.5								19.37 - JT, 10°, Planar, Rough, Clean. 19.45 - JT, 0°, Undulating, Rough, Clean. 19.50 - JT, 0°, Undulating, Rough, Clean. 19.58 - JT, 0°, Undulating, Rough, Clean.
		14.0	20.0					D A 0.99 1.14			19.77 - JT, 0°, Undulating, Rough, Clean.

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

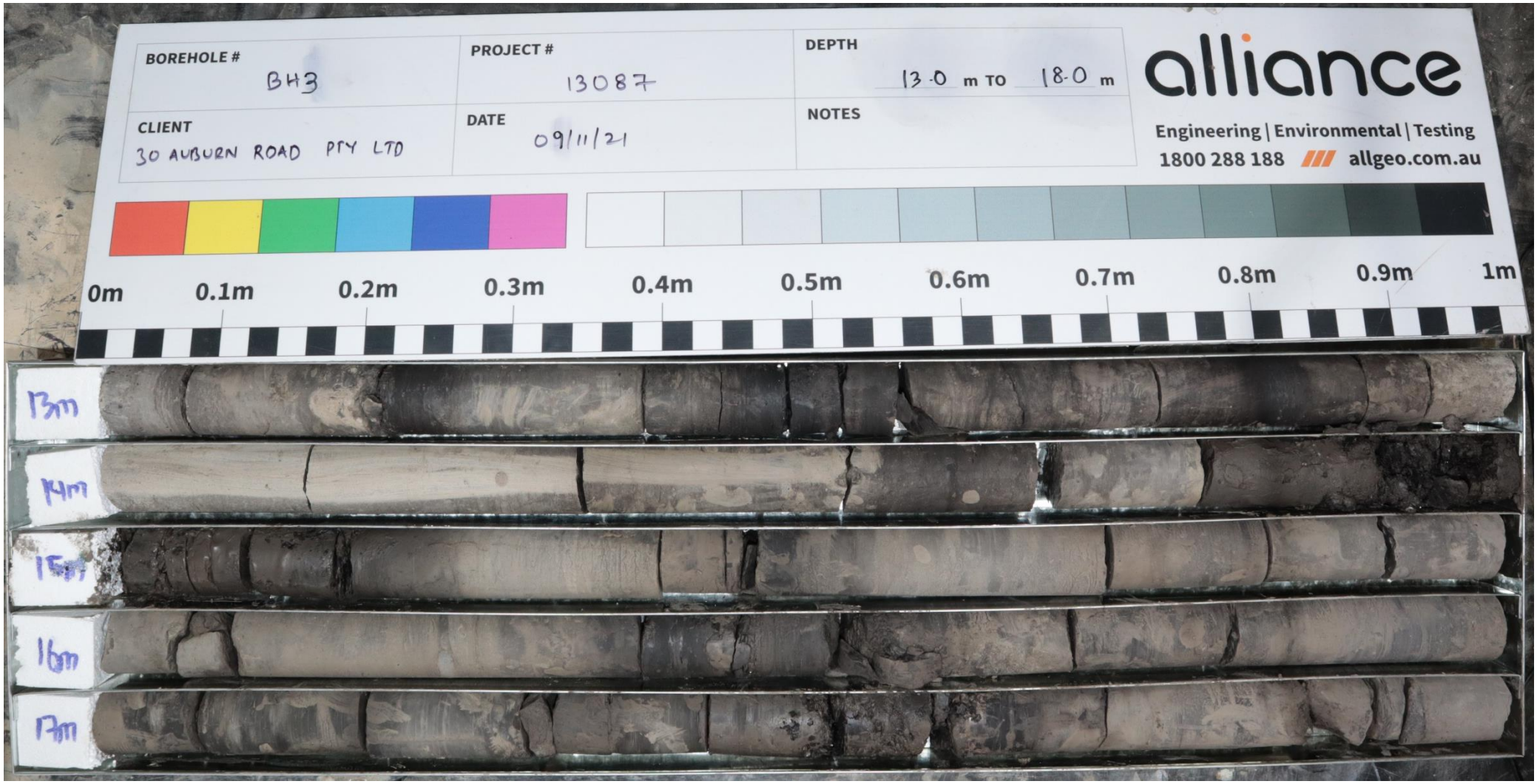
Started: 8/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: AC

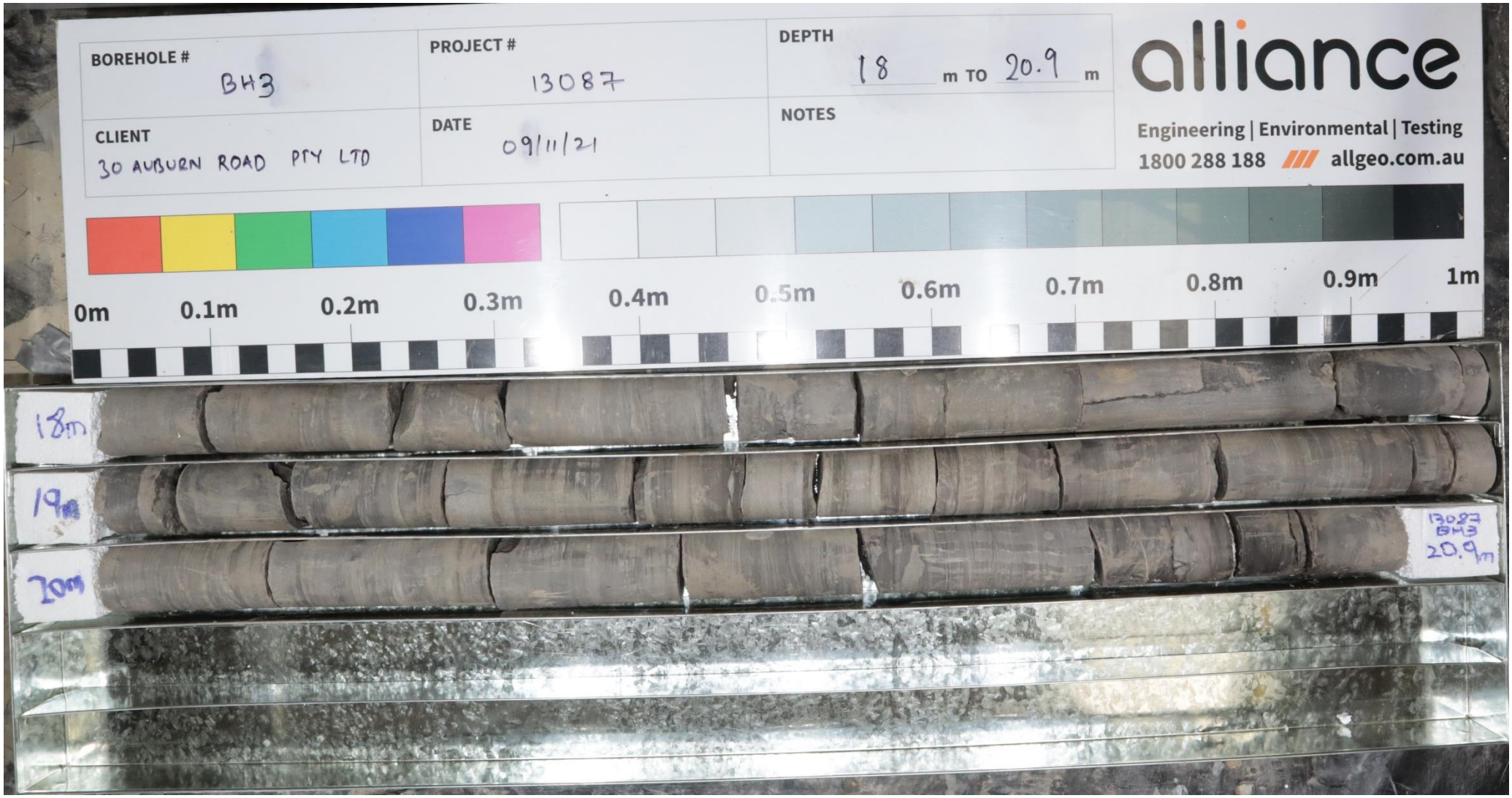
RL Surface: 33.8m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
NMLC		13.5	20.5		SHALE: dark grey, finely laminated at ~0°. *(continued)*	SW		D 0.98 A 0.93	68		20.51-20.53 - JT, 20°, Planar, Rough, Clean. 20.68 - JT, 30°, Planar, Rough, Clean. 20.83 - JT, 0°, Undulating, Rough, Clean.
		13.0									
		12.5	21.0		BH03 terminated at 20.9m						End of Borehole.
		12.0	21.5								
		11.5	22.0								
		11.0	22.5								
		10.5	23.0								
		10.0	23.5								
		9.5	24.0								
		9.0	24.5								
			25.0								

alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1



alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1



Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

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BH No: BH04
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Job No: 13087

Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 1/11/2021
Finished: 1/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** AC
RL Surface: 32.2m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT		32.0	0.0		-	CONCRETE SLAB: 150mm thickness.		D	-	PAVEMENT
					-	FILL: SAND: fine to medium grained, brown, poorly graded, appears moderately compacted.		H	-	FILL
			0.5							
	▼ Ground Water Inflow At 0.7m	31.5			CI - CH	CLAY: medium to high plasticity, pale grey mottled orange, trace silt, trace organics, MC = PL.	SPT 3, 1, 2 N=3	M	St	RESIDUAL
			1.0			1.0m, with shale layers.	SPT 8/90mm			
		31.0								
			1.5							
		30.5			-	SHALE/SILTSTONE: extremely weathered, recovered as Gravelly CLAY, low plasticity, grey, MC < PL.		M	H	EXTREMELY WEATHERED SHALE
			2.0							
		30.0								
			2.5							
		29.5								
			3.0							
		29.0								
			3.5							
		28.5								
			4.0							
		28.0								
			4.5							
		27.5								
			5.0							

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 1/11/2021
Finished: 1/11/2021
Borehole Size 110 mm

Rig Type: CE180 | **Hole Location:** Refer Drawing: 13087-GR-1-B | **Driller:** KN | **Logged:** AC
RL Surface: 32.2m | **Contractor:** BG Drilling | **Bearing:** --- | **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT		27.0	5.5		-	SHALE: dark grey, highly weathered, very low strength.		-	-	BEDROCK
		26.5	6.0							
		26.0	6.5							
		25.5	7.0							
		25.0			-	SHALE: dark grey, highly to moderately weathered, very low to low strength.		-	-	
			7.5			Borehole BH04 continued as cored hole				
		24.5	8.0							
		24.0	8.5							
		23.5	9.0							
		23.0	9.5							
		22.5	10.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 1/11/2021
Finished: 1/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** AC
RL Surface: 32.2m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
		27.0	5.5								
		26.5	6.0								
		26.0	6.5								
		25.5	7.0								
		25.0			Continued from non-cored borehole						
NMLC			7.5		SHALE: dark grey-grey, with pale grey laminations at ~0°.	HW/MW		D A 0.14 0.42			Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been described. 7.25-7.31, EW Seam. 7.33 - JT, 0°, Undulating, Rough, Clean. 7.57 - JT, 0°, Planar, Rough, Clean. 7.60 - JT, 0-5°, Planar, Rough, Clean. 7.71 - JT, 0°, Undulating, Rough, Clean.
		24.5				MW					
			8.0					D A 0.44 0.62	10		
		24.0									
			8.5								8.54 - JT, 10°, Planar, Rough, Clean. 8.63 - JT, 0°, Undulating, Rough, Clean. 8.68-8.70 - EW Seam. 8.75 - JT, 0°, Curved, Rough, Clean.
		23.5									
			9.0					D A 0.36 0.87			8.91 - JT, 25°, Undulating, Rough, Clean.
		23.0						D A 0.55 0.49			9.10 - JT, 0-5°, Undulating, Rough, Clean. 9.20 - JT, 0°, Undulating, Rough, Clean. 9.24 - JT, 0°, Undulating, Rough, Clean. 9.27 - JT, 0°, Undulating, Rough, Clean. 9.32 - JT, 0°, Undulating, Rough, Clean.
			9.5		SHALE (60%) interbedded with SILTSTONE (40%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive.				75		9.50 - JT, 10-15°, Planar, Rough, Clean.
		22.5									
			10.0					D A 0.44 0.64			9.80 - JT, 0°, Planar, Smooth, Clean.

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 1/11/2021
Finished: 1/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** AC
RL Surface: 32.2m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Material Description	Weathering	Is(50) MPa D- diametral A- axial	RQD %	Additional Data
NMLC	Full Return	22.0	10.5	SHALE (60%) interbedded with SILTSTONE (40%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive. *(continued)*	MW	D 0.34 A 0.32		10.04 - JT, 5°, Undulating, Rough, Clean. 10.05 - JT, 0-5°, Undulating, Rough, Clean. 10.08 - JT, 5-10°, Planar, Rough, Clean. 10.10 - JT, 10°, Planar, Rough, Clean. 10.13 - JT, 0°, Planar, Rough, Clean. 10.18 - JT, 5°, Planar, Rough, Clean. 10.24-10.32 - JT, 0°, Planar, Rough, Clean. 10.34 - JT, 30°, Undulating, Rough, Clean. 10.39 - JT, 0°, Planar, Rough, Clean. 10.51 - JT, 5-10°, Curved, Rough, Clean.
		21.5						10.62 - EW SM. 10.64-10.66 - EW SM.
			11.0			D 0.2 A 0.33	75	10.85 - JT, 5-10°, Curved, Rough, Clean.
		21.0				D 0.69 A 0.69		11.20 - JT, 0°, Undulating, Rough, Clean.
			11.5					11.50 - JT, 10°, Curved, Rough, Clean.
		20.5						11.69 - JT, 10°, Curved, Rough, Clean.
						D 0.14 A 0.15		
			12.0	CORE LOSS, 80mm.	EW			11.89 - EW Seam. 11.92-12 - CORE LOSS, 80mm.
				SHALE: dark grey.	SW			
		20.0				D 0.07 A 0.45		12.13 - JT, 0-5°, Curved, Rough, Clean. 12.24 - JT, 0-5°, Curved, Rough, Clean. 12.29 - JT, 0-5°, Curved, Rough, Clean. 12.33 - JT, 0-5°, Curved, Rough, Clean.
			12.5					
		19.5						
			13.0			D 0.31 A 0.48		12.88 - JT, 0°, Undulating, Rough, Clean.
		19.0				D 0.6 A 0.75		
			13.5				86	13.35 - JT, 0°, Undulating, Rough, Clean. 13.37 - JT, 0°, Planar, Rough, Clean. 13.53 - JT, 10°, Curved, Rough, Clean.
		18.5						13.66 - JT, 0°, Planar, Rough, Clean.
						D 0.46 A 0.57		
			14.0					13.85 - JT, 0-5°, Planar, Rough, Clean.
		18.0						14.13 - JT, 0-5°, Undulating, Rough, Clean. 14.21 - JT, 5°, Undulating, Rough, Clean. 14.27 - JT, 5°, Undulating, Rough, Clean. 14.32-14.34 - EW Seam.
			14.5			D 0.46 A 0.8		
		17.5						14.83 - JT, 0-5°, Undulating, Rough, Clean.
			15.0			D 0.44 A 0.66		

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 1/11/2021
Finished: 1/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** AC
RL Surface: 32.2m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength ● - Axial ○ - Diametral EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diam-etral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
				× ×	BH04 terminated at 15.05m						End of Borehole.
		17.0	15.5								
		16.5	16.0								
		16.0	16.5								
		15.5	17.0								
		15.0	17.5								
		14.5	18.0								
		14.0	18.5								
		13.5	19.0								
		13.0	19.5								
		12.5	20.0								

alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

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BH No: BH05
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Job No: 13087

Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 9/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: KT
RL Surface: 31.3m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	No Groundwater Encountered During Augering		31.0	0.5		-	FILL: Sandy CLAY: medium plasticity, grey-brown and orange, with fine to medium gravel, appears moderately compacted MC = PL.		M	-	FILL
			30.5	1.0		CI-CH	CLAY: medium to high plasticity, grey mottled red and orange, with silt, trace ironstone gravel, trace fine rounded gravel, MC = PL.	SPT 2, 2, 4 N=6	M	F-St	RESIDUAL
			30.0	1.5		CH	CLAY: high plasticity, grey and red, trace silt, trace rootlets, MC = PL.	SPT 3, 4, 8 N=12	M	St	
			29.5	2.0							
			29.0	2.5		CI	Silty CLAY: medium plasticity, dark grey and orange, MC < PL.		M	VSt-H	
			28.5	3.0				SPT 8, 18, 20 N=38			
			28.0	3.5							
			27.5	4.0			3.8m, pale grey and orange.				
			27.0	4.5				SPT 2, 5, 13 N=18			
			26.5	5.0							

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 9/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D | **Hole Location:** Refer Drawing: 13087-GR-1-B | **Driller:** KN | **Logged:** KT
RL Surface: 31.3m | **Contractor:** BG Drilling | **Bearing:** --- | **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT			26.0	5.5		CI	Silty CLAY: medium plasticity, dark grey and orange, MC < PL. *(continued)* 5.0m, trace shale layers.		M	VSt - H	
			25.5	6.0		-	SHALE: extremely weathered, recovered as Gravelly CLAY, low plasticity, grey, MC < PL.	SPT 3, 8/30mm	D	H	EXTREMELY WEATHERED SHALE
			25.0	6.5							
			24.5	7.0							
			24.0	7.5							
			23.5	8.0		-	SHALE: grey, highly weathered, very low strength.		-	-	BEDROCK
			23.0	8.5							
			22.5	9.0							
			22.0	9.5			Borehole BH05 continued as cored hole				
			21.5	10.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 9/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: KT
RL Surface: 31.3m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
			26.0	5.5								
			25.5	6.0								
			25.0	6.5								
			24.5	7.0								
			24.0	7.5								
			23.5	8.0								
			23.0	8.5								
			22.5	9.0								
			22.0			Continued from non-cored borehole						
NMLC			21.5	9.5	××××	SILTSTONE: pale grey and brown, with dark grey shale laminations at ~0°.	HW					Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been descriped.
				10.0	××××		HW-MW		D 0.19 A 0.28	73		9.44-9.46 - EW SM. 9.62 - JT, 0-5°, Undulating, Rough, Clean. 9.89 - JT, 0°, Undulating, Rough, Clean. 9.92 - JT, 0°, Curved, Rough, Clean.

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 9/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D | **Hole Location:** Refer Drawing: 13087-GR-1-B | **Driller:** KN | **Logged:** KT
RL Surface: 31.3m | **Contractor:** BG Drilling | **Bearing:** --- | **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30 100 300 1000 3000)	Additional Data
NMLC	Full Returns		21.0	10.5		SILTSTONE: pale grey and brown, with dark grey shale laminations at ~0°. *(continued)*	HW-MW					9.97 - JT, 5°, Undulating, Rough, Clean. 10.04 - JT, 0°, Planar, Rough, Clean. 10.16 - JT, 10°, Undulating, Rough, Clean. 10.27 - JT, 0°, Undulating, Rough, Clean. 10.32 - JT, 0°, Planar, Rough, Clean. 10.41 - JT, 0°, Undulating, Rough, Clean. 10.49 - JT, 0°, Planar, Rough, Clean.
			20.5			SHALE: grey and dark grey, thinly laminated at ~0°.	MW		D A 0.09 0.77			10.71-10.75 - Sheared Zone. 10.86 - JT, 0°, Planar, Rough, Clean.
				11.0								11.0-11.05 - EW SM. 11.08 - EW SM.
			20.0				HW					11.26 - EW SM.
				11.5			MW					11.49 - JT, 0°, Undulating, Rough, Clean.
			19.5						D A 0.2 0.68			11.73 - JT, 0°, Curved, Rough, Clean. 11.78 - JT, 0°, Planar, Rough, Clean.
				12.0					D A 0.69 0.59			12.10 - JT, 0-5°, Undulating, Rough, Clean.
			19.0							73		12.30 - JT, 0°, Undulating, Rough, Clean. 12.41 - EW SM.
				12.5								12.65-12.69 - Sheared Zone.
			18.5									12.82-12.95 - Sheared Zone.
				13.0								13.02 - JT, 0°, Planar, Rough, Clean.
			18.0									13.19 - JT, 0°, Undulating, Rough, Clean. 13.30 - JT, 0-5°, Planar, Rough, Clean. 13.32 - JT, 0-5°, Planar, Rough, Clean.
				13.5						77		13.44 - JT, 0-5°, Planar, Rough, Clean.
			17.5									13.62 - JT, 0-5°, Planar, Rough, Clean. 13.72 - JT, 0-10°, Undulating, Rough, Clean. 13.76 - JT, 0-5°, Planar, Rough, Clean. 13.78 - JT, 5-10°, Planar, Rough, Clean.
				14.0					D A 0.57 1.23			
						SHALE (80%) interbedded with SILTSTONE (20%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive.						14.03-14.06 - EW SM. 14.09 - JT, 0°, Undulating, Rough, Clean.
			17.0									14.22 - Sheared Zone.
				14.5					D A 0.48 1.39			14.43 - JT, 0-5°, Stepped, Rough, Clean.
			16.5							56		14.68 - JT, 0°, Undulating, Rough, Clean. 14.7-14.9 - JT, 90°, Planar, Rough, Coating.
				15.0								

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 9/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: KT

RL Surface: 31.3m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30 100 300 1000 3000)	Additional Data
NMLC			16.0	15.5		SHALE (80%) interbedded with SILTSTONE (20%): shale is dark grey, thinly laminated at ~0°; siltstone is pale grey, massive. *(continued)*	MW		D 0.43 A 0.56			15.05-15.1 - JT, 80°, Planar, Rough, Coating. 15.10 - JT, 0°, Undulating, Rough, Coating. 15.20-15.30 - JT, 80°, Planar, Rough, Coating. 15.52 - JT, 0°, Planar, Rough, Clean.
			15.5	16.0								15.70 - JT, 0°, Planar, Rough, Clean. 16.00 - JT, 0°, Undulating, Rough, Clean.
			15.0						D 0.59 A 1.39			16.25 - JT, 0°, Undulating, Rough, Clean.
				16.5			HW			56		16.35 - JT, 5°, Planar, Rough, Clean. 16.4-16.5 - JT, 50°, Planar, Rough, Clean. 16.5-16.7 - Crushed Seams.
			14.5				MW					
				17.0					D 0.16 A 0.49			17.15 - JT, 80°, Planar, Rough, Clean.
			14.0	17.5								17.5-17.58 - Crushed Seams. 17.68-17.78 - Crushed Seams.
			13.5	18.0								
			13.0						D 0.55 A 1.2			18.30 - JT, 20°, Planar, Rough, Clean. 18.35 - JT, 40°, Planar, Rough, Coating.
				18.5								18.55-18.65 - JT, 0°, Planar, Rough, Coating.
			12.5									18.70 - JT, 10°, Planar, Rough, Clean. 18.72 - JT, 20°, Planar, Rough, Clean. 18.78 - JT, 20°, Planar, Rough, Clean.
				19.0						<45		18.92 - Clay Seams.
			12.0						D 0.51 A 0.6			
				19.5								19.65 - Clay Seams. 19.72 - JT, 0°, Planar, Rough, Coating. 19.78 - JT, 0°, Planar, Rough, Coating.
			11.5									
				20.0			HW					19.92-20.1 - Clay Seams.

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Cored Borehole Log

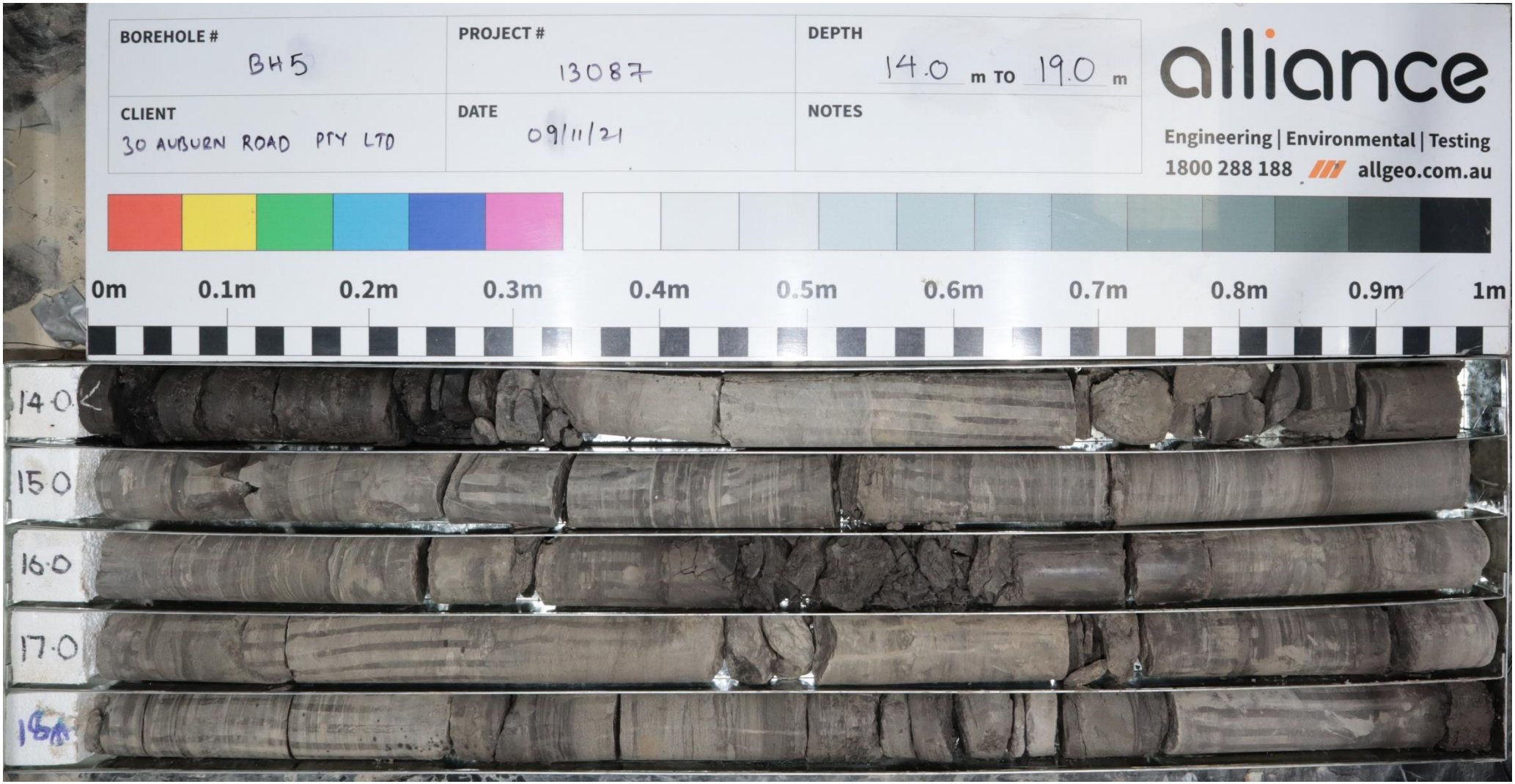
Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 9/11/2021
Finished: 9/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: KT
RL Surface: 31.3m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength ● - Axial ○ - Diametral EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diam-etral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
							HW			45		
			11.0	20.5		BH05 terminated at 20.1m						End of Borehole.
			10.5	21.0								
			10.0	21.5								
			9.5	22.0								
			9.0	22.5								
			8.5	23.0								
			8.0	23.5								
			7.5	24.0								
			7.0	24.5								
			6.5	25.0								

alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1



Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

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BH No: BH06
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Job No: 13087

Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 2/11/2021
Finished: 2/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 33.0m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT					-	ASPHALT: 100mm thickness				PAVEMENT
					-	FILL: Sandy GRAVEL: red-brown.				
		32.5	0.5		CI-CH	CLAY: medium to high plasticity, grey and mottled red orange, trace organics, with silt, MC = PL.	SPT 2, 3, 4 N=7	M	F - St	RESIDUAL
		32.0	1.0				ACM		St - VSt	
		31.5	1.5		CI-CH	Silty CLAY: medium to high plasticity, grey and red-orange, with shale layers, MC < PL.	SPT 8, 13, 24 N=37	M	VSt - H	
		31.0	2.0							
		30.5	2.5			2.5m, trace fine grained sand.		M	VSt - H	
		30.0	3.0				SPT 9, 14, 20 N=34			
		29.5	3.5							
		29.0	4.0							
		28.5	4.5			SHALE: extremely weathered, recovered as Gravelly CLAY, low plasticity, grey and brown, MC < PL.	SPT 10, 18/120mm	D	H	EXTREMELY WEATHERED SHALE
		28.0	5.0							

No Groundwater Encountered During Augering

2. NON CORED BOREHOLE (NO COORD/RL) 13087.GPJ GINT STD AUSTRALIA.GDT 22/11/21

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 2/11/2021
Finished: 2/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 33.0m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT		27.5	5.5			SHALE: extremely weathered, recovered as Gravelly CLAY, low plasticity, grey and brown, MC < PL. *(continued)*		D	H	
		27.0	6.0			SHALE: dark grey, highly weathered, very low strength, with clay bands.		-	-	BEDROCK
		26.5	6.5							
		26.0	7.0							
		25.5	7.5				SPT 25/140mm			
		25.0	8.0							
		24.5	8.5							
		24.0	9.0			SHALE: dark grey, highly to moderately weathered, low strength.		-	-	
		23.5	9.5				SPT 6/20mm			
		23.0	10.0							

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 2/11/2021
Finished: 2/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 33.0m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT						SHALE: dark grey, highly to moderately weathered, low strength. *(continued)*		-	-	
		22.5	10.5			Borehole BH06 continued as cored hole				
		22.0	11.0							
		21.5	11.5							
		21.0	12.0							
		20.5	12.5							
		20.0	13.0							
		19.5	13.5							
		19.0	14.0							
		18.5	14.5							
		18.0	15.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 2/11/2021
Finished: 2/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 33.0m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral; EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	$Is_{(50)}$ MPa (D- diametral, A- axial)	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
					Continued from non-cored borehole						
NMLC	Full Returns	22.5	10.5		SHALE: grey and dark grey.	HW					Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been described.
						MW		D 0.42 A 0.46			10.39-10.43 - Clay Seam. 10.47 - JT, 0°, Planar, Rough, Clean. 10.52 - JT, 0-5°, Curved, Rough, Clean.
		22.0	11.0								10.78 - JT, 0-5°, Undulating, Rough, Clean. 10.92 - JT, 5-10°, Undulating, Rough, Clean. 11.04 - JT, 0°, Planar, Rough, Clean.
		21.5	11.5					D 0.32 A 0.17	55		11.41 - JT, 0-5°, Planar, Rough, Clean. 11.69 - JT, 30°, Undulating, Rough, Clean.
		21.0	12.0					D 0.35 A 0.18			12.04-12.08 - EW Seam.
		20.5	12.5					D 0.1 A 0.3			12.18 - JT, 0-5°, Curved, Rough, Clean. 12.26-12.27 - EW SM. 12.32-12.40, JT, 50°, Planar, Rough, Clean. 12.34-12.35 - EW SM. 12.46-12.92 - Sheared Zone (JT, ~45°, 10-20mm spacing).
		20.0	13.0								
		19.5	13.5		BH06 terminated at 13m						End of Borehole.
		19.0	14.0								
		18.5	14.5								
		18.0	15.0								

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	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

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BH No: BH07
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Job No: 13087

Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 2/11/2021
Finished: 2/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 32.0m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT						-	CONCRETE SLAB: 200mm thickness.		D	-	PAVEMENT
						-	FILL: Sandy GRAVEL: fine to medium gravel, grey and brown, with fine to medium grained sand, appears well compacted.		D	-	
			31.5	0.5		SC	Clayey SAND: medium grained, pale grey and orange.	SPT 6, 11, 13 N=24	M	MD - D	RESIDUAL
			31.0	1.0		CI-CH	CLAY: medium to high plasticity, grey mottled orange-pale brown, MC = PL.		M	VSt	
			30.5	1.5			1.7m, with shale layers.	SPT 6, 13, 20 N=33			
			30.0	2.0							
			29.5	2.5							
			29.0	3.0		-	SHALE: extremely weathered, recovered as Gravelly CLAY, low plasticity, grey-brown, MC < PL.	SPT 10/90mm	D	H	EXTREMELY WEATHERED SHALE
			28.5	3.5							
			28.0	4.0		-	SHALE: dark grey, highly weathered, very low strength.		-	-	BEDROCK
			27.5	4.5							
			27.0	5.0							

No Groundwater Encountered During Augering

2. NON CORED BOREHOLE (NO COORD/RL) 13087.GPJ GINT STD AUSTRALIA.GDT 25/11/21

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 2/11/2021
Finished: 2/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 32.0m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT			26.5	5.5		-	SHALE: dark grey, highly weathered, very low strength. *(continued)*		-	-	
			26.0	6.0							
			25.5	6.5							
			25.0	7.0		-	SHALE: dark grey, moderately weathered, low to medium strength.		-	-	
							Borehole BH07 continued as cored hole				
			24.5	7.5							
			24.0	8.0							
			23.5	8.5							
			23.0	9.0							
			22.5	9.5							
			22.0	10.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 2/11/2021
Finished: 2/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 32.0m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral) EL -0.03 / VL -0.1 / L -0.3 / M -1 / H -3 / VH -10 / EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
			26.5	5.5								
			26.0	6.0								
			25.5	6.5								
			25.0	7.0		Continued from non-cored borehole						
NMLC			24.5	7.5		SHALE: grey, with dark grey laminations.	MW		D 0.22 A 0.11			Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been descriped. 7.20-7.26 - EW SM. 7.27 - JT, 0-5°, Undulating, Rough, Clean. 7.36 - JT, 0-5°, Planar, Rough, Clean.
			24.0	8.0					D 0.05 A 0.07 D 0.1 A 0.06	75		7.85 - JT, 5°, Planar, Rough, Clean. 7.88 - JT, 10°, Undulating, Rough, Clean. 8.25 - JT, 10°, Planar, Rough, Clean
			23.5	8.5								8.41, JT, 10°, Planar, Rough, Clean.
			23.0	9.0					D 0.11 A 0.24			8.82 - JT, 5°.
						CORE LOSS: 200mm.	EW					9.00-9.20 - CORE LOSS, 200mm.
			22.5	9.5		SHALE: grey with pale grey laminations at ~0°.	MW		D 0.58 A 0.56 D 0.11 A 0.71	63		9.21-9.22 - JT, 0°, Planar, Rough, Clean. 9.26 - JT, 0-5°, Undulating, Rough, Clean. 9.27 - JT, 0°, Undulating, Rough, Clean. 9.28-9.29 - EW SM. 9.34 - JT, 0°, Planar, Smooth, Clean. 9.36 - JT, 0°, Planar, Smooth, Clean. 9.41 - JT, 0°, Planar, Smooth, Clean. 9.80 - JT, 10-15°, Undulating, Rough, Clean.
			22.0	10.0								

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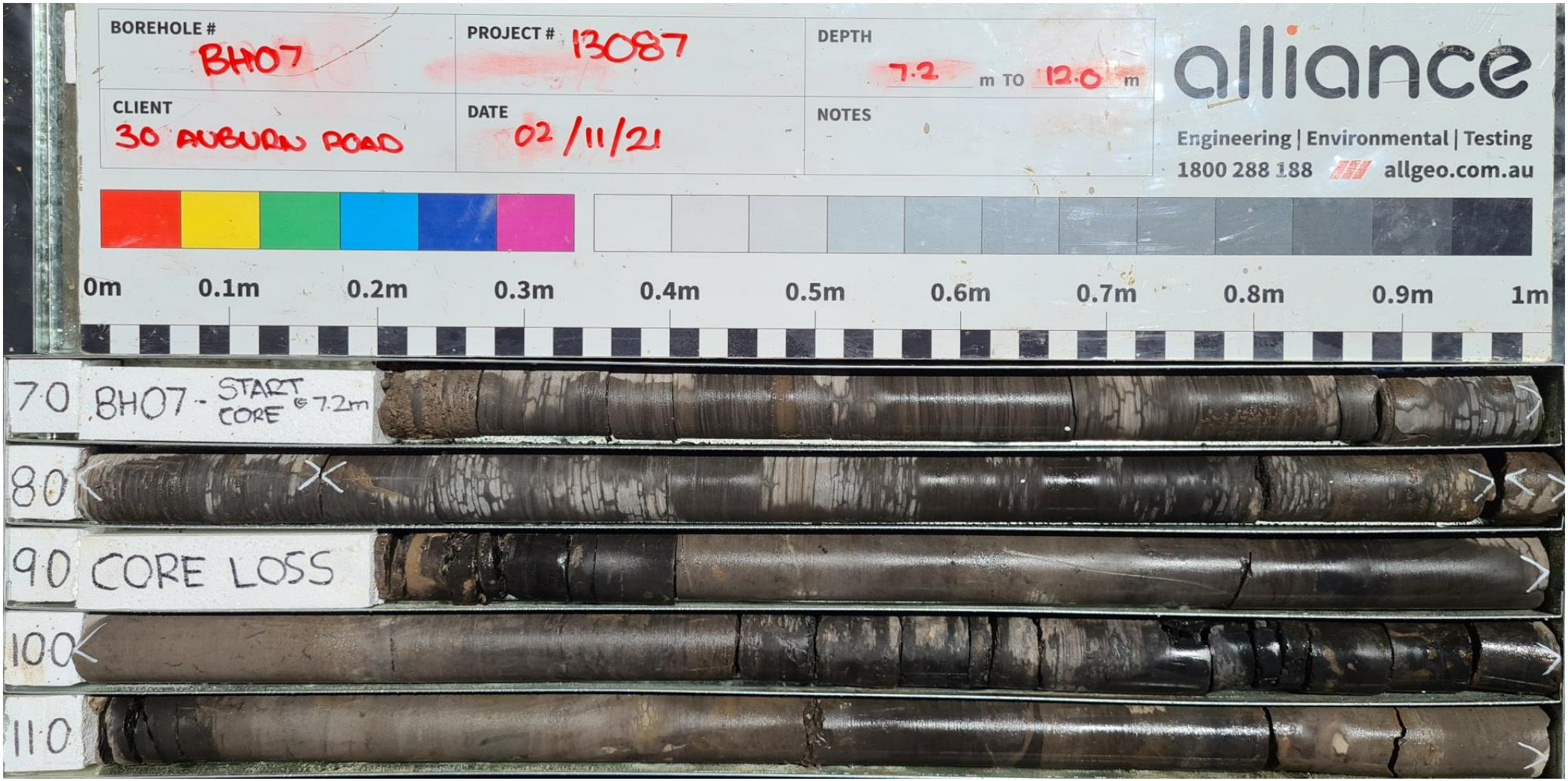
Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 2/11/2021
Finished: 2/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 32.0m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral; EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	$Is_{(50)}$ MPa (D- diametral, A- axial)	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
NMLC	Full Returns		21.5	10.5		SHALE: grey with pale grey laminations at ~0°. *(continued)*	MW		D 1.19 A 1.33			10.22 - JT, 0°, Planar, Rough, Clean.
						SHALE: dark grey and grey.						10.45 - JT, 0°, Undulating, Rough, Clean. 10.51 - JT, 0°, Undulating, Rough, Clean. 10.57 - JT, 0°, Undulating, Rough, Clean. 10.61 - JT, 0°, Undulating, Rough, Clean. 10.63 - JT, 0°, Undulating, Rough, Clean. 10.67 - JT, 0°, Undulating, Rough, Clean. 10.77 - JT, 0°, Planar, Rough, Clean. 10.81 - JT, 0°, Planar, Rough, Clean. 10.83 - JT, 0°, Planar, Rough, Clean. 10.85 - JT, 0°, Planar, Rough, Clean. 10.90 - JT, 0°, Planar, Rough, Clean. 10.96 - JT, 0°, Planar, Rough, Clean. 11.02 - JT, 0-5°, Undulating, Rough, Clean. 11.04 - JT, 0-5°, Undulating, Rough, Clean. 11.06 - JT, 5-10°, Planar, Rough, Clean. 11.08 - JT, 0-5°, Undulating, Rough, Clean.
			21.0	11.0					D 0.11 A 0.51	63		
			20.5	11.5								11.51 - JT, 0°, Undulating, Rough, Clean.
									D 0.28 A 0.26			11.82 - JT, 0-5°, Undulating, Rough, Clean.
			20.0	12.0								11.90 - JT, 5-10°, Undulating, Rough, Clean.
						CORE LOSS: 100mm.	EW			<		12.00-12.10, CORE LOSS, 100mm.
						SHALE: dark grey.	MW		D 1.35 A 0.9			12.10-12.20, Fractured Zone (JT, 0-10°, 10-20mm spacing)
			19.5	12.5						51		12.32 - JT, 0°, Planar, Smooth, Clean. 12.36 - JT, 0°, Smooth, Clean. 12.40 - JT, 0°, Smooth, Clean. 12.46 - JT, 0°, Planar, Rough, Clean. 12.54-12.57 - JT, 0-5°, Planar, Rough, Clean.
									D 0.06 A 0.32			
			19.0	13.0								12.92 - JT, 5-10°, Undulating, Rough, Clean.
						BH07 terminated at 13m						End of Borehole.
			18.5	13.5								
			18.0	14.0								
			17.5	14.5								
			17.0	15.0								



alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

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BH No: BH08
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Job No: 13087

Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: KT

RL Surface: 31.9m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT					-	CONCRETE: 150mm thickness.		D	-	PAVEMENT
					-	FILL: Sandy GRAVEL: fine to medium gravel, grey and brown, with fine to medium grained sand.		D	St	
		31.5	0.5		CI-CH	CLAY: medium to high plasticity, grey mottled red and orange, MC > PL.	SPT 2, 4, 5 N=9	M	St	RESIDUAL
		31.0	1.0							
		30.5	1.5			1.5m, grey.	SPT 5, 11, 14 N=25		VSt	
		30.0	2.0				ACM			
		29.5	2.5		CI	Silty CLAY: medium plasticity, pale grey and red, MC > PL, with ironstone gravel.		M	St - VSt	
		29.0	3.0				SPT 5, 8, 10 N=18			
		28.5	3.5			3.5m, trace shale layers.				
		28.0	4.0							
		27.5	4.5		-	SHALE/SILTSTONE: extremely weathered, recovered as Gravelly CLAY, low plasticity, dark grey and grey, MC < PL.	SPT 13, 14, HB	D	H	EXTREMELY WEATHERED SHALE
	No Groundwater Encountered During Augering	27.0	5.0							

2. NON CORED BOREHOLE (NO COORD/RL) 13087.GPJ GINT STD AUSTRALIA.GDT 22/11/21

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D | **Hole Location:** Refer Drawing: 13087-GR-1-B | **Driller:** KN | **Logged:** KT
RL Surface: 31.9m | **Contractor:** BG Drilling | **Bearing:** --- | **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT		26.5	5.5		-	SHALE/SILTSTONE: extremely weathered, recovered as Gravelly CLAY, low plasticity, dark grey and grey, MC < PL. *(continued)*		D	H	
		26.0	6.0		-	SHALE: grey, highly weathered, very low strength.	SPT 13, 35/20mm	-	-	BEDROCK
		25.5	6.5							
		25.0	7.0							
		24.5	7.5							
		24.0	8.0							
		23.5	8.5							
		23.0			-	SHALE: black-grey, highly to moderately weathered, very low to low strength.		-	-	
			9.0			Borehole BH08 continued as cored hole				
		22.5	9.5							
		22.0	10.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: KT

RL Surface: 31.9m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
		26.5	5.5								
		26.0	6.0								
		25.5	6.5								
		25.0	7.0								
		24.5	7.5								
		24.0	8.0								
		23.5	8.5								
		23.0			Continued from non-cored borehole						
NMLC			9.0		SHALE: brown-grey, fine grained, finely laminated (1-10mm, ~0°).	HW					Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been descriped.
					From 9.1m, As above, dark grey.	MW					8.9-9.0 - JT, 75°, Undulating, Rough, Stained. 9.06 - BP, 0°, Undulating, Rough, Clay. 9.07 - Crushed Seam, 20mm. 9.22 - BP, 0°, Planar, Rough, Clay. 9.38 - BP, 0°, Undulating, Rough, Clay.
		22.5	9.5						58		9.57 - BP, 0°, Undulating, Rough, Clay.
								D A 0.1 0.13			9.68 - BP, 0°, Undulating, Rough, Clay.
		22.0	10.0								9.81-9.83 - Clay Seam, 20mm. 9.85-9.89 - Crushed Seam, 40mm.

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: KT

RL Surface: 31.9m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30 100 300 1000 3000)	Additional Data
NMLC	Full Returns	21.5	10.5		SHALE: brown-grey, fine grained, finely laminated (1-10mm, ~0°). *(continued)*	MW					10.08-10.09 - EW SM, 20mm. 10.13 - BP, 0°, Undulating, Rough, Clay. 10.15 - BP, 0°, Undulating, Rough, Clay. 10.26 - BP, 0°, Undulating, Rough, Clay. 10.35 - BP, 0°, Planar, Rough, Clay.
											10.61 - BP, 0°, Planar, Rough, Clay. 10.72 - EW SM, 60mm.
		21.0	11.0			HW			58		10.83 - BP, 0°, Undulating, Rough, Clay. 10.92-11.06 - EW SM, 160mm.
											11.12 - JT, 0°, Undulating, Rough, Clean.
					SILTSTONE (70%) interbedded with SHALE (30%): siltstone is pale grey, massive; shale is dark grey, finely laminated (1-10mm, ~0°).	MW		D A 0.61 0.53			
		20.5	11.5								11.48 - JT, 0°, Undulating, Rough, Clean. 11.57 - JT, 0°, Undulating, Rough, Clean.
											11.79 - JT, 0°, Undulating, Rough, Clean.
		20.0	12.0								
								D A 0.47 0.41			12.24 - JT, 0°, Planar, Rough, Clean.
		19.5	12.5			HW					12.42 - JT, 0°, Undulating, Rough, Clean. 12.42-12.45 - JT, 60°, Planar, Rough, Clean. 12.50 - JT, 0°, Undulating, Rough, Clean. 12.53-12.77 - EW Seam, 240mm.
						MW					
		19.0	13.0								12.85 - BP, 0°, Undulating, Rough, Clean. 13.0-13.03 - Crushed Seam, 38mm. 13.1-13.11 - Crushed Seam, 10mm.
						HW					13.2-13.24 - Clay Seam, 40mm. 13.24 - Crushed Seam, 40mm.
		18.5	13.5			MW		D A 0.16 1.23	54		13.28-13.33 - JT, 60°, Planar, Rough, Clean.
											13.6-13.62 - Clay Seam, 20mm. 13.63 - JT, 0°, Undulating, Rough, Clay. 13.74 - JT, 0°, Undulating, Rough, Clay.
		18.0	14.0								13.91 - JT, 0°, Undulating, Rough, Clay.
					SHALE (60%) interbedded with SILTSTONE (40%): shale is dark grey, finely laminated (1-10mm, ~0°); siltstone is pale grey, massive.						14-14.05 - EW Seam, 50mm. 14.1-14.14 - JT, 45°, Planar, Rough, Clean. 14.14 - JT, 40°, Undulating, Rough, Clay. 14.22-14.24 - Clay Seam, 20mm.
		17.5	14.5								14.59 - BP, 0°, Undulating, Rough, Clean.
											14.73 - JT, 0°, Undulating, Rough, Clay. 14.77-14.79 - Crushed Seam, 20mm.
		17.0	15.0						80		

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: KT
RL Surface: 31.9m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
NMLC					SHALE (60%) interbedded with SILTSONE (40%): shale is dark grey, finely laminated (1-10mm, ~0°); siltstone is pale grey, massive. *(continued)*	MW		D 0.16 A 0.24			15.06 - Crushed Seam, 10mm. 15.17 - BP, 0°, Undulating, Rough, Clean. 15.23 - JT, 15°, Undulating, Rough, Clean. 15.31-15.36 - Crushed Seam, 50mm. 15.4-15.47 - Crushed Seam, 70mm. 15.51 - BP, 0°, Irregular, Rough, Clean. 15.60 - BP, 0°, Irregular, Rough, Clean.
		16.5	15.5								
		16.0	16.0					D 0.45 A 0.3			15.91-16.04 - EW SM, 138mm.
		15.5	16.5					D 0.55 A 0.71	80		16.66 - JT, 0°, Undulating, Rough, Stained. 16.78-16.79 - JT, 0°, Undulating, Rough, Coating. 16.84-16.88 - Clay Seams. 16.90 - JT, 20°, Planar, Rough, Clean.
		15.0	17.0		SHALE: dark grey, finely laminated at ~0°.	SW					17.00 - JT, 0°, Undulating, Rough, Coating. 17.10-17.15 - EW SM. 17.23 - JT, 0°, Undulating, Rough, Coating. 17.30-17.40 - Crushed Seam.
		14.5	17.5					D 0.23 A 0.39			17.47-17.52 - JT, 20°, Planar, Rough, Stained.
		14.0	18.0					D 0.46 A 1.09			17.90 - JT, 70°, Undulating, Rough, Clean. 17.91-17.93 - Crushed Seam. 18.02 - JT, 0°, Planar, Rough, Clean.
		13.5	18.5								18.35-18.48 - JT, 70°, Planar, Rough, Clean. 18.67 - JT, 0°, Undulating, Rough, Clean.
		13.0	19.0					D 0.46 A 0.94	67		19.00 - JT, 0°, Undulating, Rough, Stained. 19.10 - JT, 0°, Planar, Rough, Clean. 19.10-19.14 - Clay Seams.
		12.5	19.5		SHALE (70%) interbedded with SILTSTONE (30%): dark grey.	MW					19.48-19.52 - Crushed Seams.
		12.0	20.0					D 0.48 A 0.76			19.76-19.79 - JT, 20°, Planar, Rough, Clean.

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Cored Borehole Log

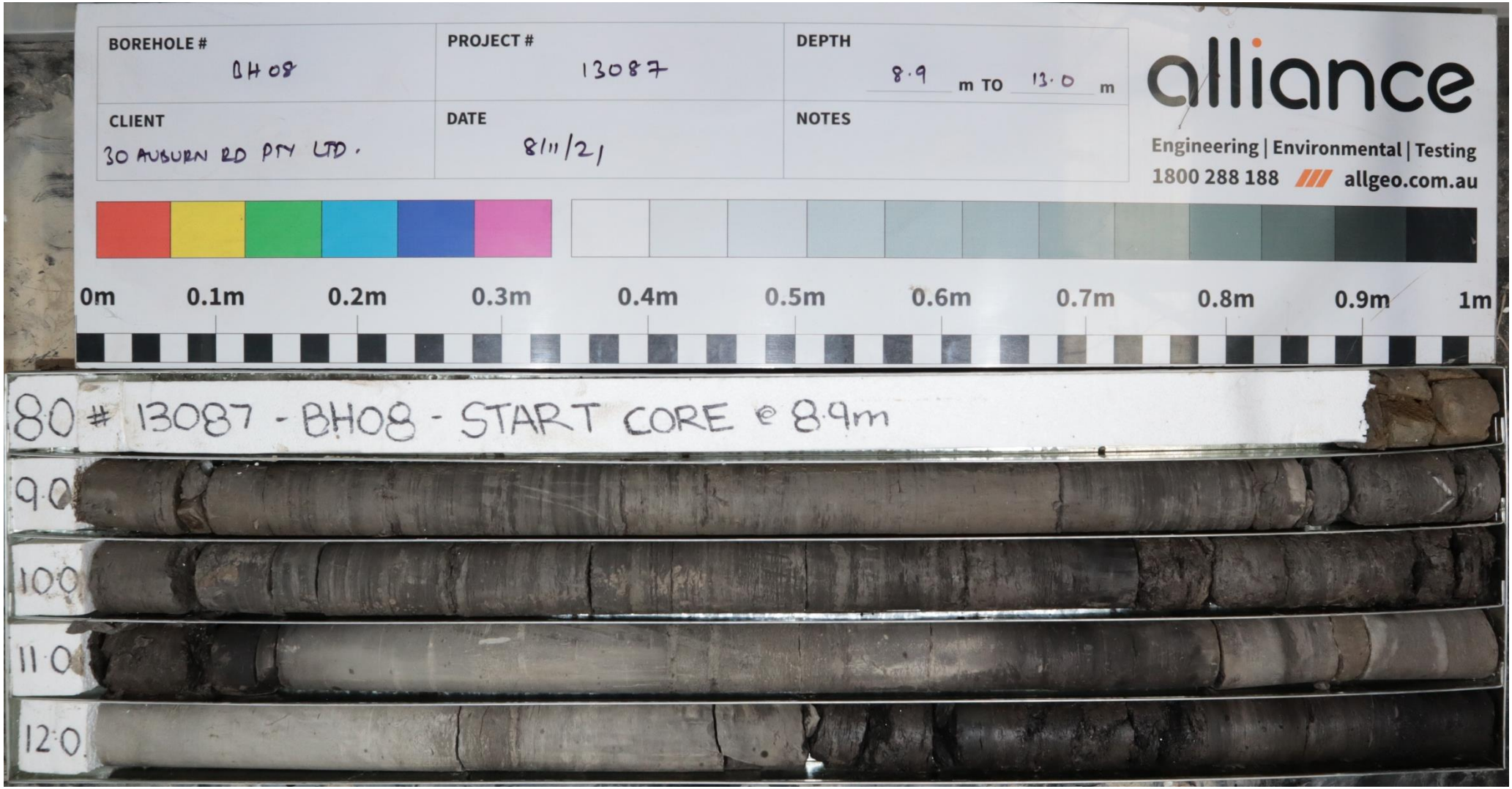
Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 8/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer Drawing: 13087-GR-1-B
Driller: KN
Logged: KT

RL Surface: 31.9m
Contractor: BG Drilling
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength ● - Axial ○ - Diametral (EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
						MW			67		
					BH08 terminated at 20.1m						End of Borehole.
		11.5	20.5								
		11.0	21.0								
		10.5	21.5								
		10.0	22.0								
		9.5	22.5								
		9.0	23.0								
		8.5	23.5								
		8.0	24.0								
		7.5	24.5								
		7.0	25.0								



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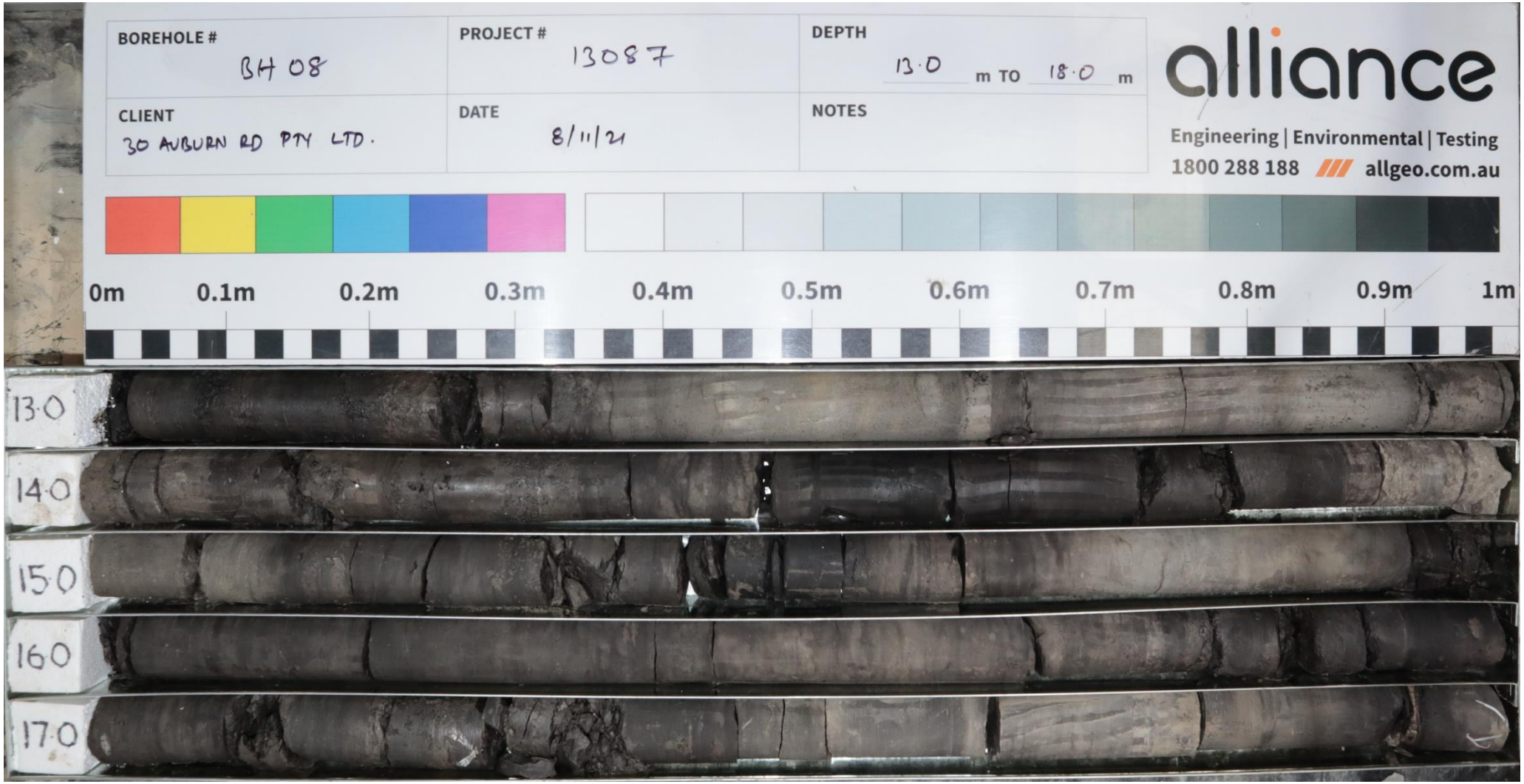
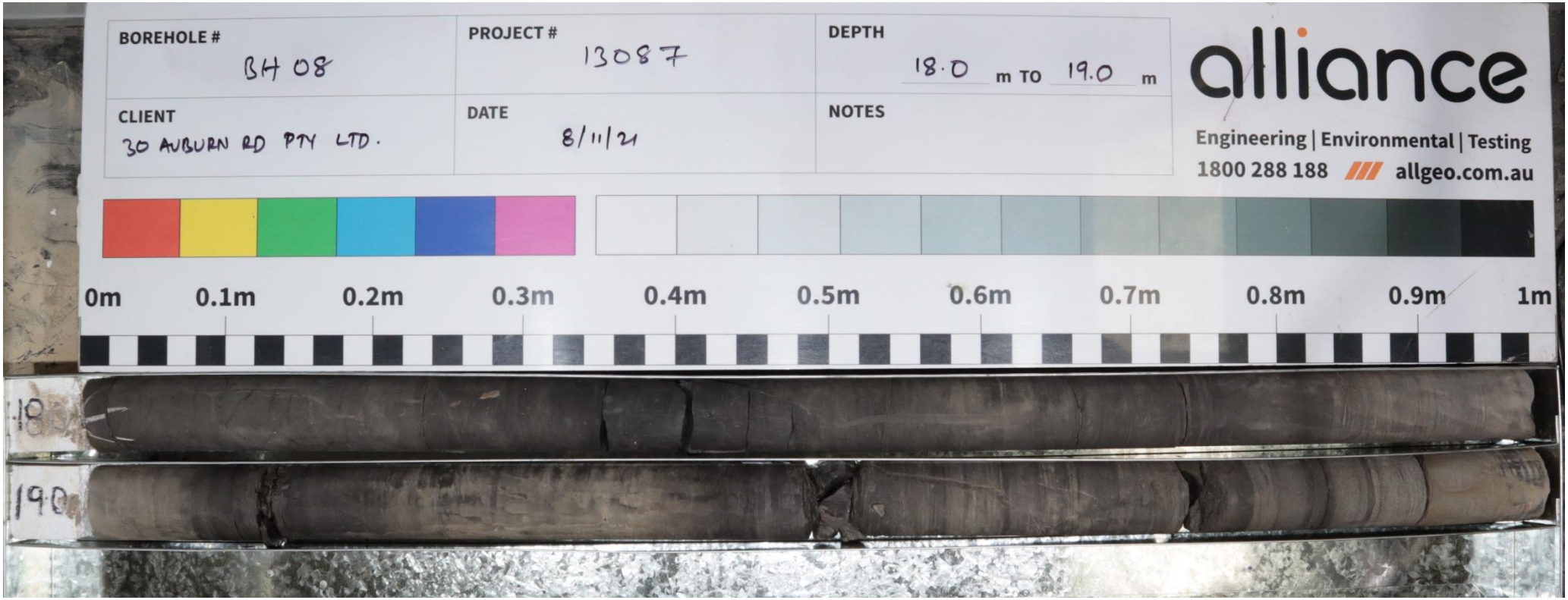
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1



Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1



Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

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BH No: BH09
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Job No: 13087

Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 3/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 30.8m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT					-	ASPHALT: 50mm thickness.		-	-	PAVEMENT
		30.5	0.5		-	Gravelly CLAY: medium plasticity, orange and brown grey, with fine to medium gravel, trace sand, appears moderately compacted.		M	-	FILL
		30.0	1.0		-	SAND: medium grained, orange and pale brown. At 0.8m, conduit.	SPT 4, 4, 6 N=10	M	-	
		29.5	1.5		-	Gravelly CLAY: medium plasticity, orange brown and red, with fine to medium grained, trace sand, appears moderately compacted.		M	-	
		29.0	2.0		CL-CH	CLAY: medium plasticity, grey mottled orange and red, MC <~ PL, with silt, with ironstone gravel.	SPT 3, 4, 7 N=11	M	St	
		28.5	2.5		CL-CH	CLAY: medium plasticity, dark grey mottled red, MC < PL, with silt.		M	VSt	RESIDUAL
		28.0	3.0				SPT 12, 9/40mm			
		27.5	3.5		CI	CLAY: medium plasticity, dark grey mottled red, MC < PL, with silt, trace shale layer.		M	VSt	
	No Groundwater Encountered During Augering	27.0	4.0							
		26.5	4.5				SPT 8, 11, 15 N=26			
		26.0	5.0							

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 3/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 30.8m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT		25.5	5.5		CI	CLAY: medium plasticity, dark grey mottled red, MC < PL, with silt, trace shale layer. *(continued)*		M	VSt	
		25.0	6.0		-	SHALE: extremely weathered, recovered as Gravelly CLAY, low plasticity, grey and brown, MC < PL.		D	H	Extremely Weathered Shale
		24.5	6.5				SPT 15, 4/20mm			
		24.0	7.0		-	SHALE: dark grey, highly weathered, very low strength.		-	-	
		23.5	7.5				SPT 24, 24/170mm			
		23.0	8.0							
		22.5	8.5							
		22.0	9.0							
		21.5								
		21.0	9.5			Borehole BH09 continued as cored hole				
			10.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 3/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 30.8m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
		25.5	5.5								
		25.0	6.0								
		24.5	6.5								
		24.0	7.0								
		23.5	7.5								
		23.0	8.0								
		22.5	8.5								
		22.0	9.0								
		21.5			Continued from non-cored borehole						
NMLC		21.0	9.5		SHALE: grey with dark grey lamination at ~0°.	HW MW	●	D 0.17 A 0.22	42		Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been descriped. 9.35 - 9.42 - Clay Seam, 70mm. 9.60 - JT, 0°, Undulating, Rough, Clean. 9.67 - JT, 0°, Undulating, Rough, Clean. 9.72 - JT, 5 - 10°, Undulating, Rough, Clean. 9.74 - JT, 5°, Undulating, Rough, Clean. 9.81 - JT, 0 - 5°, Undulating, Rough, Clean. 9.96 - JT, 5°, Undulating, Smooth, Clean.
			10.0								

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 3/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 30.8m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
NMLC	Full Returns	20.5	10.5		SHALE: grey with dark grey lamination at ~0°. *(continued)*	MW					10.06 - JT, 0-5°, Curved, Rough, Clean.
					SHALE: grey and dark grey.	MW/SW		D 0.44 A 0.27			10.21 - JT, 5 - 10°, Planar, Rough, Clay. 10.27 - JT, 10°, Curved, Rough, Clay. 10.34 - JT, 5-10°, Curved, Rough, Clean. 10.40 - JT, 10-25°, Planar, Rough, Clean.
		20.0	11.0						< 42		10.53 - JT, 0°, Undulating, Rough, Clean. 10.54 - JT, 0°, Undulating, Rough, Clean. 10.60 - JT, 0°, Undulating, Rough, Clean. 10.68 - 10.69 - EW Seam. 10.72 - JT, 0-5°, Planar, Rough, Clean. 10.81 - JT, 0°, Undulating, Rough, Clean. 10.87 - 10.91 - EW Seam. 10.93 - JT, 0-5°, Planar, Rough, Clean.
		19.5	11.5					D 0.3 A 0.42			11.16 - JT, 0°, Planar, Rough, Clean. 11.20 - JT, 0°, Planar, Rough, Clean. 11.29 - JT, 0-5°, Curved, Rough, Clean.
		19.0	12.0					D 0.38 A 0.17			11.53 - 11.54 - JT, 0°, Curved, Rough, Clean. 11.76 - JT, 0°, Planar, Rough, Clean. 11.81 - JT, 0°, Planar, Rough, Clean.
					SHALE: dark grey.						11.98 - JT, 0°, Planar, Rough, Clean.
		18.5	12.5					D 0.45 A 0.44	68		12.30 - JT, 0-5°, Planar, Rough, Clean.
		18.0	13.0								12.50 - JT, 5°, Undulating, Rough, Clean. 12.52 - JT, 0-5°, Undulating, Rough, Clean. 12.59 - JT, 5-10°, Undulating, Rough, Clean. 12.68 - JT, 5-10°, Undulating, Rough, Clean. 12.76 - JT, 0-5°, Undulating, Rough, Clean.
					BH09 terminated at 13.1m						12.90 - JT, 0°, Planar, Rough, Clean. 12.92-13.00 - Sheared zone (JT, 0°, 10-20mm spacing). 13.04 - JT, 0-10°, Curved, Rough, Clean. End of Borehole.
		17.5	13.5								
		17.0	14.0								
		16.5	14.5								
		16.0	15.0								

Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 5/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 31.8m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT		31.8	0.0		-	TOPSOIL: Silty CLAY: low plasticity, brown and dark grey, with fine gravel, appears barely compacted.		M	-	TOPSOIL
		31.5	0.5		-	CLAY: medium plasticity, brown grey and orange, trace fine to medium grained sand, trace silt, with gravel, appears moderately compacted, MC > PL.	SPT 2, 7, 7 N=14	M	-	FILL
		31.0	1.0							
		30.5	1.5		-	From 1.5m, As above with concrete gravel.	SPT 4, 6, 8 N=14	M	-	
	Ground Water Inflow At 1.5m	30.0	2.0		Cl	CLAY: medium plasticity, grey and red, with silt, trace fine to medium, rounded gravel, MC < PL.		M	St	RESIDUAL
		29.5	2.5							
		29.0	3.0		-	SHALE: extremely weathered, recovered as Gravelly CLAY, low plasticity, grey and brown, MC < PL.	SPT 14/80mm N=ref	D	H	EXTREMELY WEATHERED SHALE
		28.5	3.5							
		28.0	4.0							
		27.5	4.5		-	SHALE: grey, highly weathered, very low strength, with clay bands.	SPT 9/50mm HB N=ref	-	-	BEDROCK
		27.0	5.0							

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 5/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 31.8m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT		26.5	5.5		-	SHALE: grey, highly weathered, very low strength, with clay bands. *(continued)*		-	-	
		26.0	6.0							
		25.5	6.5							
		25.0	7.0							
		24.5	7.5							
		24.0	8.0			Borehole BH10 continued as cored hole				
		23.5	8.5							
		23.0	9.0							
		22.5	9.5							
		22.0	10.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 5/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 31.8m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
		26.5	5.5								
		26.0	6.0								
		25.5	6.5								
		25.0	7.0								
		24.5	7.5		Continued from non-cored borehole						
NMLC		24.0	8.0		SHALE: grey and brown, with clay seams.	EW		D 0.08 A 0.12	<		Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been descriped. 7.60-7.95 - EW Material (not competent rock), 350mm thickness.
		23.5	8.5			HW EW			15		8.06 - JT, 10°, Undulating, Rough, Clean. 8.17 - JT, 0°, Undulating, Rough, Clean. 8.21 - JT, 0-5°, Undulating, Rough, Clean. 8.31 - JT, 0-5°, Curved, Rough, Clay.
		23.0	9.0		Core Loss: 130mm.	EW			<		8.31-8.90 - EW Material (not competent rock), 590mm thickness. 8.90-9.03 - CORE LOSS, 130mm.
		22.5	9.5		SHALE: grey and brown, with clay bands	EW HW EW			9		9.05-9.45 - EW Material (not competent rock), 400mm thickness. 9.61 - JT, 0°, Undulating, Rough, Clean. 9.62-9.96 - EW Material (not competent rock), 340mm thickness.
		22.0	10.0						<		

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 5/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 31.8m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	RL (m)	Depth (m)	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30 100 300 1000 3000)	Additional Data
NMLC	Full Returns	21.5	10.5	SHALE: grey and brown, with clay bands *(continued)*	HW			<		10.09 - JT, 0°, Undulating, Rough, Veneer. 10.10-10.15 - Clay Seam. 10.30-10.34 - Crushed Seam. 10.44 - JT, 0°, Undulating, Rough.
				Core Loss: 1160mm	EW			<		10.51-11.67 - CORE LOSS, 1160mm.
		21.0	11.0					0		
		20.5	11.5							
		20.0		SHALE: grey and brown, with clay bands	HW					11.68-11.83 - Crushed Seam.
			12.0	Core Loss: 170mm.	EW			<		11.83-12.00 - CORE LOSS, 170mm.
				SHALE: grey and brown, with clay bands	HW					12.00-12.48 - EW Material (not competent rock), 480mm thickness.
		19.5	12.5					<		12.57-12.59 - JT, 0°, Undulating, Rough, Veneer. 12.68-12.94 - Crushed Seam, 260mm.
		19.0	13.0					11		12.97 - BP, 0°, Undulating, Rough, Clean.
				SHALE: dark grey, thinly laminated (1-10mm thickness, ~0°).	MW		D 0.83 A 0.94			13.05 - BP, 0°, Undulating, Rough, Clean. 13.08 - BP, 0°, Rough, Clay Coating. 13.14 - JT, Clay Seam, 0°, Rough. 13.17 - BP, 0°, Undulating, Rough, Clean. 13.21 - BP, 0°, Undulating, Rough, Clean. 13.31 - BP, 0°, Undulating, Rough, Clean. 13.43 - BP, 0°, Undulating, Rough, Clean.
		18.5	13.5							13.53-13.57 - JT, 90°, Irregular, Undulating, Rough, Coating.
				Core Loss: 300mm	EW			<		13.60-13.90 - CORE LOSS, 300mm.
		18.0	14.0	SHALE: dark grey, thinly laminated (1-10mm thickness, ~0°).	MW					13.92 - JT, Refilled Seam, 10°, Undulating, Rough, Coating. 14.05 - JT, 0°, Undulating, Rough, Veneer. 14.07 - JT, 0°, Undulating, Rough, Veneer. 14.11 - JT, 0°, Undulating, Rough, Veneer. 14.16 - JT, 0°, Undulating, Rough, Veneer. 14.21 - JT, 0°, Undulating, Rough, Veneer. 14.32 - BP, 10°, Planar, Rough. 14.39-14.42 - JT, Refilled Seam, 0°, Undulating, Rough, Clean.
		17.5	14.5					39		14.62-14.86 - BP, 0°, Planar, Rough, Clean.
		17.0	15.0							

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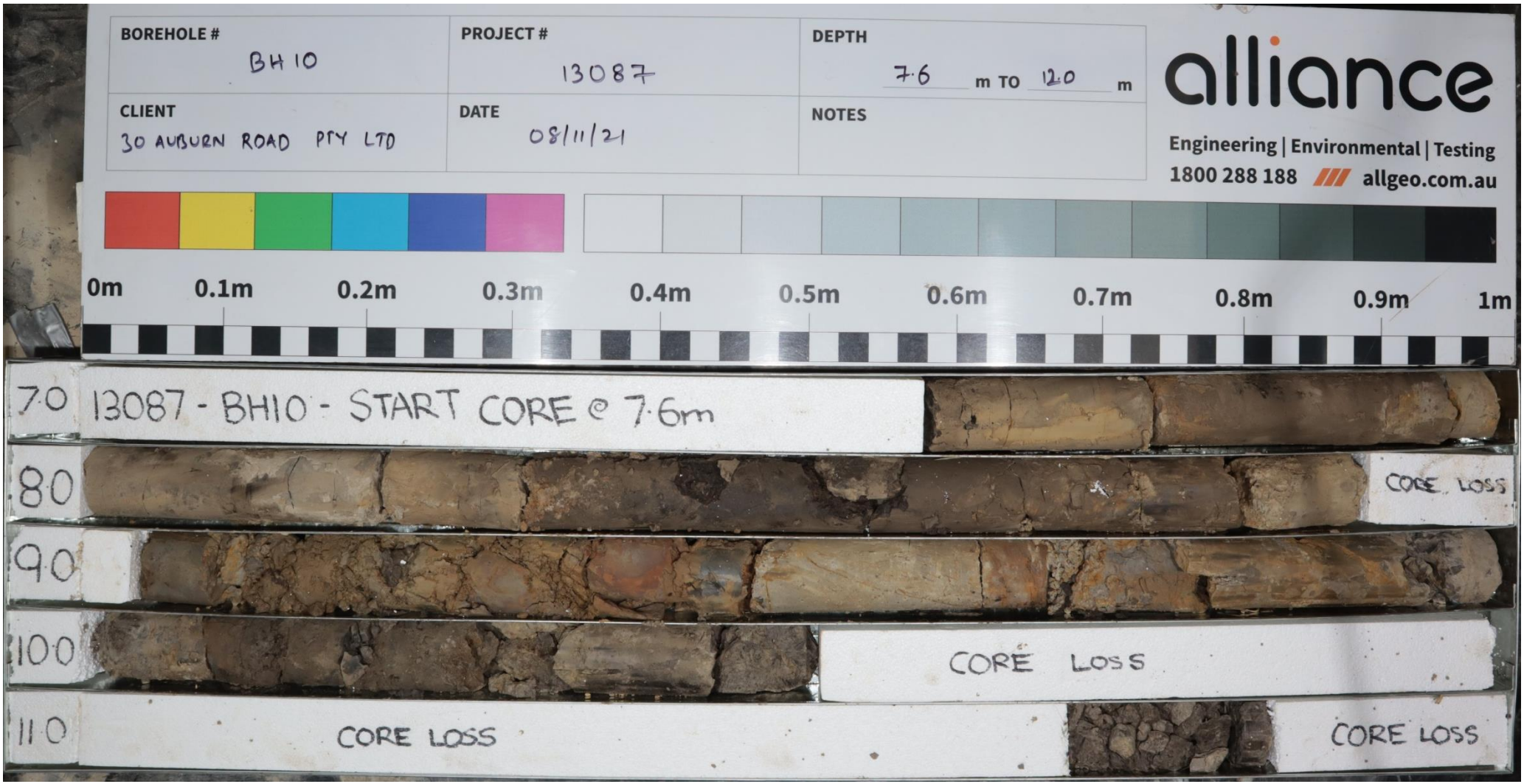
Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

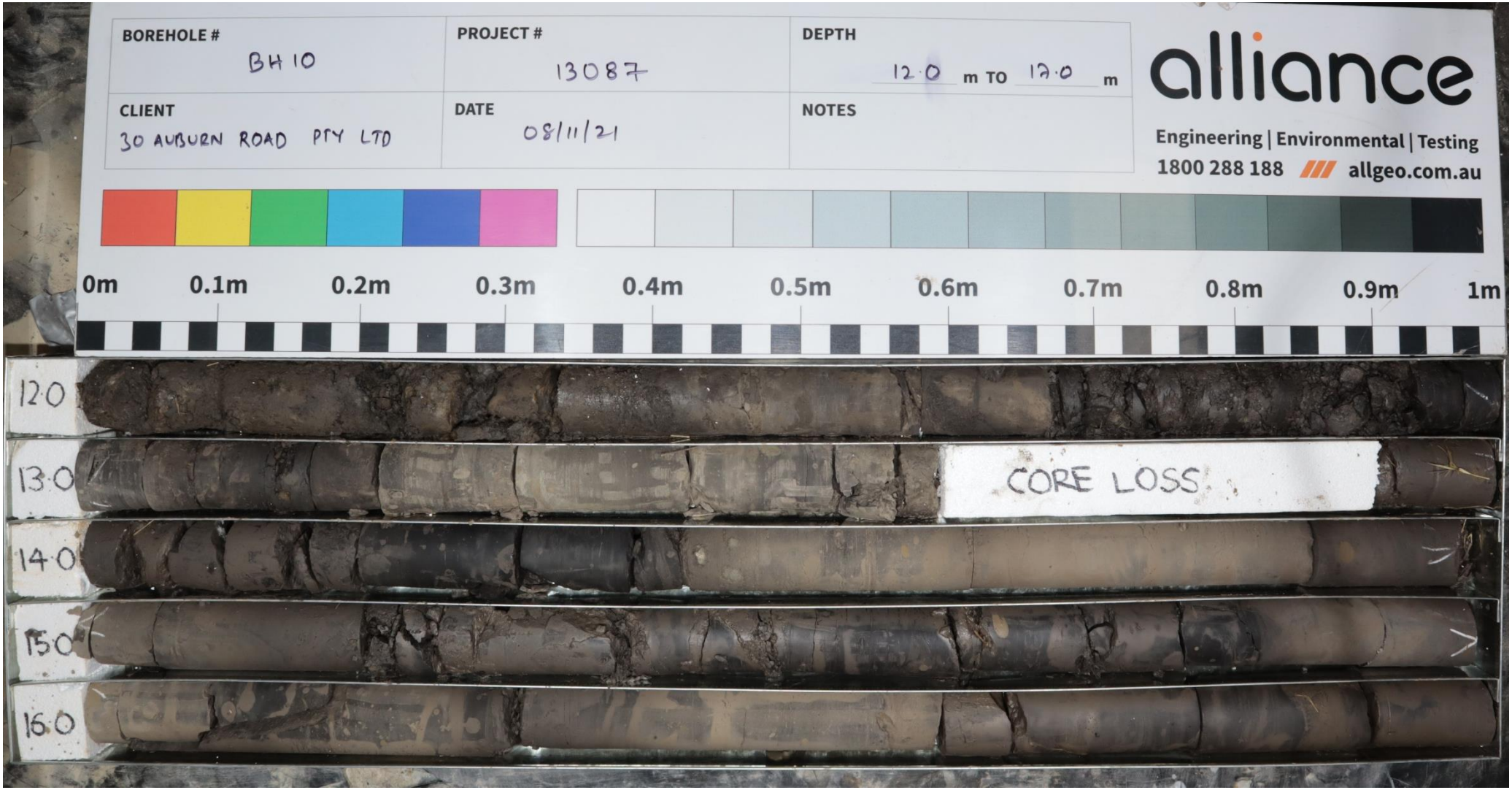
Started: 5/11/2021
Finished: 8/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 31.8m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

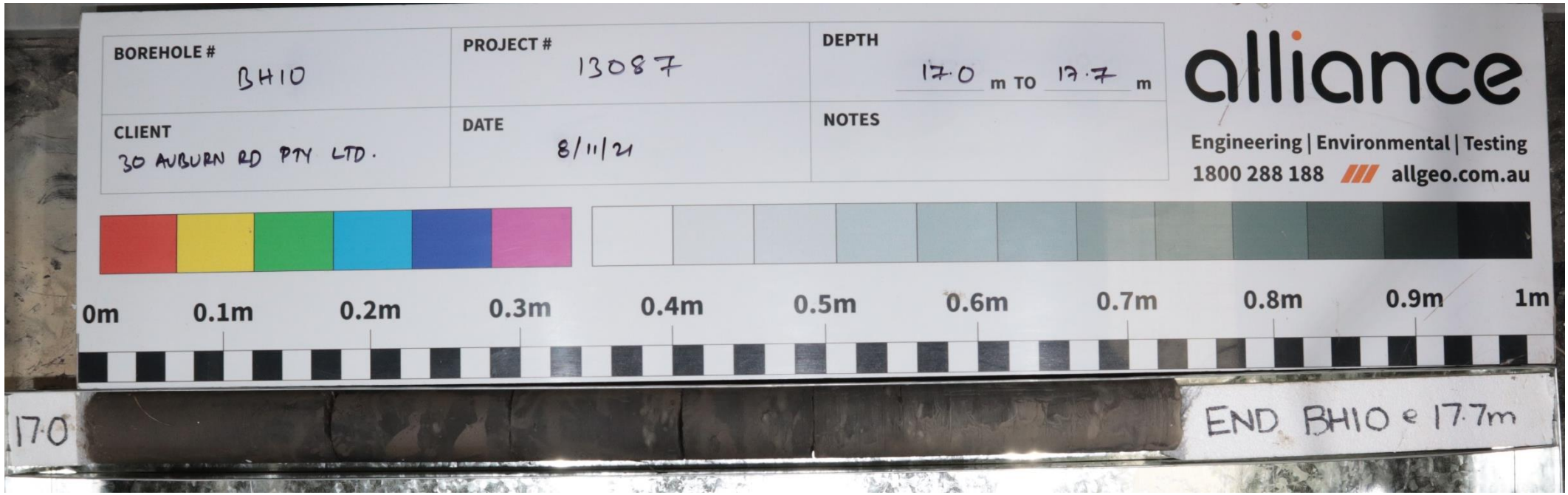
Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
NMLC		16.5	15.5		SHALE: dark grey, thinly laminated (1-10mm thickness, ~0°). *(continued)*	MW					15.08-15.2 - JT, 0°, Undulating, Rough, Veneer. 15.21-15.29 - Crushed Seam. 15.37-15.38 - Crushed Seam. 15.45 - JT, 0°, Undulating, Rough, Clay Coating. 15.47-15.48 - Crushed Seam. 15.61-15.7 - Crushed Seam.
		16.0	16.0						39		15.77 - JT, 15°, EW, Undulating, Rough, Clean. 15.81 - JT, 15°, EW, Undulating, Rough, Clean. 15.92 - JT, 15°, EW, Undulating, Rough, Clean. 16.04-16.18 - JT, 60°, Undulating, Rough, Clean.
		15.5	16.5			SW					16.30 - JT, 0°, Undulating, Rough, Clean.
		15.0	17.0								16.60 - JT, 0°, Undulating, Rough, Clean. 16.65 - JT, 0°, Undulating, Rough, Clean. 16.77 - JT, 0°, Undulating, Rough, Clean. 16.90 - JT, 0°, Undulating, Rough, Clean.
		14.5	17.5						100		17.17 - BP, 0°, Planar, Rough, Clean. 17.29 - BP, 0°, Planar, Rough, Clean. 17.40 - BP, 0°, Planar, Rough, Clean.
		14.0	18.0		BH10 terminated at 17.7m						End of Borehole.
		13.5	18.5								
		13.0	19.0								
		12.5	19.5								
		12.0	20.0								



alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1



Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1



alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

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BH No: BH11
PAGE 1 OF 4
Job No: 13087

Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 4/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 31.3m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	No Groundwater Encountered During Augering		31.0	0.0		-	FILL: Silty CLAY with gravel, low plasticity, dark grey and brown, with organics.		M	-	FILL
						-	FILL: CLAY: medium plasticity, brown grey and red orange with ripped shale, with silt, trace sand, appears moderately to well compacted, MC = PL.		M	-	
			30.5	0.5				SPT 6, 8, 8 N=16			
				1.0		CI-CH	CLAY: medium to high plasticity, grey and brown orange, trace fine to medium rounded gravel, appears moderately compacted, MC = PL.		M	St	RESIDUAL
			30.0	1.5				SPT 2, 4, 5 N=9			
			29.5	2.0		CH	CLAY: high plasticity, dark grey, trace fine to medium rounded gravel, MC = PL.		M	St	
			29.0	2.5		CH	CLAY: high plasticity, grey mottled red orange, with silt, trace sand, MC =PL.		M	St	
			28.5	3.0				SPT 3, 5, 7 N=12			
			28.0	3.5							
			27.5	4.0							
			27.0	4.5			4.3m, ironstone gravel, MC = PL.	SPT 10, 16, 24 N=40		VSt - H	
			26.5	5.0							

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Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 4/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 31.3m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT			26.0	5.5		CH	CLAY: high plasticity, grey mottled red orange, with silt, trace sand, MC =PL. *(continued)*		M	St	
			25.5	6.0		CI	Silty CLAY: medium plasticity, grey mottled orange, MC = PL.	SPT 12, 15, 21 N=36	M	VSt - H	
			25.0	6.5			6.5m, with shale layers.				
			24.5	7.0		-	SHALE: extremely weathered, recovered as Gravelly CLAY, low plasticity, grey and brown, MC < PL.		D	H	EXTREMELY WEATHERED SHALE
			24.0	7.5				SPT 18, 20/120mm			
			23.5	8.0							
			23.0	8.5							
			22.5	9.0			Borehole BH11 continued as cored hole				
			22.0	9.5							
			21.5	10.0							

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 4/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 31.3m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
			26.0	5.5								
			25.5	6.0								
			25.0	6.5								
			24.5	7.0								
			24.0	7.5								
			23.5	8.0								
			23.0	8.5		Continued from non-cored borehole						
NMLC			22.5	9.0		Core Loss: 500mm.	EW			<		Unless otherwise stated, defects are HB, DB or closed bedding parting and therefore have not been descriped. 8.7-9.2 - CORE LOSS, 500mm.
			22.0	9.5		SHALE: grey and brown, trace clay bands.	HW			< 48		9.24-9.26 - EW Seam. 9.35 - JT, 0°, Planar, Rough, Clay. 9.42 - JT, 0-5°, Undulating, Rough, Clay. 9.47 - JT, 0-5°, Undulating, Rough, Clean. 9.54 - JT, 0°, Undulating, Rough. 9.62 - JT, 0°, Planar, Rough, Clean.
			21.5	10.0			MW			<		9.72-9.74 - EW, Seam. 9.79 - JT, 10°, Undulating, Rough, Clean.

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Cored Borehole Log

Client: 30 Auburn Road Pty Ltd
Project: Proposed Mixed Use Development
Location: 30-46 Auburn Rd, Regents Park NSW 2143

Started: 4/11/2021
Finished: 4/11/2021
Borehole Size 110 mm

Rig Type: CE180 **Hole Location:** Refer Drawing: 13087-GR-1-B **Driller:** KN **Logged:** KT
RL Surface: 31.3m **Contractor:** BG Drilling **Bearing:** --- **Checked:** MS

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● Axial, ○ Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
NMLC	Full Returns		21.0	10.5		SHALE: grey and brown, trace clay bands. *(continued)*	MW		D 0.15 A 0.17			10.06 - JT, 0°, Undulating, Rough, Clean.
						SHALE: grey with dark grey laminates at ~0°.						10.24 - JT, 5°, Curved, Rough, Clean.
			20.5	11.0						48		10.41 - JT, 0-5°, Curved, Rough, Clean. 10.50 - JT, 0-5°, Undulating, Rough, Clean. 10.72 - JT, 0°, Planar, Rough, Clean. 10.73 - JT, 180°, Planar, Rough, Clean. 10.8-10.87 - Sheared Zone. 10.95 - JT, 0°, Planar, Rough, Clean. 11.02 - JT, 0°, Planar, Rough, Clean.
			20.0	11.5		SHALE: dark grey.			D 0.05 A 0.14			11.11 - JT, 0-5°, Planar, Rough, Clean. 11.34 - JT, 0°, Planar, Smooth, Clean. 11.45 - JT, 0-5°, Planar, Rough, Clean.
			19.5	12.0						45		11.66 - EW, Seam. 11.69 - JT, 0°, Undulating, Rough, Clean. 11.80 - JT, 0-5°, Undulating, Rough, Clean. 11.81-11.82 - EW, Seam. 11.84-11.85 - EW, Seam. 11.87-11.91 - JT, 0°, Undulating, Rough, Clean. 11.92-12 - EW, Seam. 12.02 - JT, 0-5°, Undulating, Rough, Clean. 12.06 - JT, 0-5°, Undulating, Rough, Clean. 12.10 - JT, 0-5°, Undulating, Rough, Clean. 12.12 - JT, 0-5°, Undulating, Rough, Clean. 12.20 - JT, 0°, Curved, Rough, Clean. 12.25-12.29 - EW, Seam. 12.30 - JT, 0°, Planar, Rough, Clean. 12.37 - JT, 0°, Planar, Rough, Clean.
			19.0	12.5		SHALE: dark grey.	SW		D 0.12 A 0.1			12.61 - JT, 0-10°, Planar, Rough, Clean.
			18.5	13.0								
						BH11 terminated at 13m						End of Borehole.
			18.0	13.5								
			17.5	14.0								
			17.0	14.5								
			16.5	15.0								

alliance	Client Name:	30 Auburn Road Pty Ltd	Figure / Drawing Number:	Corebox Photos
	Project Name:	Proposed Mixed Use Development	Figure / Drawing Date:	22/11/2021
	Project Location:	30-46 Auburn Road, Regents Park NSW 2143	Report Number:	13087-GR-1-1

APPENDIX D – Groundwater Monitoring & Pump Test Results

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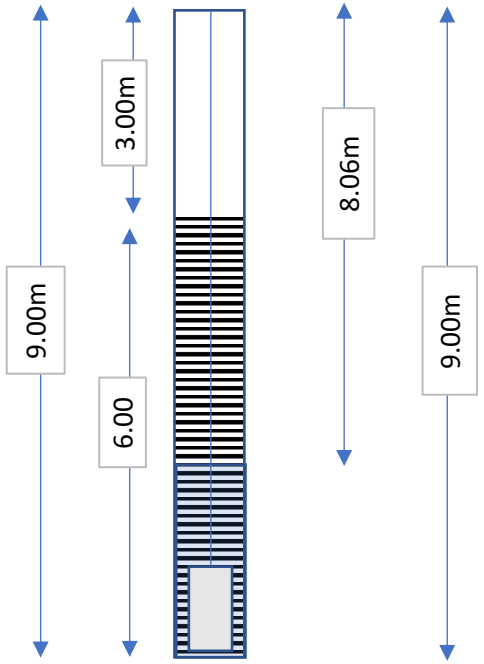
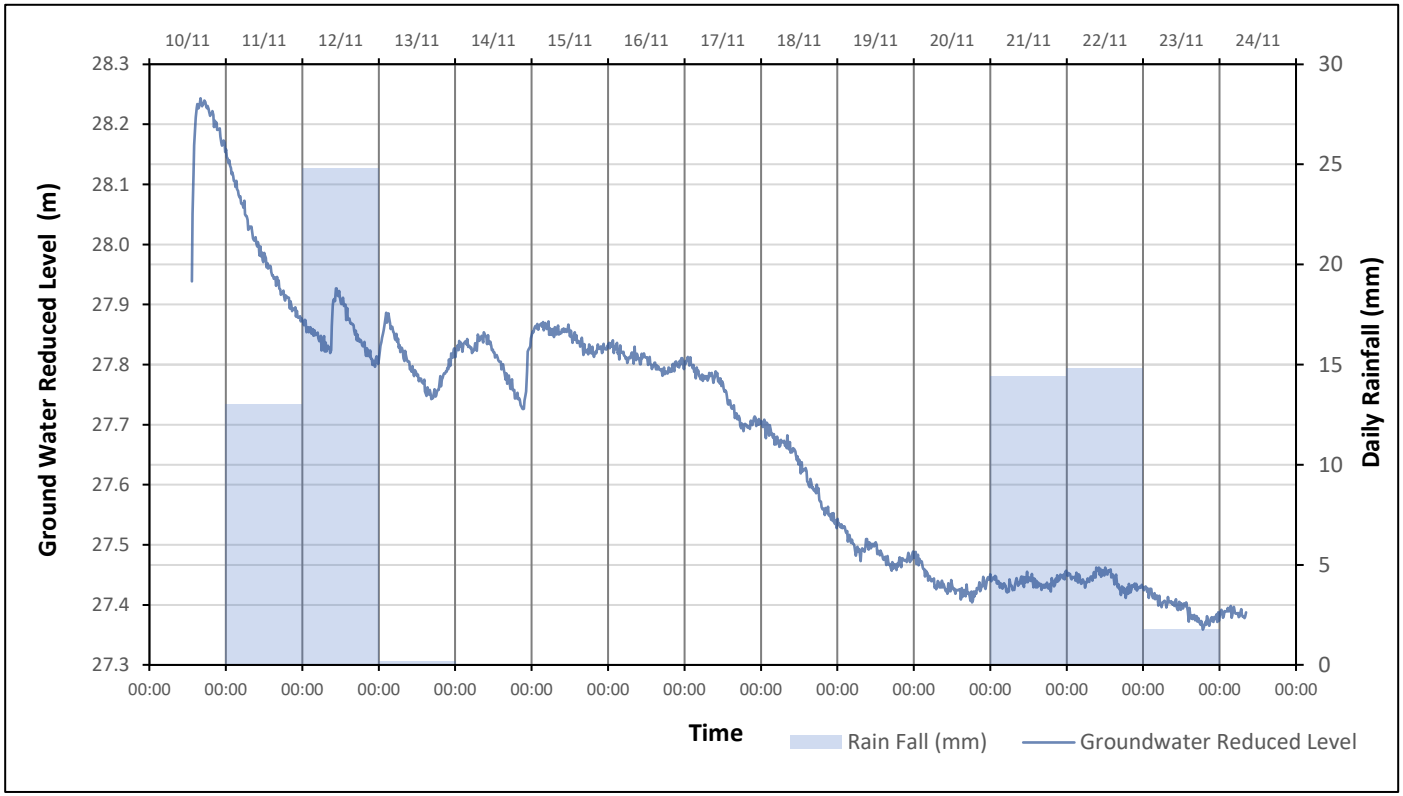
Groundwater Monitoring

Client :	Sonsari Pty Ltd	**Location:**	BH01
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	10/11/21 - 24/11/21
Test Method :	-	**Tested By :**	MS

Test	BH01				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	8.06	**Solid Casing Length(L)**	m	3
Casing Radius (r_c)	m	0.025	**Screened Length (L_e)**	m	6
Borehole Radius (r_w)	m	0.05	**Existing Ground RL**	m	36

Well and Logger Details	
Time	10/11/2021 13:32





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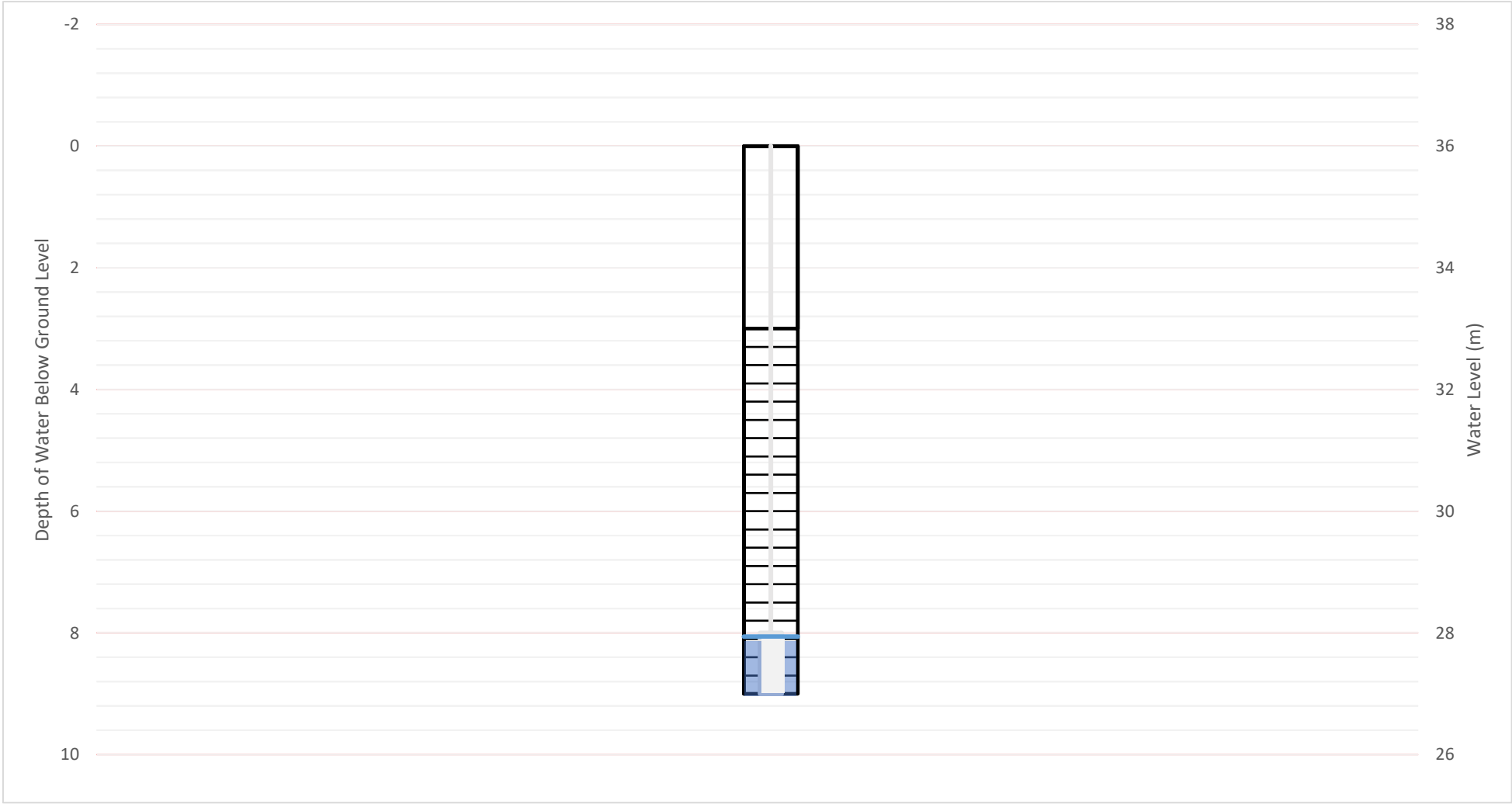
Scaled Well and Logger Details		
Ground RL	m	36
Solid Length	m	3
Slotted Length	m	6
Logger Install Depth	m	9
Initial Water Level	m	8.06



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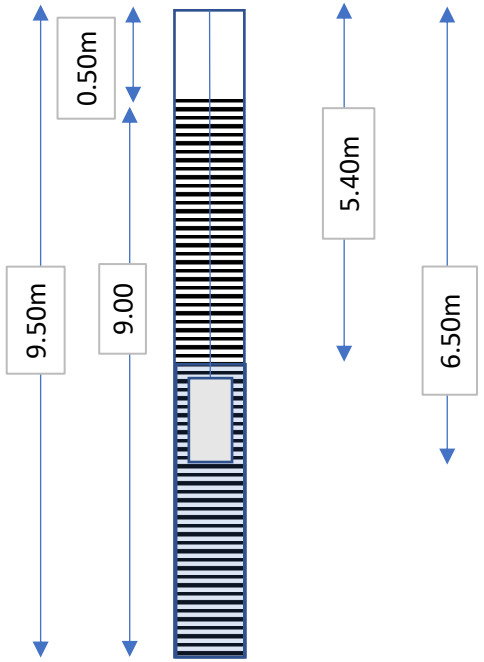
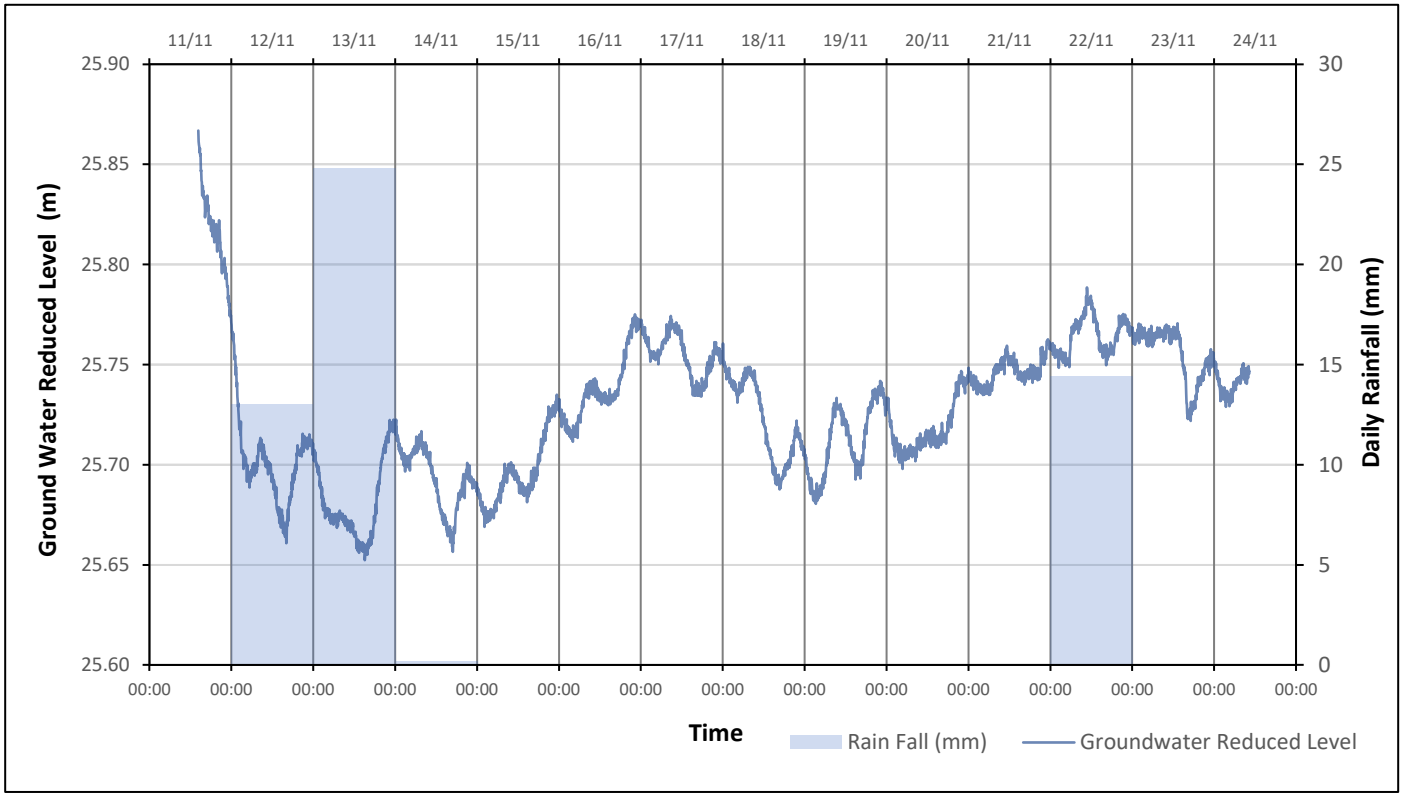
Groundwater Monitoring

Client :	Sonsari Pty Ltd	**Location:**	BH05
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	11/11/21 - 24/11/21
Test Method :	-	**Tested By :**	AH

Test	BH05				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	5.4	**Solid Casing Length(L)**	m	0.5
Casing Radius (r_c)	m	0.025	**Screened Length (L_e)**	m	9
Borehole Radius (r_w)	m	0.05	**Existing Ground RL**	m	31.3

Well and Logger Details	
Time	11/11/2021 14:25





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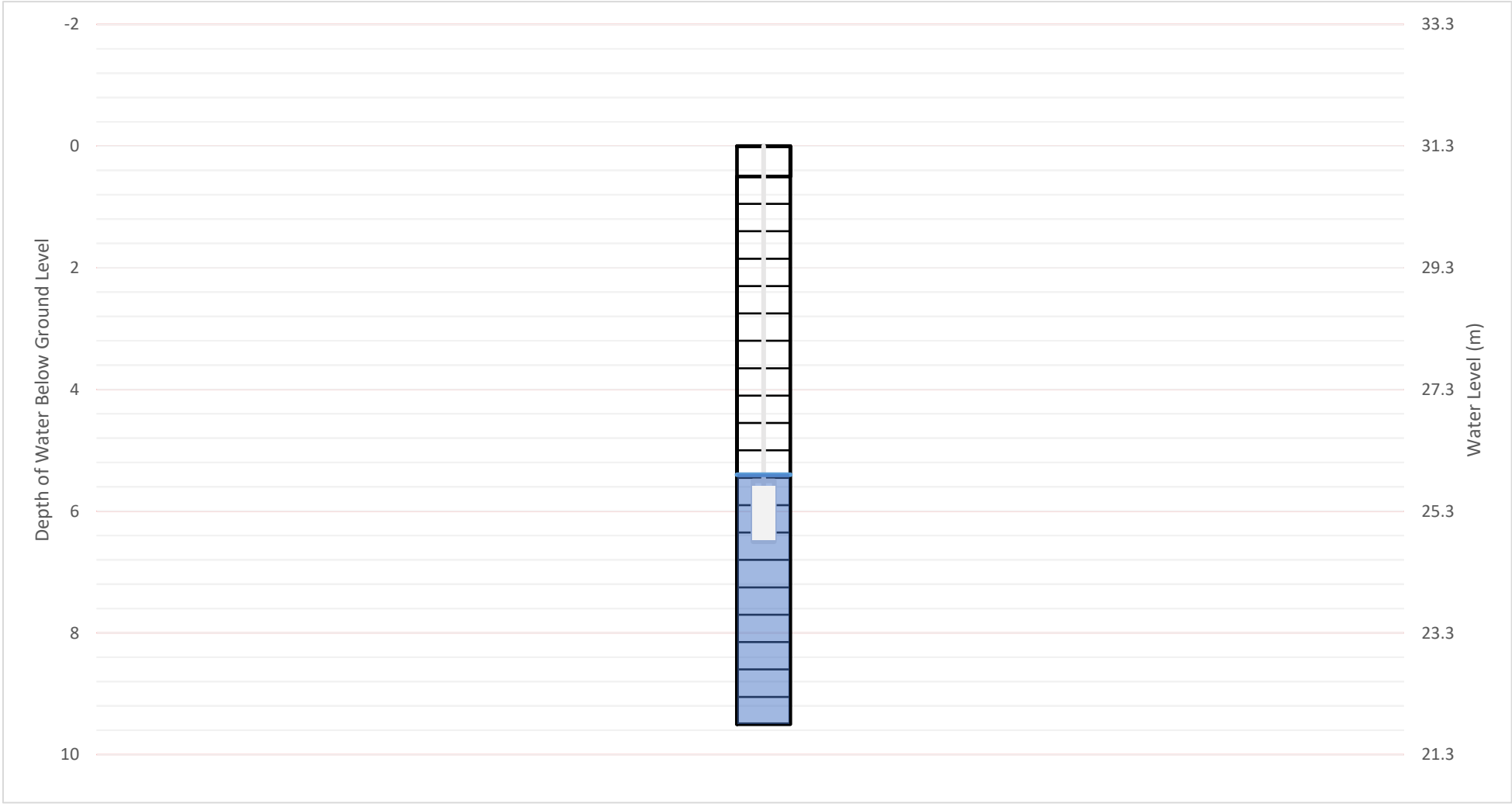
Scaled Well and Logger Details		
Ground RL	m	31.3
Solid Length	m	0.5
Slotted Length	m	9
Logger Install Depth	m	6.5
Initial Water Level	m	5.4



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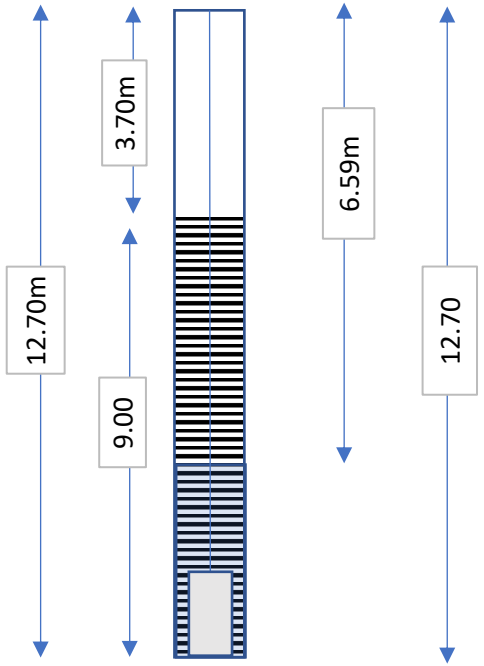
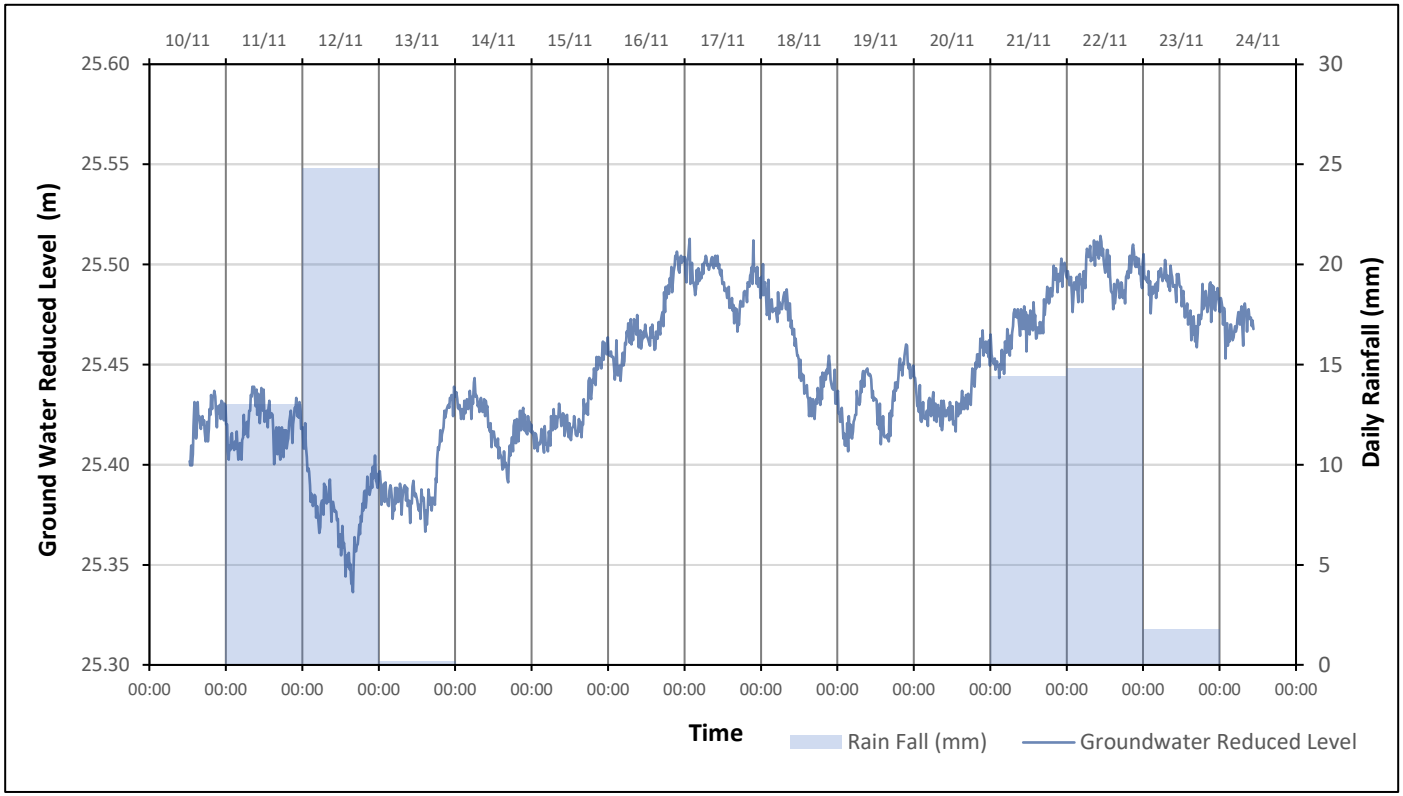
Groundwater Monitoring

Client :	Sonsari Pty Ltd	**Location:**	BH07
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	11/11/21 - 23/11/21
Test Method :	-	**Tested By :**	MS

Test	BH07				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	6.59	**Solid Casing Length(L)**	m	3.7
Casing Radius (r_c)	m	0.025	**Screened Length (L_e)**	m	9
Borehole Radius (r_w)	m	0.05	**Existing Ground RL**	m	32

Well and Logger Details	
Time	10/11/2021 12:52





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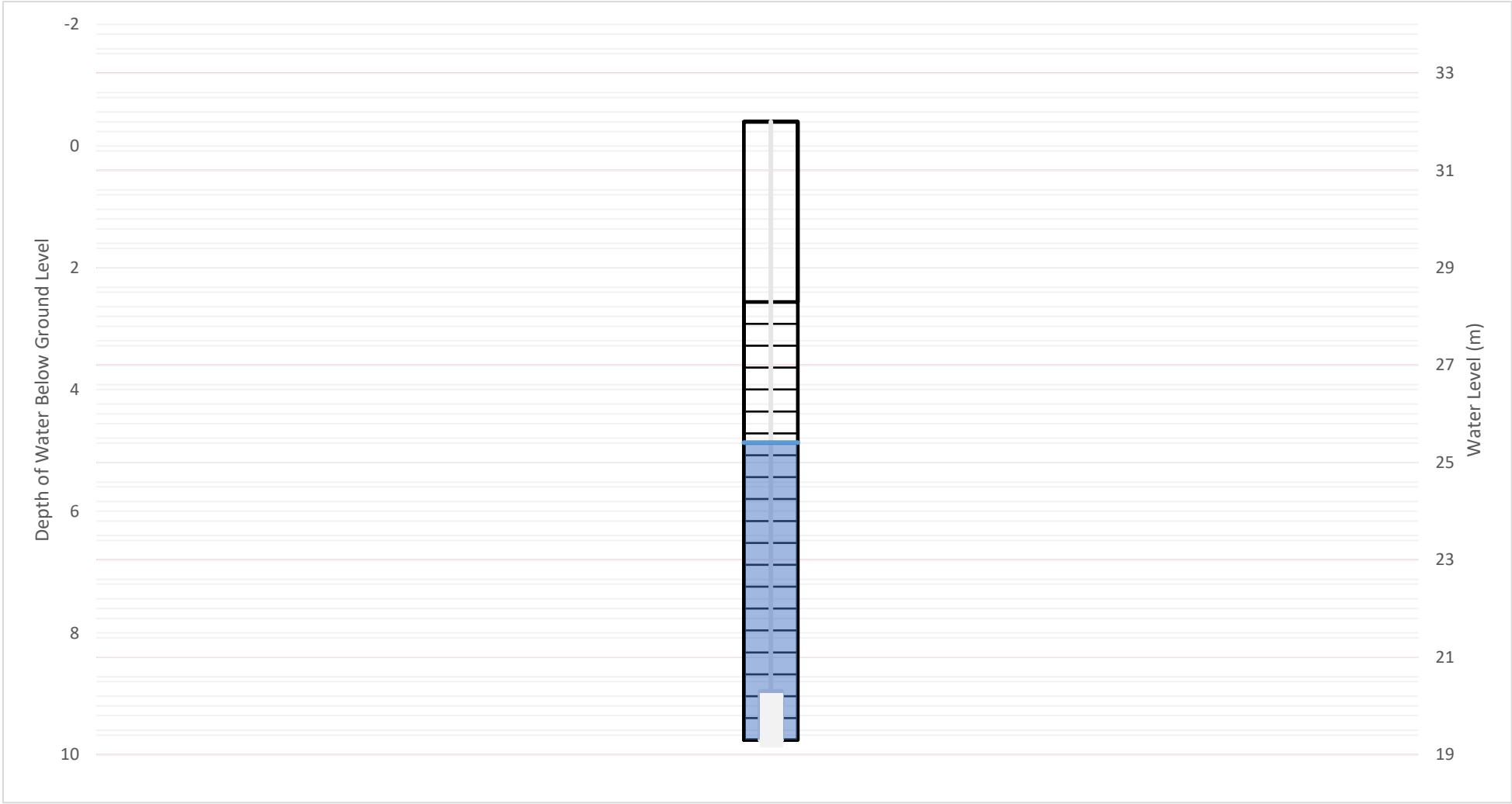
Scaled Well and Logger Details		
Ground RL	m	32
Solid Length	m	3.7
Slotted Length	m	9
Logger Install Depth	m	12.7
Initial Water Level	m	6.59



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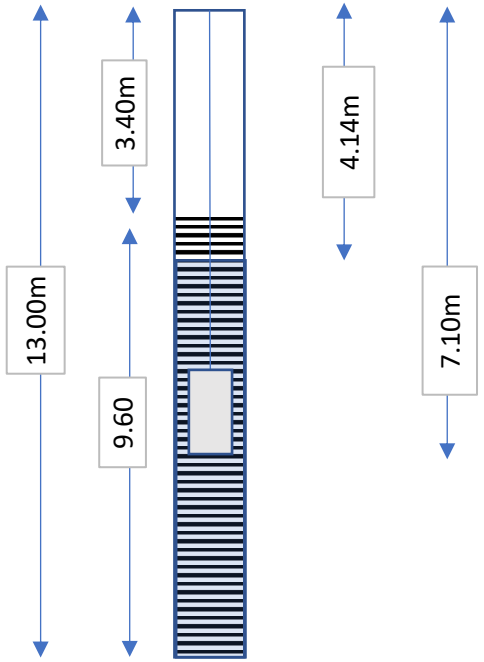
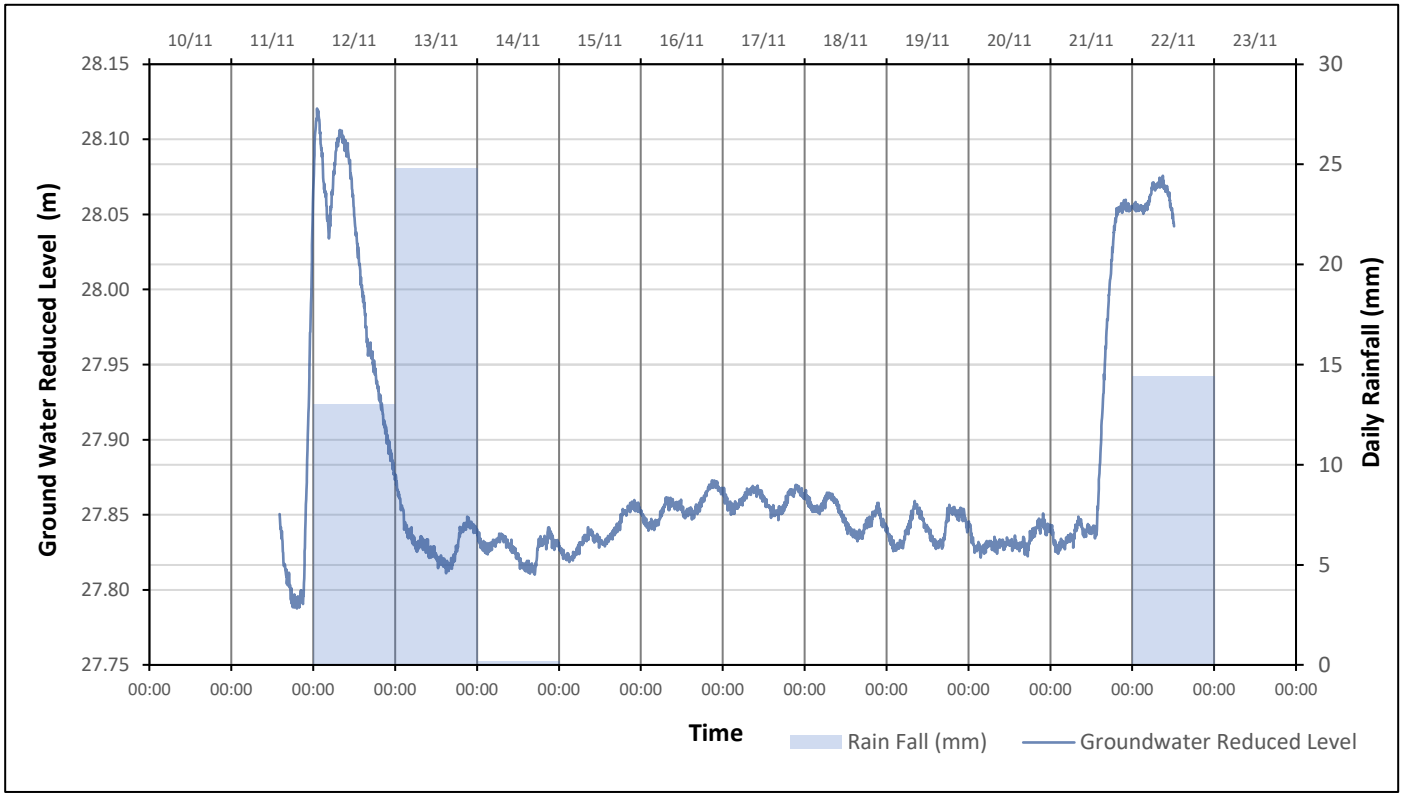
Groundwater Monitoring

Client :	Sonsari Pty Ltd	**Location:**	BH11
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	11/11/21 - 23/11/21
Test Method :	-	**Tested By :**	AH

Test	BH11				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	4.14	**Solid Casing Length(L)**	m	3.4
Casing Radius (r_c)	m	0.025	**Screened Length (L_e)**	m	9.6
Borehole Radius (r_w)	m	0.05	**Existing Ground RL**	m	31.3

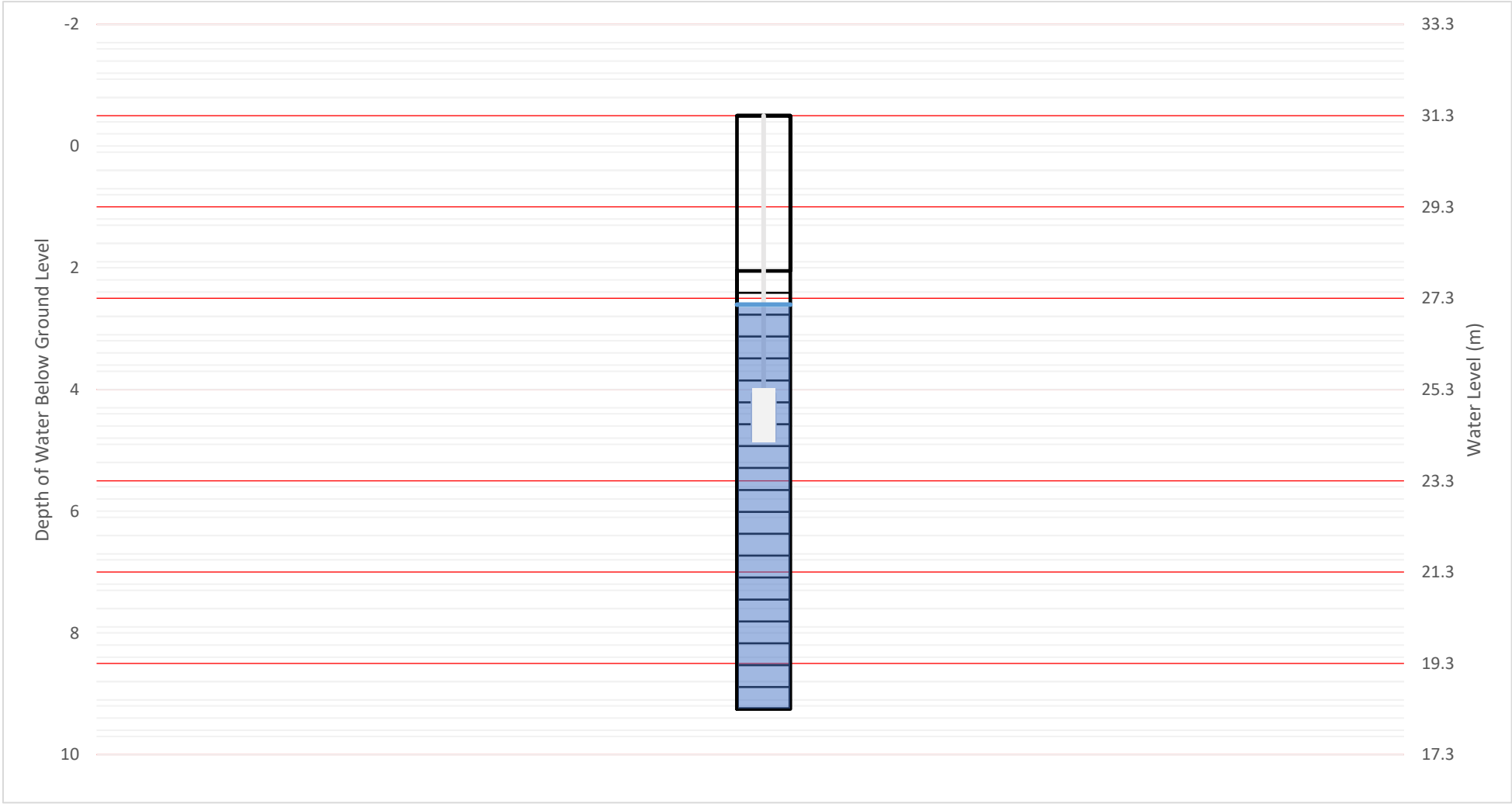
Well and Logger Details	
Time	11/11/2021 14:15





alliance

Scaled Well and Logger Details		
Ground RL	m	31.3
Solid Length	m	3.4
Slotted Length	m	9.6
Logger Install Depth	m	7.1
Initial Water Level	m	4.14



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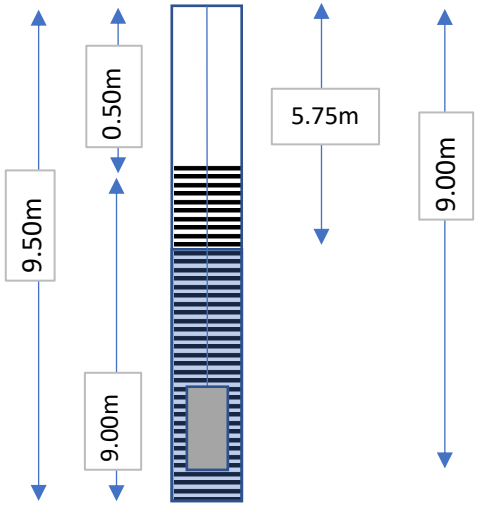
Rising Head Permeability Test Report

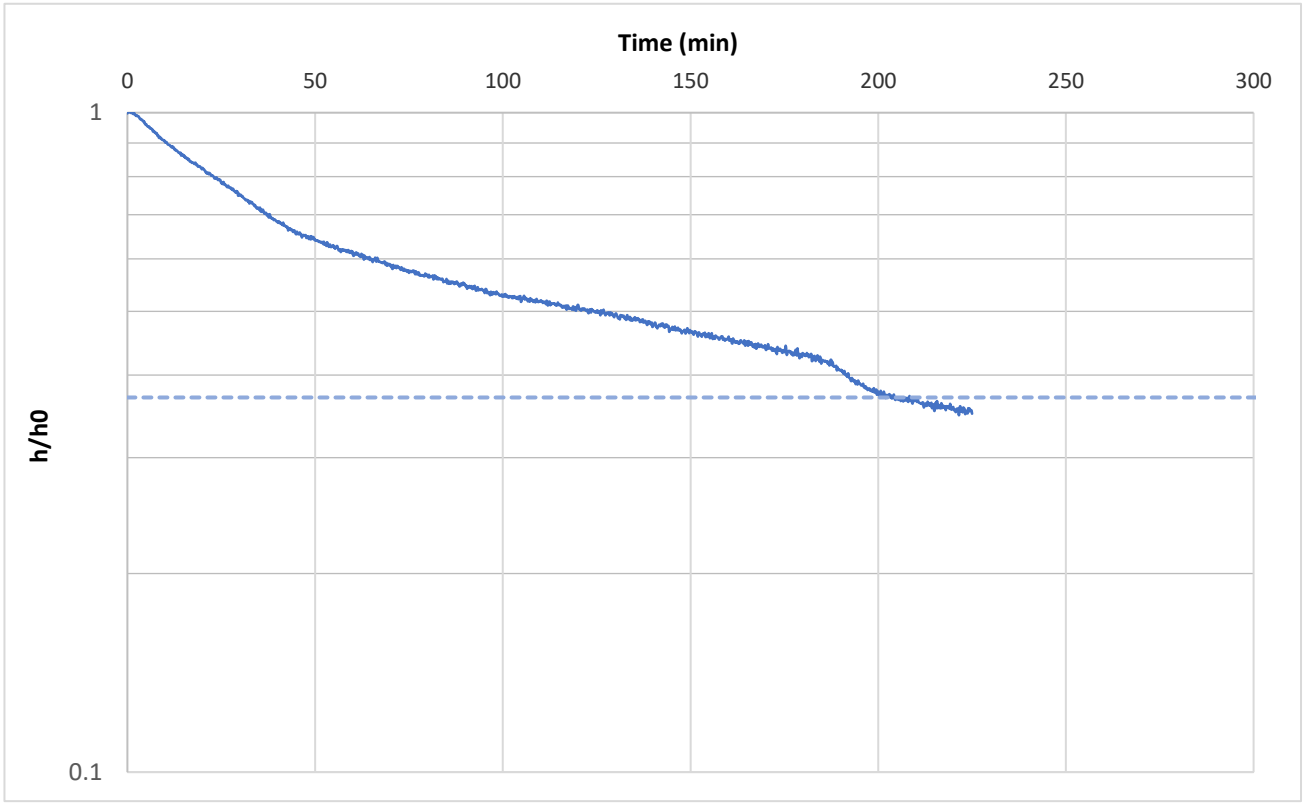
Client :	Sonsari Pty Ltd	**Location:**	BH05
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	24/11/2021
Test Method :	Hvorslev's Method (1951)	**Tested By :**	MS

Test	**BH05**				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	5.75	**Solid Casing Length (L)**	m	0.5
Groundwater Depth at t=0s	m	8.34	**Screened Length (L_e)**	m	9
Casing Radius (r_c)	m	0.025	**Characteristic Time (t_0)**	min	205.6666667
Borehole Radius (r_w)	m	0.05	**Hydraulic Conductivity (k)**	m/day	**0.0013**

$$K = \frac{r_c^2 \cdot \ln\left(\frac{L_e}{r_w}\right)}{2 \cdot L_e \cdot t_0}$$

Logger Details	
Time	10:22am





alliance

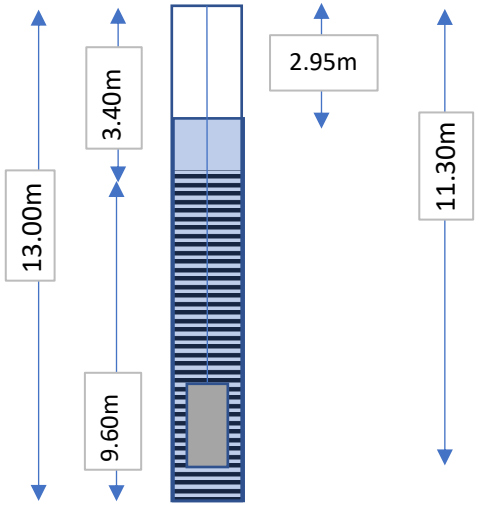
Rising Head Permeability Test Report

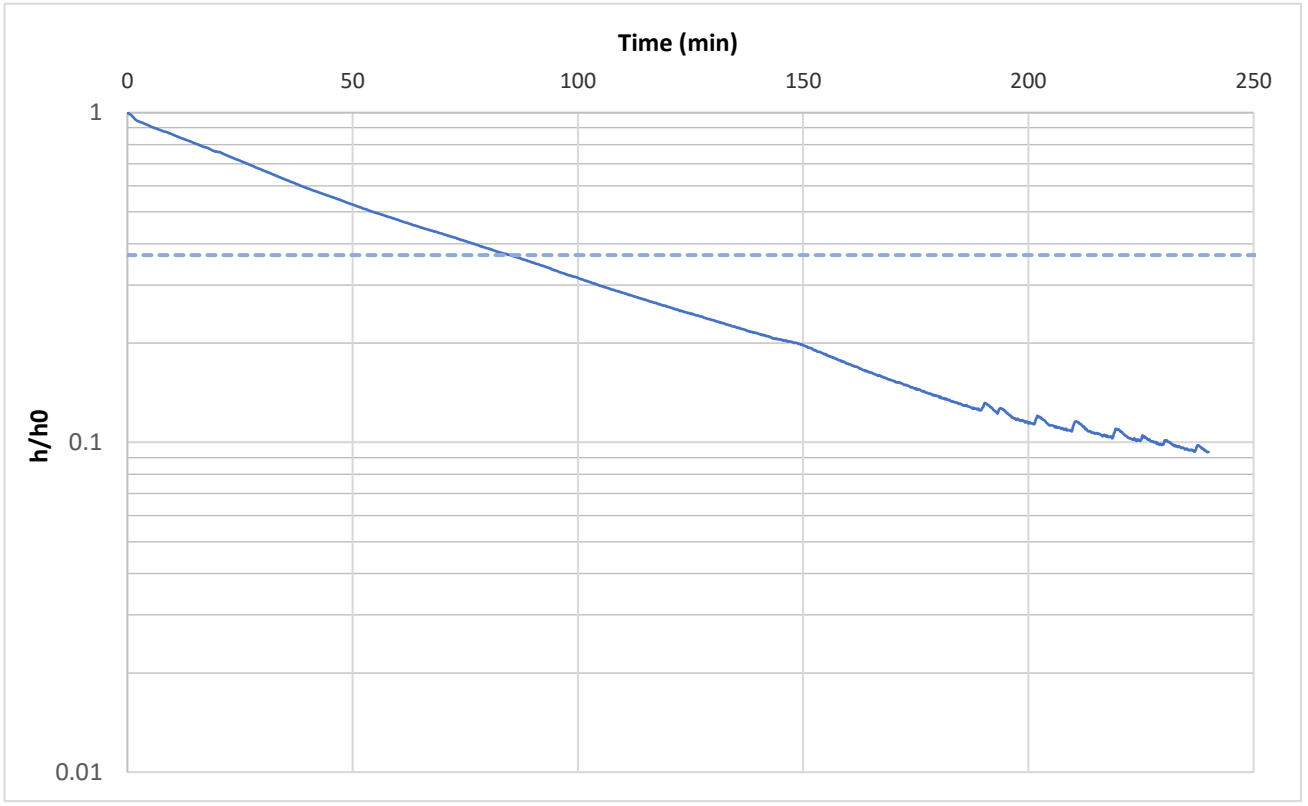
Client :	Sonsari Pty Ltd	**Location:**	BH11
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	24/11/2021
Test Method :	Hvorslev's Method (1951)	**Tested By :**	MS

Test	**BH11**				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	2.95	**Solid Casing Length (L)**	m	3.4
Groundwater Depth at t=0s	m	8.7	**Screened Length (L_e)**	m	9.6
Casing Radius (r_c)	m	0.025	**Characteristic Time (t_0)**	min	85
Borehole Radius (r_w)	m	0.05	**Hydraulic Conductivity (k)**	m/day	**0.0029**

$$K = \frac{r_c^2 \cdot \ln\left(\frac{L_e}{r_w}\right)}{2 \cdot L_e \cdot t_0}$$

Logger Details	
Time	9:10am





APPENDIX E – Laboratory Test Certificates

Alliance Geotechnical
10 Welder Road
Seven Hills
NSW 2147

Attention: **Matt Swinbourn**

Report **843317-S**
Project name 30 AUBURN ROAD
Project ID 13087
Received Date Nov 17, 2021

Client Sample ID			**BH02**	**BH04**	**BH05**	**BH06**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-No53568**	**S21-No53569**	**S21-No53570**	**S21-No53571**
Date Sampled			**Nov 05, 2021**	**Nov 01, 2021**	**Nov 09, 2021**	**Nov 02, 2021**
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	25	< 10	140	96
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	100	12	400	340
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.5	6.6	6.8	5.2
Resistivity*	0.5	ohm.m	98	850	25	29
Sulphate (as SO4)	10	mg/kg	13	< 10	37	44
% Moisture	1	%	15	19	15	14

Client Sample ID			**BH08**	**BH11**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**S21-No53572**	**S21-No53573**
Date Sampled			**Nov 08, 2021**	**Nov 04, 2021**
Test/Reference	LOR	Unit		
Chloride	10	mg/kg	< 10	18
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	46	64
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.5	4.9
Resistivity*	0.5	ohm.m	220	160
Sulphate (as SO4)	10	mg/kg	11	< 10
% Moisture	1	%	17	17

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Chloride	Sydney	Nov 23, 2021	28 Days
- Method: In-house method LTM-INO-4270 Anions by Ion Chromatography			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Sydney	Nov 23, 2021	7 Days
- Method: LTM-INO-4030 Conductivity			
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	Nov 23, 2021	7 Days
- Method: LTM-GEN-7090 pH by ISE			
Sulphate (as SO4)	Sydney	Nov 23, 2021	28 Days
- Method: In-house method LTM-INO-4270 Sulphate by Ion Chromatograph			
% Moisture	Sydney	Nov 23, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261 Site # 1254

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 6253 4444
NATA # 2377 Site # 2370

Eurofins Environment Testing NZ Limited
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Alliance Geotechnical
Address: 10 Welder Road
Seven Hills
NSW 2147

Project Name: 30 AUBURN ROAD
Project ID: 13087

Order No.:
Report #: 843317
Phone: 1800 288 188
Fax: 02 9675 1888

Received: Nov 17, 2021 5:55 PM
Due: Nov 24, 2021
Priority: 1 Day
Contact Name: Matt Swinbourn

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aggressivity Soil Set	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254							
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							
Mayfield Laboratory - NATA # 1261 Site # 25079							
Perth Laboratory - NATA # 2377 Site # 2370							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	BH02	Nov 05, 2021		Soil	S21-No53568	X	X
2	BH04	Nov 01, 2021		Soil	S21-No53569	X	X
3	BH05	Nov 09, 2021		Soil	S21-No53570	X	X
4	BH06	Nov 02, 2021		Soil	S21-No53571	X	X
5	BH08	Nov 08, 2021		Soil	S21-No53572	X	X
6	BH11	Nov 04, 2021		Soil	S21-No53573	X	X
Test Counts						6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs..

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM where no positive PFAS results have been reported have been reviewed and no data was affected.

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Chloride	mg/kg	< 10			10	Pass	
Sulphate (as SO4)	mg/kg	< 10			10	Pass	
LCS - % Recovery							
Chloride	%	97			70-130	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	%	84			70-130	Pass	
Resistivity*	%	84			70-130	Pass	
Sulphate (as SO4)	%	96			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-No53570	CP	%	15	14	3.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
Charl Du Preez	Senior Analyst-Inorganic (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

APPENDIX C

Groundwater Field Water Quality Parameters And Chemical Analysis

E

Appendix E Field Sheets and Calibration Certificates

PURGING AND GROUNDWATER SAMPLING DATA SHEET

BORE No: GW01

Project No SES_590 Project Name Data Gap Invest. Date 8/6/21 Sampled by: A.S.

Development 8/6/21

Development Method Bailer/12V
Time Started — SWL (start) 5.2mbtoc Volume Removed 30L Bore Depth (start) —
Time Stopped — SWL (end) — Discharge Rate — Bore Depth (end) —
Comments Removed 15L Bailer + 15L 12V. Okay recharge for micropurge. Very sludgy at base. NAPL Present (If yes thickness) N/A

Purging - 11/6/21

Purge Method Micro Purge Depth 7-7.5m btoc
Time Started — SWL (start) 5.05m btoc Bore Volume — Bore Depth (start) 9.45m btoc
Time Stopped — SWL (end) 5.65m " Volume Removed — Bore Depth (end) —
Comments Flow set at 0.25L/min. Drawdown stabile @ 5.36m btoc. ~~After~~ 20 min drawdown 5.55m btoc
Drawdown @ sample 5.67m btoc. NAPL Present (If yes thickness) —

Sampling

Sampling Method — Sampling Depth —
Time Started — SWL (start) —
Time Stopped — SWL (end) —
Comments

OVA Monitoring

Time	Ambient	Bore Head	Discharge

Field Analyses

Time	Vol Removed (L)	EC (uS/cm)	pH	T (C)	Redox (mV)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Comments (Color, turbidity)
5 min	1L	25707	6.32	21.1	103.2		1.72	Brown turbid, no odours
10 "	2L	25,805	6.25	21.2	110.9		2.13	" "
20 "	3-4L	25,855	6.22	21.4	117.0		2.15	"
25 min	4-5L	25,779	6.21	21.3	119.8		2.15	"
35 "	6-7L	25,443	6.11	20.5	128.8		2.19	"

Sample

Prepared By:.....
Checked By:.....

PURGING AND GROUNDWATER SAMPLING DATA SHEET

BORE No: GW02

Project No SES_590 Project Name Data Gap Invest. Date 11/6/21 Sampled by: A.S.

Development

Development Method
Time Started — SWL (start) — Volume Removed — Bore Depth (start)
Time Stopped — SWL (end) — Discharge Rate — Bore Depth (end)
Comments: Existing bore – no development — NAPL Present
(If yes thickness)

Purging – 11/6/21

Purge Method: Micro — Purge Depth: ~ 8m bgl
Time Started — SWL (start): 5.20m btoc — Bore Volume — Bore Depth (start): 11.39m btoc
Time Stopped — SWL (end): 8.16 " — Volume Removed — Bore Depth (end)
Comments: Drawdown dropping rapidly. ↓ slow recharge. Flow rate ≈ 0.4L/min. Drawdown drop to 6.8m btoc after 15mins. Reduced flow. — NAPL Present: —
(If yes thickness)

Sampling

Sampling Method — Sampling Depth
Time Started — SWL (start)
Time Stopped — SWL (end)
Comments

OVA Monitoring

Time	Ambient	Bore Head	Discharge

Field Analyses

Time	Vol Removed (L)	EC (uS/cm)	pH	T (C)	Redox (mV)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Comments (Color, turbidity)
5 min	1-2L	896	6.98	20.8	73.1		0.88	Brown, ↓ turbid, no odours
10 min	4-5L	997	6.94	20.8	78.4		0.68	" " "
20 min	6-7L	1063	6.96	20.7	82.5		0.39	"
25 mins	7-8L	1,070	6.94	20.7	83.9		0.34	"
30 mins		1,001	6.92	20.4	84.9		0.38	"

sample

Prepared By:.....
Checked By:.....

PURGING AND GROUNDWATER SAMPLING DATA SHEET

BORE No: GW03

Project No SES_590 Project Name Data Gap Invest. Date 9/6/21 Sampled by: A.S.

Development

Development Method 12V
Time Started — SWL (start) 5.4mbgl Volume Removed ≈ 10L Bore Depth (start) —
Time Stopped — SWL (end) dry Discharge Rate Bore Depth (end) —
Comments Slow recharge. Okay for micropurge. NAPL Present (If yes thickness) N/A

Purging — 11/6/21

Purge Method Micro Purge Depth ≈ 7-7.5mbgl
Time Started — SWL (start) 5.37m btoc Bore Volume Bore Depth (start) 8.00m btoc
Time Stopped — SWL (end) 7.37 " Volume Removed Bore Depth (end)
Comments Drawdown @ 15 mins 6.37mbtoc. Flow rate ≈ 0.4L/min NAPL Present
@ 20mins drawdown below top of pump. Stop pump allow to recharge. (If yes thickness) —
Recharge very slow.

Sampling

Sampling Method Sampling Depth
Time Started SWL (start)
Time Stopped SWL (end)
Comments Removed pump + used bailer (disposable)

OVA Monitoring

Time	Ambient	Bore Head	Discharge

Field Analyses

Time	Vol Removed (L)	EC (uS/cm)	pH	T (C)	Redox (mV)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Comments (Color, turbidity)
5 min	1-2L	19,913	6.31	18.9	134.4		4.85	Brown/grey, turbid, no odours
15 min	3-4L	20,560	6.33	18.9	135.7		4.57	"
20 min	5-6L	6,293	6.34	18.8	136.5		5.45	"
1hr	—	21,174	6.75	18.7	127.1		4.30	✓ turbid brown.

Prepared By:.....
Checked By:.....

PURGING AND GROUNDWATER SAMPLING DATA SHEET

BORE No: GW04

Project No SES_590 Project Name Data Crop Invest. Date 9/6/21 Sampled by: A.S.

Development

Development Method Bailer (disposable)
Time Started — SWL (start) 6.0mbgl Volume Removed ≈ 5L. Bore Depth (start) —
Time Stopped — SWL (end) dry Discharge Rate — Bore Depth (end) —
Comments v slow recharge. Clear then very turbid dark brown. NAPL Present
Not suitable for micropurge. (If yes thickness) N/A

Purging – 11/6/21

Purge Method Bailer (disposable) Purge Depth
Time Started — SWL (start) 5.89m btoc Bore Volume — Bore Depth (start) 7.96m btoc
Time Stopped — SWL (end) — Volume Removed — Bore Depth (end) —
Comments Bailed dry @ 7.5L. NAPL Present
(If yes thickness) —

Sampling

Sampling Method — Sampling Depth —
Time Started — SWL (start) —
Time Stopped — SWL (end) —
Comments

OVA Monitoring

Time	Ambient	Bore Head	Discharge

Field Analyses

Time	Vol Removed (L)	EC (uS/cm)	pH	T (C)	Redox (mV)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Comments (Color, turbidity)
	2L	22,763	5.49	19.0	132.0		4.59	Brown, v turbid no odours

Prepared By:.....
Checked By:.....

PURGING AND GROUNDWATER SAMPLING DATA SHEET

BORE No: GW05

Project No SES_590 Project Name Data Gap Inv Date 9/6/21 Sampled by: A.S

Development

Development Method 12V
Time Started —
Time Stopped —
Comments Minimal sludge @ base. okay recharge & good for micro purge.

SWL (start) 2.8m bgl
SWL (end) dry
Volume Removed 25L to dry
Discharge Rate

Bore Depth (start) —
Bore Depth (end) —
NAPL Present (If yes thickness) N/A

Purging — 11/6/21

Purge Method Micro
Time Started —
Time Stopped —
Comments Monument stick up 0.7m. Drawdown falling slowly. Drawdown stabilised @ ≈ 4.5m btoc. Pump rate @ ≈ 350mL/min Recharge too slow. Drawdown to ~~top~~ below top of pump. Hold pump for 5min then sample, to allow SWL back to approx 80%

Purge Depth ≈ 5.0m bgl
SWL (start) 3.45m btoc
SWL (end) 5.09m "
Bore Volume
Volume Removed

Bore Depth (start) 8.77m btoc
Bore Depth (end)
NAPL Present (If yes thickness) —

Sampling

Sampling Method
Time Started
Time Stopped
Comments Recharge back to 4.7m btoc after 60mins

Sampling Depth
SWL (start)
SWL (end)

OVA Monitoring

Time	Ambient	Bore Head	Discharge

Field Analyses

Time	Vol Removed (L)	EC (uS/cm)	pH	T (C)	Redox (mV)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Comments (Color, turbidity)
5min	1-2L	1,646	5.08	18.1	155.1		2.54	Fairly clear, no odr
12min	2-3L	1,648	4.96	18.0	169.9		3.29	" " "
30min	5-6L	1,762	4.93	17.7	184.9		4.17	" " "
1.5 hrs	—	3,126	4.88	18.0	210.0		3.58	" " "

Prepared By:.....
Checked By:.....

PURGING AND GROUNDWATER SAMPLING DATA SHEET

BORE No: GW06

Project No SES_590 Project Name Data Gap Invest. Date 9/6/21 Sampled by: A.S.

Development

Development Method —
Time Started
Time Stopped
Comments Bore is dry.

SWL (start) —
SWL (end)

Volume Removed
Discharge Rate

Bore Depth (start)
Bore Depth (end)
NAPL Present
(If yes thickness)

Purging — 11/6/21

Purge Method —
Time Started
Time Stopped
Comments Bore is dry.

Purge Depth
SWL (start) —
SWL (end)

Bore Volume
Volume Removed

Bore Depth (start)
Bore Depth (end)
NAPL Present
(If yes thickness)

Sampling

Sampling Method
Time Started
Time Stopped
Comments

Sampling Depth
SWL (start)
SWL (end)

OVA Monitoring

Time	Ambient	Bore Head	Discharge

Field Analyses

Time	Vol Removed (L)	EC (uS/cm)	pH	T (C)	Redox (mV)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Comments (Color, turbidity)

Prepared By:.....
Checked By:.....

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	ADAM SULLIVAN	Manager	Huong Crawford
Client	SULLIVAN ENVIRONMENTAL SCIENCES PTY. LIMITED	Laboratory	SGS Alexandria Environmental
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Facsimile	(Not specified)	Facsimile	+61 2 8594 0499
Email	ENQUIRIES@SULLIVAN-ES.COM.AU	Email	au.environmental.sydney@sgs.com
Project	**SES_590 (Regents Park)**	SGS Reference	**SE220656 R0**
Order Number	(Not specified)	Date Received	11 Jun 2021
Samples	10	Date Reported	21 Jun 2021

COMMENTS

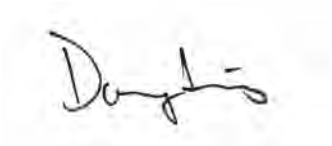
Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

VPH/VOC - The Limit of Reporting (LOR) has been raised due to interferences from the sample matrix.

PFAS subcontracted to SGS Melbourne, Unit 10/585 Blackburn Road Notting Hill VIC 3168, NATA Accreditation Number 2562, Site number 14420. ME321013.

MA1523: Some surrogate recovery is outside of the acceptance criteria due to sample matrix interference

SIGNATORIES



Dong LIANG
Metals/Inorganics Team Leader

Ly Kim HA
Organic Section Head

Teresa NGUYEN
Organic Chemist

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE220656.001 Water 11 Jun 2021 GW01	SE220656.002 Water 11 Jun 2021 QC01	SE220656.003 Water 11 Jun 2021 GW02	SE220656.004 Water 11 Jun 2021 GW03
VOCs in Water Method: AN433 Tested: 16/6/2021						
Fumigants						
2,2-dichloropropane	µg/L	0.5	-	-	<5.0↑	<0.5
1,2-dichloropropane	µg/L	0.5	-	-	<5.0↑	<0.5
cis-1,3-dichloropropene	µg/L	0.5	-	-	<5.0↑	<0.5
trans-1,3-dichloropropene	µg/L	0.5	-	-	<5.0↑	<0.5
1,2-dibromoethane (EDB)	µg/L	0.5	-	-	<5.0↑	<0.5
Halogenated Aliphatics						
Dichlorodifluoromethane (CFC-12)	µg/L	5	-	-	<50↑	<5
Chloromethane	µg/L	5	-	-	<50↑	<5
Vinyl chloride (Chloroethene)	µg/L	0.3	-	-	<3.0↑	<0.3
Bromomethane	µg/L	10	-	-	<100↑	<10
Chloroethane	µg/L	5	-	-	<50↑	<5
Trichlorofluoromethane	µg/L	1	-	-	<10↑	<1
Iodomethane	µg/L	5	-	-	<50↑	<5
1,1-dichloroethene	µg/L	0.5	-	-	<5.0↑	<0.5
Dichloromethane (Methylene chloride)	µg/L	5	-	-	<50↑	<5
Allyl chloride	µg/L	2	-	-	<20↑	<2
trans-1,2-dichloroethene	µg/L	0.5	-	-	<5.0↑	<0.5
1,1-dichloroethane	µg/L	0.5	-	-	<5.0↑	<0.5
cis-1,2-dichloroethene	µg/L	0.5	-	-	<5.0↑	<0.5
Bromochloromethane	µg/L	0.5	-	-	<5.0↑	<0.5
1,2-dichloroethane	µg/L	0.5	-	-	<5.0↑	<0.5
1,1,1-trichloroethane	µg/L	0.5	-	-	<5.0↑	<0.5
1,1-dichloropropene	µg/L	0.5	-	-	<5.0↑	<0.5
Carbon tetrachloride	µg/L	0.5	-	-	<5.0↑	<0.5
Dibromomethane	µg/L	0.5	-	-	<5.0↑	<0.5
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	-	-	<5.0↑	<0.5
1,1,2-trichloroethane	µg/L	0.5	-	-	<5.0↑	<0.5
1,3-dichloropropane	µg/L	0.5	-	-	<5.0↑	<0.5
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	-	-	<5.0↑	<0.5
1,1,1,2-tetrachloroethane	µg/L	0.5	-	-	<5.0↑	<0.5
cis-1,4-dichloro-2-butene	µg/L	1	-	-	<10↑	<1
1,1,2,2-tetrachloroethane	µg/L	0.5	-	-	<5.0↑	<0.5
1,2,3-trichloropropane	µg/L	0.5	-	-	<5.0↑	<0.5
trans-1,4-dichloro-2-butene	µg/L	1	-	-	<10↑	<1
1,2-dibromo-3-chloropropane	µg/L	0.5	-	-	<5.0↑	<0.5
Hexachlorobutadiene	µg/L	0.5	-	-	<5.0↑	<0.5
Halogenated Aromatics						
Chlorobenzene	µg/L	0.5	-	-	<5.0↑	<0.5
Bromobenzene	µg/L	0.5	-	-	<5.0↑	<0.5
2-chlorotoluene	µg/L	0.5	-	-	<5.0↑	<0.5
4-chlorotoluene	µg/L	0.5	-	-	<5.0↑	<0.5
1,3-dichlorobenzene	µg/L	0.5	-	-	<5.0↑	<0.5
1,4-dichlorobenzene	µg/L	0.3	-	-	<3.0↑	<0.3
1,2-dichlorobenzene	µg/L	0.5	-	-	<5.0↑	<0.5
1,2,4-trichlorobenzene	µg/L	0.5	-	-	<5.0↑	<0.5
1,2,3-trichlorobenzene	µg/L	0.5	-	-	<5.0↑	<0.5
Monocyclic Aromatic Hydrocarbons						
Benzene	µg/L	0.5	<0.5	<0.5	<5.0↑	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<5.0↑	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<50↑	<0.5
m/p-xylene	µg/L	1	<1	<1	<10↑	<1
o-xylene	µg/L	0.5	<0.5	<0.5	<5.0↑	<0.5
Styrene (Vinyl benzene)	µg/L	0.5	-	-	<5.0↑	<0.5
Isopropylbenzene (Cumene)	µg/L	0.5	-	-	<5.0↑	<0.5
n-propylbenzene	µg/L	0.5	-	-	<5.0↑	<0.5

Parameter	Units	LOR	Sample Number: SE220656.001 Sample Matrix: Water Sample Date: 11 Jun 2021 Sample Name: GW01	SE220656.002 Water 11 Jun 2021 QC01	SE220656.003 Water 11 Jun 2021 GW02	SE220656.004 Water 11 Jun 2021 GW03
VOCs in Water Method: AN433 Tested: 16/6/2021 (continued)						
1,3,5-trimethylbenzene	µg/L	0.5	-	-	<5.0↑	<0.5
tert-butylbenzene	µg/L	0.5	-	-	<5.0↑	<0.5
1,2,4-trimethylbenzene	µg/L	0.5	-	-	<5.0↑	<0.5
sec-butylbenzene	µg/L	0.5	-	-	<5.0↑	<0.5
p-isopropyltoluene	µg/L	0.5	-	-	<5.0↑	<0.5
n-butylbenzene	µg/L	0.5	-	-	<5.0↑	<0.5
Nitrogenous Compounds						
Acrylonitrile	µg/L	0.5	-	-	<5.0↑	<0.5
2-nitropropane	µg/L	100	-	-	<1000↑	<100
Oxygenated Compounds						
Acetone (2-propanone)	µg/L	10	-	-	<100↑	<10
MtBE (Methyl-tert-butyl ether)	µg/L	2	-	-	<20↑	<2
Vinyl acetate	µg/L	10	-	-	<100↑	<10
MEK (2-butanone)	µg/L	10	-	-	<100↑	<10
MIBK (4-methyl-2-pentanone)	µg/L	5	-	-	<50↑	<5
2-hexanone (MBK)	µg/L	5	-	-	<50↑	<5
Polycyclic VOCs						
Naphthalene	µg/L	0.5	<0.5	<0.5	<5.0↑	<0.5
Sulphonated Compounds						
Carbon disulfide	µg/L	2	-	-	<20↑	<2
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**102**	**101**	**97**	**101**
d8-toluene (Surrogate)	%	-	**94**	**97**	**97**	**97**
Bromofluorobenzene (Surrogate)	%	-	**102**	**102**	**102**	**101**
Totals						
Total Xylenes	µg/L	1.5	<1.5	<1.5	<15↑	<1.5
Total BTEX	µg/L	3	<3	<3	<30↑	<3
Total VOC	µg/L	10	-	-	<100↑	<10

Parameter	Units	LOR	Sample Number: SE220656.001 Sample Matrix: Water Sample Date: 11 Jun 2021 Sample Name: GW01	SE220656.002 Water 11 Jun 2021 QC01	SE220656.003 Water 11 Jun 2021 GW02	SE220656.004 Water 11 Jun 2021 GW03
VOCs in Water Method: AN433 Tested: 16/6/2021 (continued)						
Trihalomethanes						
Chloroform (THM)	µg/L	0.5	-	-	<5.0↑	<0.5
Bromodichloromethane (THM)	µg/L	0.5	-	-	<5.0↑	<0.5
Dibromochloromethane (THM)	µg/L	0.5	-	-	<5.0↑	<0.5
Bromoform (THM)	µg/L	0.5	-	-	<5.0↑	<0.5
Volatile Petroleum Hydrocarbons in Water Method: AN433 Tested: 16/6/2021						
TRH C6-C10	µg/L	50	<50	<50	<500↑	<50
TRH C6-C9	µg/L	40	<40	<40	<400↑	<40
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**102**	**101**	**97**	**101**
d8-toluene (Surrogate)	%	-	**94**	**97**	**97**	**97**
Bromofluorobenzene (Surrogate)	%	-	**102**	**102**	**102**	**101**
VPH F Bands						
Benzene (F0)	µg/L	0.5	<0.5	<0.5	<5.0↑	<0.5
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	<500↑	<50
TRH (Total Recoverable Hydrocarbons) in Water Method: AN403 Tested: 17/6/2021						
TRH C10-C14	µg/L	50	<50	<50	<50	<50
TRH C15-C28	µg/L	200	<200	<200	**360**	<200
TRH C29-C36	µg/L	200	<200	<200	**220**	<200
TRH C37-C40	µg/L	200	<200	<200	<200	<200
TRH C10-C40	µg/L	320	<320	<320	**570**	<320
TRH F Bands						
TRH >C10-C16	µg/L	60	<60	<60	<60	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	<60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	**530**	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500	<500

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE220656.001 Water 11 Jun 2021 GW01	SE220656.002 Water 11 Jun 2021 QC01	SE220656.003 Water 11 Jun 2021 GW02	SE220656.004 Water 11 Jun 2021 GW03
PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: AN420 Tested: 17/6/2021						
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	**0.1**	**0.1**	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	**0.1**	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	**0.2**	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	**0.2**	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	**0.2**	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1	**1**	<1
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**54**	**44**	**42**	**50**
2-fluorobiphenyl (Surrogate)	%	-	**68**	**56**	**48**	**56**
d14-p-terphenyl (Surrogate)	%	-	**80**	**68**	**62**	**74**
Trace Metals (Dissolved) in Water by ICPMS Method: AN318 Tested: 15/6/2021						
Arsenic, As	µg/L	1	**1**	**1**	<1	<1
Cadmium, Cd	µg/L	0.1	**0.8**	**0.9**	**0.2**	**0.2**
Chromium, Cr	µg/L	1	**3**	**4**	**6**	**6**
Copper, Cu	µg/L	1	**2**	**3**	**1**	**2**
Lead, Pb	µg/L	1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	**24**	**24**	**15**	**15**
Zinc, Zn	µg/L	5	**59**	**65**	**15**	**18**
Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 15/6/2021						
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level Method: MA-1523 Tested: 21/6/2021						
Perfluorobutanoic acid (PFBA)	µg/L	0.0005	-	-	**0.016**	-
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	-	-	**0.0008**	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	-	-	**0.0040**	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	-	-	**0.0017**	-
Perfluorooctanoic Acid (PFOA)	µg/L	0.0005	-	-	**0.0009**	-
Perfluorononanoic acid (PFNA)	µg/L	0.001	-	-	<0.001	-
Perfluorodecanoic acid (PFDA)	µg/L	0.001	-	-	<0.001	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.001	-	-	<0.001	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.001	-	-	<0.001	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.001	-	-	<0.001	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.001	-	-	<0.001	-
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.002	-	-	<0.002	-
Perfluorobutane sulfonate (PFBS)	µg/L	0.001	-	-	**0.002**	-
Perfluoropentane sulfonate (PFPeS)	µg/L	0.001	-	-	<0.001	-
Perfluorohexane sulfonate (PFHxS)	µg/L	0.0002	-	-	**0.0012**	-
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.0002	-	-	<0.0002	-
Perfluorooctane sulfonate (PFOS)	µg/L	0.0002	-	-	**0.0006**	-
Sum of PFHxS and PFOS	µg/L	0.0002	-	-	**0.0018**	-
Perfluorononane sulfonate (PFNS)	µg/L	0.0005	-	-	<0.0005	-
Perfluorodecane sulfonate (PFDS)	µg/L	0.0005	-	-	<0.0005	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE220656.001 Water 11 Jun 2021 GW01	SE220656.002 Water 11 Jun 2021 QC01	SE220656.003 Water 11 Jun 2021 GW02	SE220656.004 Water 11 Jun 2021 GW03
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level	**Method: MA-1523**	**Tested: 21/6/2021**	**(continued)**				
Perfluorododecane sulfonate (PFDoS)	µg/L	0.0005		-	-	<0.0005	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.0005		-	-	<0.0005	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.0005		-	-	<0.0005	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.0005		-	-	<0.0005	-
Perfluorooctane sulfonamide (PFOSA)	µg/L	0.002		-	-	<0.002	-
N-Methylperfluorooctane sulfonamide (N-MeFOSA)	µg/L	0.0025		-	-	<0.0025	-
N-Ethylperfluorooctane sulfonamide (N-EtFOSA)	µg/L	0.0025		-	-	<0.0025	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025		-	-	<0.0025	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025		-	-	<0.0025	-
N-Methylperfluorooctanesulfonamidoacetic acid	µg/L	0.0025		-	-	<0.0025	-
N-Ethylperfluorooctanesulfonamidoacetic Acid	µg/L	0.0025		-	-	<0.0025	-
Total PFAS (n=30)	µg/L	0.006		-	-	**0.027**	-
(13C4-PFBA) Isotopically Labelled Internal Recovery	%	-		-	-	**100**	-
(13C5-PFPeA) Isotopically Labelled Internal Recovery	%	-		-	-	**98**	-
(13C5-PFHxA) Isotopically Labelled Internal Recovery	%	-		-	-	**95**	-
(13C4-PFHpA) Isotopically Labelled Internal Recovery	%	-		-	-	**96**	-
(13C4_PFOA) Isotopically Labelled Internal Recovery	%	-		-	-	**104**	-
(13C9-PFNA) Isotopically Labelled Internal Recovery	%	-		-	-	**108**	-
(13C6-PFDA) Isotopically Labelled Internal Recovery	%	-		-	-	**103**	-
(13C7-PFUdA) Isotopically Labelled Internal Recovery	%	-		-	-	**112**	-
(13C2-PFDoA) Isotopically Labelled Internal Recovery	%	-		-	-	**118**	-
(13C2_PFTeDA) Isotopically Labelled Internal Recovery	%	-		-	-	**140**	-
(13C2-PFHxDA) Isotopically Labelled Internal Recovery	%	-		-	-	**183**	-
(13C3-PFBS) Isotopically Labelled Internal Recovery	%	-		-	-	**90**	-
(13C3-PFHxS) Isotopically Labelled Internal Recovery	%	-		-	-	**106**	-
(13C8-PFOS) Isotopically Labelled Internal Recovery	%	-		-	-	**95**	-
(13C2-4:2 FTS) Isotopically Labelled Internal Recovery	%	-		-	-	**83**	-
(13C2-6:2 FTS) Isotopically Labelled Internal Recovery	%	-		-	-	**66**	-
(13C2-8:2 FTS) Isotopically Labelled Internal Recovery	%	-		-	-	**67**	-
(13C8-PFOSA) Isotopically Labelled Internal Recovery	%	-		-	-	**60**	-
(D3-N-MeFOSA) Isotopically Labelled Internal Recovery	%	-		-	-	**71**	-
(D5-N-EtFOSA) Isotopically Labelled Internal Recovery	%	-		-	-	**76**	-
(D7-N-MeFOSE) Isotopically Labelled Internal Recovery	%	-		-	-	**65**	-
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery	%	-		-	-	**65**	-
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery	%	-		-	-	**68**	-
(D5-N-EtFOSAA) Isotopically Labelled Internal Recovery	%	-		-	-	**66**	-

Parameter	Units	LOR	Sample Number: SE220656.005 Sample Matrix: Water Sample Date: 11 Jun 2021 Sample Name: GW04	SE220656.006 Water 11 Jun 2021 GW05	SE220656.007 Water 11 Jun 2021 Rinse_HA	SE220656.008 Water 11 Jun 2021 Rinse_Pump
VOCs in Water Method: AN433 Tested: 16/6/2021						
Fumigants						
2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	-	-
1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	-	-
cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	-	-
trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	-	-
1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	-	-
Halogenated Aliphatics						
Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	-	-
Chloromethane	µg/L	5	<5	<5	-	-
Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	-	-
Bromomethane	µg/L	10	<10	<10	-	-
Chloroethane	µg/L	5	<5	<5	-	-
Trichlorofluoromethane	µg/L	1	<1	<1	-	-
Iodomethane	µg/L	5	<5	<5	-	-
1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	-	-
Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	-	-
Allyl chloride	µg/L	2	<2	<2	-	-
trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	-	-
1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	-	-
cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	-	-
Bromochloromethane	µg/L	0.5	<0.5	<0.5	-	-
1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	-	-
1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	-	-
1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	-	-
Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	-	-
Dibromomethane	µg/L	0.5	<0.5	<0.5	-	-
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	-	-
1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	-	-
1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	-	-
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	-	-
1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	-	-
cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	-	-
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	-	-
1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	-	-
trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	-	-
1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	-	-
Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	-	-
Halogenated Aromatics						
Chlorobenzene	µg/L	0.5	<0.5	<0.5	-	-
Bromobenzene	µg/L	0.5	<0.5	<0.5	-	-
2-chlorotoluene	µg/L	0.5	<0.5	<0.5	-	-
4-chlorotoluene	µg/L	0.5	<0.5	<0.5	-	-
1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	-	-
1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	-	-
1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	-	-
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	-	-
1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	-	-
Monocyclic Aromatic Hydrocarbons						
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	-	-
Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	-	-
n-propylbenzene	µg/L	0.5	<0.5	<0.5	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE220656.005 Water 11 Jun 2021 GW04	SE220656.006 Water 11 Jun 2021 GW05	SE220656.007 Water 11 Jun 2021 Rinse_HA	SE220656.008 Water 11 Jun 2021 Rinse_Pump
VOCs in Water Method: AN433 Tested: 16/6/2021 (continued)						
1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	-	-
tert-butylbenzene	µg/L	0.5	<0.5	<0.5	-	-
1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	-	-
sec-butylbenzene	µg/L	0.5	<0.5	<0.5	-	-
p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	-	-
n-butylbenzene	µg/L	0.5	<0.5	<0.5	-	-
Nitrogenous Compounds						
Acrylonitrile	µg/L	0.5	<0.5	<0.5	-	-
2-nitropropane	µg/L	100	<100	<100	-	-
Oxygenated Compounds						
Acetone (2-propanone)	µg/L	10	<10	<10	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<2	-	-
Vinyl acetate	µg/L	10	<10	<10	-	-
MEK (2-butanone)	µg/L	10	<10	<10	-	-
MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	-	-
2-hexanone (MBK)	µg/L	5	<5	<5	-	-
Polycyclic VOCs						
Naphthalene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Sulphonated Compounds						
Carbon disulfide	µg/L	2	<2	<2	-	-
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**101**	**99**	**99**	**98**
d8-toluene (Surrogate)	%	-	**95**	**95**	**97**	**97**
Bromofluorobenzene (Surrogate)	%	-	**101**	**101**	**100**	**103**
Totals						
Total Xylenes	µg/L	1.5	<1.5	<1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3	<3	<3
Total VOC	µg/L	10	<10	<10	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE220656.005 Water 11 Jun 2021 GW04	SE220656.006 Water 11 Jun 2021 GW05	SE220656.007 Water 11 Jun 2021 Rinse_HA	SE220656.008 Water 11 Jun 2021 Rinse_Pump
VOCs in Water Method: AN433 Tested: 16/6/2021 (continued)							
Trihalomethanes							
Chloroform (THM)	µg/L	0.5		<0.5	<0.5	-	-
Bromodichloromethane (THM)	µg/L	0.5		<0.5	<0.5	-	-
Dibromochloromethane (THM)	µg/L	0.5		<0.5	<0.5	-	-
Bromoform (THM)	µg/L	0.5		<0.5	<0.5	-	-
Volatile Petroleum Hydrocarbons in Water Method: AN433 Tested: 16/6/2021							
TRH C6-C10	µg/L	50		<50	<50	<50	<50
TRH C6-C9	µg/L	40		<40	<40	<40	<40
Surrogates							
d4-1,2-dichloroethane (Surrogate)	%	-		**101**	**99**	**99**	**98**
d8-toluene (Surrogate)	%	-		**95**	**95**	**97**	**97**
Bromofluorobenzene (Surrogate)	%	-		**101**	**101**	**100**	**103**
VPH F Bands							
Benzene (F0)	µg/L	0.5		<0.5	<0.5	<0.5	<0.5
TRH C6-C10 minus BTEX (F1)	µg/L	50		<50	<50	<50	<50
TRH (Total Recoverable Hydrocarbons) in Water Method: AN403 Tested: 17/6/2021							
TRH C10-C14	µg/L	50		<50	<50	<50	<50
TRH C15-C28	µg/L	200		<200	<200	<200	<200
TRH C29-C36	µg/L	200		<200	<200	<200	<200
TRH C37-C40	µg/L	200		<200	<200	<200	<200
TRH C10-C40	µg/L	320		<320	<320	<320	<320
TRH F Bands							
TRH >C10-C16	µg/L	60		<60	<60	<60	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60		<60	<60	<60	<60
TRH >C16-C34 (F3)	µg/L	500		<500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500		<500	<500	<500	<500

Parameter	Units	LOR	Sample Number: SE220656.005 Sample Matrix: Water Sample Date: 11 Jun 2021 Sample Name: GW04	SE220656.006 Water 11 Jun 2021 GW05	SE220656.007 Water 11 Jun 2021 Rinse_HA	SE220656.008 Water 11 Jun 2021 Rinse_Pump
PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: AN420 Tested: 17/6/2021						
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1	<1	<1
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**56**	**44**	**42**	**60**
2-fluorobiphenyl (Surrogate)	%	-	**66**	**52**	**46**	**68**
d14-p-terphenyl (Surrogate)	%	-	**82**	**66**	**68**	**86**
Trace Metals (Dissolved) in Water by ICPMS Method: AN318 Tested: 15/6/2021						
Arsenic, As	µg/L	1	<1	<1	<1	<1
Cadmium, Cd	µg/L	0.1	**0.3**	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	**14**	**1**	<1	<1
Copper, Cu	µg/L	1	**1**	**6**	<1	**2**
Lead, Pb	µg/L	1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	**7**	**54**	<1	**5**
Zinc, Zn	µg/L	5	**19**	**180**	<5	**17**
Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 15/6/2021						
Mercury	mg/L	0.0001	<0.0001	**0.0005**	<0.0001	<0.0001
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level Method: MA-1523 Tested: 21/6/2021						
Perfluorobutanoic acid (PFBA)	µg/L	0.0005	-	**0.0034**	<0.0005	<0.0005
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	-	**0.0068**	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	-	**0.0088**	<0.0005	<0.0005
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	-	**0.0043**	<0.0005	<0.0005
Perfluorooctanoic Acid (PFOA)	µg/L	0.0005	-	**0.0044**	<0.0005	<0.0005
Perfluorononanoic acid (PFNA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluoroundecanoic acid (PFUnA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluorododecanoic acid (PFDoA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.002	-	<0.002	<0.002	<0.002
Perfluorobutane sulfonate (PFBS)	µg/L	0.001	-	**0.003**	<0.001	<0.001
Perfluoropentane sulfonate (PFPeS)	µg/L	0.001	-	**0.003**	<0.001	<0.001
Perfluorohexane sulfonate (PFHxS)	µg/L	0.0002	-	**0.0079**	<0.0002	<0.0002
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.0002	-	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonate (PFOS)	µg/L	0.0002	-	**0.0003**	<0.0002	<0.0002
Sum of PFHxS and PFOS	µg/L	0.0002	-	**0.0082**	<0.0002	<0.0002
Perfluorononane sulfonate (PFNS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
Perfluorodecane sulfonate (PFDS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE220656.005 Water 11 Jun 2021 GW04	SE220656.006 Water 11 Jun 2021 GW05	SE220656.007 Water 11 Jun 2021 Rinse_HA	SE220656.008 Water 11 Jun 2021 Rinse_Pump
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level	**Method: MA-1523**	**Tested: 21/6/2021**	**(continued)**				
Perfluorododecane sulfonate (PFDoS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonamide (PFOSA)	µg/L	0.002	-	<0.002	<0.002	<0.002
N-Methylperfluorooctane sulfonamide (N-MeFOSA)	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
N-Ethylperfluorooctane sulfonamide (N-EtFOSA)	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
2-(N-Methylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
2-(N-Ethylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
N-Methylperfluorooctanesulfonamidoacetic acid	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
N-Ethylperfluorooctanesulfonamidoacetic Acid	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
Total PFAS (n=30)	µg/L	0.006	-	**0.042**	<0.0060	<0.0060
(13C4-PFBA) Isotopically Labelled Internal Recovery	%	-	-	**102**	**99**	**101**
(13C5-PFPeA) Isotopically Labelled Internal Recovery	%	-	-	**136**	**95**	**97**
(13C5-PFHxA) Isotopically Labelled Internal Recovery	%	-	-	**83**	**112**	**102**
(13C4-PFHpA) Isotopically Labelled Internal Recovery	%	-	-	**84**	**104**	**108**
(13C4_PFOA) Isotopically Labelled Internal Recovery	%	-	-	**99**	**99**	**101**
(13C9-PFNA) Isotopically Labelled Internal Recovery	%	-	-	**108**	**105**	**106**
(13C6-PFDA) Isotopically Labelled Internal Recovery	%	-	-	**114**	**122**	**121**
(13C7-PFUdA) Isotopically Labelled Internal Recovery	%	-	-	**126**	**113**	**83**
(13C2-PFDoA) Isotopically Labelled Internal Recovery	%	-	-	**140**	**132**	**93**
(13C2_PFTeDA) Isotopically Labelled Internal Recovery	%	-	-	**195**	**146**	**138**
(13C2-PFHxDA) Isotopically Labelled Internal Recovery	%	-	-	**372**	**269**	**221**
(13C3-PFBS) Isotopically Labelled Internal Recovery	%	-	-	**85**	**117**	**93**
(13C3-PFHxS) Isotopically Labelled Internal Recovery	%	-	-	**94**	**100**	**100**
(13C8-PFOS) Isotopically Labelled Internal Recovery	%	-	-	**100**	**95**	**100**
(13C2-4:2 FTS) Isotopically Labelled Internal Recovery	%	-	-	**64**	**127**	**86**
(13C2-6:2 FTS) Isotopically Labelled Internal Recovery	%	-	-	**58**	**105**	**80**
(13C2-8:2 FTS) Isotopically Labelled Internal Recovery	%	-	-	**53**	**113**	**83**
(13C8-PFOSA) Isotopically Labelled Internal Recovery	%	-	-	**56**	**83**	**82**
(D3-N-MeFOSA) Isotopically Labelled Internal Recovery	%	-	-	**66**	**110**	**76**
(D5-N-EtFOSA) Isotopically Labelled Internal Recovery	%	-	-	**74**	**122**	**108**
(D7-N-MeFOSE) Isotopically Labelled Internal Recovery	%	-	-	**57**	**106**	**102**
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery	%	-	-	**52**	**104**	**95**
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery	%	-	-	**58**	**100**	**100**
(D5-N-EtFOSAA) Isotopically Labelled Internal Recovery	%	-	-	**65**	**94**	**87**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE220656.009 Water 02 Jun 2021 Trip Blank	SE220656.010 Water 02 Jun 2021 Trip Spike
VOCs in Water Method: AN433 Tested: 16/6/2021				
Fumigants				
2,2-dichloropropane	µg/L	0.5	-	-
1,2-dichloropropane	µg/L	0.5	-	-
cis-1,3-dichloropropene	µg/L	0.5	-	-
trans-1,3-dichloropropene	µg/L	0.5	-	-
1,2-dibromoethane (EDB)	µg/L	0.5	-	-
Halogenated Aliphatics				
Dichlorodifluoromethane (CFC-12)	µg/L	5	-	-
Chloromethane	µg/L	5	-	-
Vinyl chloride (Chloroethene)	µg/L	0.3	-	-
Bromomethane	µg/L	10	-	-
Chloroethane	µg/L	5	-	-
Trichlorofluoromethane	µg/L	1	-	-
Iodomethane	µg/L	5	-	-
1,1-dichloroethene	µg/L	0.5	-	-
Dichloromethane (Methylene chloride)	µg/L	5	-	-
Allyl chloride	µg/L	2	-	-
trans-1,2-dichloroethene	µg/L	0.5	-	-
1,1-dichloroethane	µg/L	0.5	-	-
cis-1,2-dichloroethene	µg/L	0.5	-	-
Bromochloromethane	µg/L	0.5	-	-
1,2-dichloroethane	µg/L	0.5	-	-
1,1,1-trichloroethane	µg/L	0.5	-	-
1,1-dichloropropene	µg/L	0.5	-	-
Carbon tetrachloride	µg/L	0.5	-	-
Dibromomethane	µg/L	0.5	-	-
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	-	-
1,1,2-trichloroethane	µg/L	0.5	-	-
1,3-dichloropropane	µg/L	0.5	-	-
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	-	-
1,1,1,2-tetrachloroethane	µg/L	0.5	-	-
cis-1,4-dichloro-2-butene	µg/L	1	-	-
1,1,2,2-tetrachloroethane	µg/L	0.5	-	-
1,2,3-trichloropropane	µg/L	0.5	-	-
trans-1,4-dichloro-2-butene	µg/L	1	-	-
1,2-dibromo-3-chloropropane	µg/L	0.5	-	-
Hexachlorobutadiene	µg/L	0.5	-	-
Halogenated Aromatics				
Chlorobenzene	µg/L	0.5	-	-
Bromobenzene	µg/L	0.5	-	-
2-chlorotoluene	µg/L	0.5	-	-
4-chlorotoluene	µg/L	0.5	-	-
1,3-dichlorobenzene	µg/L	0.5	-	-
1,4-dichlorobenzene	µg/L	0.3	-	-
1,2-dichlorobenzene	µg/L	0.5	-	-
1,2,4-trichlorobenzene	µg/L	0.5	-	-
1,2,3-trichlorobenzene	µg/L	0.5	-	-
Monocyclic Aromatic Hydrocarbons				
Benzene	µg/L	0.5	<0.5	[105%]
Toluene	µg/L	0.5	<0.5	[104%]
Ethylbenzene	µg/L	0.5	<0.5	[105%]
m/p-xylene	µg/L	1	<1	[104%]
o-xylene	µg/L	0.5	<0.5	[106%]
Styrene (Vinyl benzene)	µg/L	0.5	-	-
Isopropylbenzene (Cumene)	µg/L	0.5	-	-
n-propylbenzene	µg/L	0.5	-	-

Parameter	Units	LOR	Sample Number: SE220656.009 Sample Matrix: Water Sample Date: 02 Jun 2021 Sample Name: Trip Blank	Sample Number: SE220656.010 Sample Matrix: Water Sample Date: 02 Jun 2021 Sample Name: Trip Spike
VOCs in Water Method: AN433 Tested: 16/6/2021 (continued)				
1,3,5-trimethylbenzene	µg/L	0.5	-	-
tert-butylbenzene	µg/L	0.5	-	-
1,2,4-trimethylbenzene	µg/L	0.5	-	-
sec-butylbenzene	µg/L	0.5	-	-
p-isopropyltoluene	µg/L	0.5	-	-
n-butylbenzene	µg/L	0.5	-	-
Nitrogenous Compounds				
Acrylonitrile	µg/L	0.5	-	-
2-nitropropane	µg/L	100	-	-
Oxygenated Compounds				
Acetone (2-propanone)	µg/L	10	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	2	-	-
Vinyl acetate	µg/L	10	-	-
MEK (2-butanone)	µg/L	10	-	-
MIBK (4-methyl-2-pentanone)	µg/L	5	-	-
2-hexanone (MBK)	µg/L	5	-	-
Polycyclic VOCs				
Naphthalene	µg/L	0.5	<0.5	-
Sulphonated Compounds				
Carbon disulfide	µg/L	2	-	-
Surrogates				
d4-1,2-dichloroethane (Surrogate)	%	-	**97**	**101**
d8-toluene (Surrogate)	%	-	**97**	**99**
Bromofluorobenzene (Surrogate)	%	-	**100**	**96**

Parameter	Units	LOR	Sample Number: SE220656.009 Sample Matrix: Water Sample Date: 02 Jun 2021 Sample Name: Trip Blank	Sample Number: SE220656.010 Sample Matrix: Water Sample Date: 02 Jun 2021 Sample Name: Trip Spike
VOCs in Water Method: AN433 Tested: 16/6/2021 (continued)				
Totals				
Total Xylenes	µg/L	1.5	<1.5	-
Total BTEX	µg/L	3	<3	-
Total VOC	µg/L	10	-	-
Trihalomethanes				
Chloroform (THM)	µg/L	0.5	-	-
Bromodichloromethane (THM)	µg/L	0.5	-	-
Dibromochloromethane (THM)	µg/L	0.5	-	-
Bromoform (THM)	µg/L	0.5	-	-
Volatile Petroleum Hydrocarbons in Water Method: AN433 Tested: 16/6/2021				
TRH C6-C10	µg/L	50	-	-
TRH C6-C9	µg/L	40	-	-
Surrogates				
d4-1,2-dichloroethane (Surrogate)	%	-	-	-
d8-toluene (Surrogate)	%	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-
VPH F Bands				
Benzene (F0)	µg/L	0.5	-	-
TRH C6-C10 minus BTEX (F1)	µg/L	50	-	-
TRH (Total Recoverable Hydrocarbons) in Water Method: AN403 Tested: 18/6/2021				
TRH C10-C14	µg/L	50	-	-
TRH C15-C28	µg/L	200	-	-
TRH C29-C36	µg/L	200	-	-
TRH C37-C40	µg/L	200	-	-
TRH C10-C40	µg/L	320	-	-
TRH F Bands				
TRH >C10-C16	µg/L	60	-	-
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	-	-
TRH >C16-C34 (F3)	µg/L	500	-	-
TRH >C34-C40 (F4)	µg/L	500	-	-

Parameter	Units	LOR	Sample Number: SE220656.009 Sample Matrix: Water Sample Date: 02 Jun 2021 Sample Name: Trip Blank	Sample Number: SE220656.010 Sample Matrix: Water Sample Date: 02 Jun 2021 Sample Name: Trip Spike
PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: AN420 Tested: 21/6/2021				
Naphthalene	µg/L	0.1	-	-
2-methylnaphthalene	µg/L	0.1	-	-
1-methylnaphthalene	µg/L	0.1	-	-
Acenaphthylene	µg/L	0.1	-	-
Acenaphthene	µg/L	0.1	-	-
Fluorene	µg/L	0.1	-	-
Phenanthrene	µg/L	0.1	-	-
Anthracene	µg/L	0.1	-	-
Fluoranthene	µg/L	0.1	-	-
Pyrene	µg/L	0.1	-	-
Benzo(a)anthracene	µg/L	0.1	-	-
Chrysene	µg/L	0.1	-	-
Benzo(b&j)fluoranthene	µg/L	0.1	-	-
Benzo(k)fluoranthene	µg/L	0.1	-	-
Benzo(a)pyrene	µg/L	0.1	-	-
Indeno(1,2,3-cd)pyrene	µg/L	0.1	-	-
Dibenzo(ah)anthracene	µg/L	0.1	-	-
Benzo(ghi)perylene	µg/L	0.1	-	-
Total PAH (18)	µg/L	1	-	-
Surrogates				
d5-nitrobenzene (Surrogate)	%	-	-	-
2-fluorobiphenyl (Surrogate)	%	-	-	-
d14-p-terphenyl (Surrogate)	%	-	-	-
Trace Metals (Dissolved) in Water by ICPMS Method: AN318 Tested: 18/6/2021				
Arsenic, As	µg/L	1	-	-
Cadmium, Cd	µg/L	0.1	-	-
Chromium, Cr	µg/L	1	-	-
Copper, Cu	µg/L	1	-	-
Lead, Pb	µg/L	1	-	-
Nickel, Ni	µg/L	1	-	-
Zinc, Zn	µg/L	5	-	-
Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 15/6/2021				
Mercury	mg/L	0.0001	-	-
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level Method: MA-1523 Tested: 21/6/2021				
Perfluorobutanoic acid (PFBA)	µg/L	0.0005	-	-
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	-	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	-	-
Perfluorooctanoic Acid (PFOA)	µg/L	0.0005	-	-
Perfluorononanoic acid (PFNA)	µg/L	0.001	-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.001	-	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.001	-	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.001	-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.001	-	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.001	-	-
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.002	-	-
Perfluorobutane sulfonate (PFBS)	µg/L	0.001	-	-
Perfluoropentane sulfonate (PFPeS)	µg/L	0.001	-	-
Perfluorohexane sulfonate (PFHxS)	µg/L	0.0002	-	-
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.0002	-	-
Perfluorooctane sulfonate (PFOS)	µg/L	0.0002	-	-
Sum of PFHxS and PFOS	µg/L	0.0002	-	-
Perfluorononane sulfonate (PFNS)	µg/L	0.0005	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE220656.009 Water 02 Jun 2021 Trip Blank	SE220656.010 Water 02 Jun 2021 Trip Spike
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level Method: MA-1523 Tested: 21/6/2021 (continued)				
Perfluorodecane sulfonate (PFDS)	µg/L	0.0005	-	-
Perfluorododecane sulfonate (PFDoS)	µg/L	0.0005	-	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.0005	-	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.0005	-	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.0005	-	-
Perfluorooctane sulfonamide (PFOSA)	µg/L	0.002	-	-
N-Methylperfluorooctane sulfonamide (N-MeFOSA)	µg/L	0.0025	-	-
N-Ethylperfluorooctane sulfonamide (N-EtFOSA)	µg/L	0.0025	-	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025	-	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025	-	-
N-Methylperfluorooctanesulfonamidoacetic acid	µg/L	0.0025	-	-
N-Ethylperfluorooctanesulfonamidoacetic Acid	µg/L	0.0025	-	-
Total PFAS (n=30)	µg/L	0.006	-	-
(13C4-PFBA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C5-PFPeA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C5-PFHxA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C4-PFHpA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C4_PFOA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C9-PFNA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C6-PFDA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C7-PFUdA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C2-PFDoA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C2_PFTeDA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C2-PFHxDA) Isotopically Labelled Internal Recovery	%	-	-	-
(13C3-PFBS) Isotopically Labelled Internal Recovery	%	-	-	-
(13C3-PFHxS) Isotopically Labelled Internal Recovery	%	-	-	-
(13C8-PFOS) Isotopically Labelled Internal Recovery	%	-	-	-
(13C2-4:2 FTS) Isotopically Labelled Internal Recovery	%	-	-	-
(13C2-6:2 FTS) Isotopically Labelled Internal Recovery	%	-	-	-
(13C2-8:2 FTS) Isotopically Labelled Internal Recovery	%	-	-	-
(13C8-PFOSA) Isotopically Labelled Internal Recovery	%	-	-	-
(D3-N-MeFOSA) Isotopically Labelled Internal Recovery	%	-	-	-
(D5-N-EtFOSA) Isotopically Labelled Internal Recovery	%	-	-	-
(D7-N-MeFOSE) Isotopically Labelled Internal Recovery	%	-	-	-
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery	%	-	-	-
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery	%	-	-	-
(D5-N-EtFOSAA) Isotopically Labelled Internal Recovery	%	-	-	-

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Mercury (dissolved) in Water **Method: ME-(AU)-[ENV]AN311(Perth)/AN312**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Mercury	LB226721	mg/L	0.0001	<0.0001	22%	102%

PAH (Polynuclear Aromatic Hydrocarbons) in Water **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Naphthalene	LB226912	µg/L	0.1	<0.1	0%	73%
2-methylnaphthalene	LB226912	µg/L	0.1	<0.1	0%	NA
1-methylnaphthalene	LB226912	µg/L	0.1	<0.1	0%	NA
Acenaphthylene	LB226912	µg/L	0.1	<0.1	0%	75%
Acenaphthene	LB226912	µg/L	0.1	<0.1	0%	79%
Fluorene	LB226912	µg/L	0.1	<0.1	0%	NA
Phenanthrene	LB226912	µg/L	0.1	<0.1	0%	78%
Anthracene	LB226912	µg/L	0.1	<0.1	0%	82%
Fluoranthene	LB226912	µg/L	0.1	<0.1	0%	88%
Pyrene	LB226912	µg/L	0.1	<0.1	0%	88%
Benzo(a)anthracene	LB226912	µg/L	0.1	<0.1	0%	NA
Chrysene	LB226912	µg/L	0.1	<0.1	0%	NA
Benzo(b&j)fluoranthene	LB226912	µg/L	0.1	<0.1	0%	NA
Benzo(k)fluoranthene	LB226912	µg/L	0.1	<0.1	0%	NA
Benzo(a)pyrene	LB226912	µg/L	0.1	<0.1	0%	83%
Indeno(1,2,3-cd)pyrene	LB226912	µg/L	0.1	<0.1	0%	NA
Dibenzo(ah)anthracene	LB226912	µg/L	0.1	<0.1	0%	NA
Benzo(ghi)perylene	LB226912	µg/L	0.1	<0.1	0%	NA
Total PAH (18)	LB226912	µg/L	1	<1		

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
d5-nitrobenzene (Surrogate)	LB226912	%	-	52%	4 - 10%	56%
2-fluorobiphenyl (Surrogate)	LB226912	%	-	62%	9 - 10%	62%
d14-p-terphenyl (Surrogate)	LB226912	%	-	74%	8 - 10%	78%

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Trace Metals (Dissolved) in Water by ICPMS Method: ME-(AU)-[ENV]AN318

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Arsenic, As	LB226776	µg/L	1	<1	0%	104%
Cadmium, Cd	LB226776	µg/L	0.1	<0.1	0%	104%
Chromium, Cr	LB226776	µg/L	1	<1	0%	109%
Copper, Cu	LB226776	µg/L	1	<1	50%	108%
Lead, Pb	LB226776	µg/L	1	<1	0%	114%
Nickel, Ni	LB226776	µg/L	1	<1	6%	104%
Zinc, Zn	LB226776	µg/L	5	<5	5%	107%

TRH (Total Recoverable Hydrocarbons) in Water Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
TRH C10-C14	LB226912	µg/L	50	<50	0%	85%
TRH C15-C28	LB226912	µg/L	200	<200	0 - 1%	94%
TRH C29-C36	LB226912	µg/L	200	<200	0 - 11%	102%
TRH C37-C40	LB226912	µg/L	200	<200	0%	NA
TRH C10-C40	LB226912	µg/L	320	<320	0 - 6%	NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
TRH >C10-C16	LB226912	µg/L	60	<60	0%	90%
TRH >C10-C16 - Naphthalene (F2)	LB226912	µg/L	60	<60	0%	NA
TRH >C16-C34 (F3)	LB226912	µg/L	500	<500	0 - 4%	104%
TRH >C34-C40 (F4)	LB226912	µg/L	500	<500	0%	97%

VOCs in Water Method: ME-(AU)-[ENV]AN433

Fumigants

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
2,2-dichloropropane	LB226894	µg/L	0.5	<0.5	0%	NA
1,2-dichloropropane	LB226894	µg/L	0.5	<0.5	0%	NA
cis-1,3-dichloropropene	LB226894	µg/L	0.5	<0.5	0%	NA
trans-1,3-dichloropropene	LB226894	µg/L	0.5	<0.5	0%	NA
1,2-dibromoethane (EDB)	LB226894	µg/L	0.5	<0.5	0%	NA

Halogenated Aliphatics

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Dichlorodifluoromethane (CFC-12)	LB226894	µg/L	5	<5	0%	NA
Chloromethane	LB226894	µg/L	5	<5	0%	NA
Vinyl chloride (Chloroethene)	LB226894	µg/L	0.3	<0.3	0%	NA
Bromomethane	LB226894	µg/L	10	<10	0%	NA
Chloroethane	LB226894	µg/L	5	<5	0%	NA
Trichlorofluoromethane	LB226894	µg/L	1	<1	0%	NA
Iodomethane	LB226894	µg/L	5	<5	0%	NA
1,1-dichloroethene	LB226894	µg/L	0.5	<0.5	0%	84%
Dichloromethane (Methylene chloride)	LB226894	µg/L	5	<5	0%	NA
Allyl chloride	LB226894	µg/L	2	<2	0%	NA
trans-1,2-dichloroethene	LB226894	µg/L	0.5	<0.5	0%	NA
1,1-dichloroethane	LB226894	µg/L	0.5	<0.5	0%	NA
cis-1,2-dichloroethene	LB226894	µg/L	0.5	<0.5	0%	NA
Bromochloromethane	LB226894	µg/L	0.5	<0.5	0%	NA
1,2-dichloroethane	LB226894	µg/L	0.5	<0.5	0%	96%
1,1,1-trichloroethane	LB226894	µg/L	0.5	<0.5	0%	NA
1,1-dichloropropene	LB226894	µg/L	0.5	<0.5	0%	NA
Carbon tetrachloride	LB226894	µg/L	0.5	<0.5	0%	NA
Dibromomethane	LB226894	µg/L	0.5	<0.5	0%	NA
Trichloroethene (Trichloroethylene,TCE)	LB226894	µg/L	0.5	<0.5	0%	90%

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

VOCs in Water Method: ME-(AU)-[ENV]AN433 (continued)

				MB	DUP %RPD	LCS %Recovery
1,1,2-trichloroethane	LB226894	µg/L	0.5	<0.5	0%	NA
1,3-dichloropropane	LB226894	µg/L	0.5	<0.5	0%	NA
Tetrachloroethene (Perchloroethylene,PCE)	LB226894	µg/L	0.5	<0.5	0%	NA
1,1,1,2-tetrachloroethane	LB226894	µg/L	0.5	<0.5	0%	NA
cis-1,4-dichloro-2-butene	LB226894	µg/L	1	<1	0%	NA
1,1,2,2-tetrachloroethane	LB226894	µg/L	0.5	<0.5	0%	NA
1,2,3-trichloropropane	LB226894	µg/L	0.5	<0.5	0%	NA
trans-1,4-dichloro-2-butene	LB226894	µg/L	1	<1	0%	NA
1,2-dibromo-3-chloropropane	LB226894	µg/L	0.5	<0.5	0%	NA
Hexachlorobutadiene	LB226894	µg/L	0.5	<0.5	0%	NA

Halogenated Aromatics

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Chlorobenzene	LB226894	µg/L	0.5	<0.5	0%	100%
Bromobenzene	LB226894	µg/L	0.5	<0.5	0%	NA
2-chlorotoluene	LB226894	µg/L	0.5	<0.5	0%	NA
4-chlorotoluene	LB226894	µg/L	0.5	<0.5	0%	NA
1,3-dichlorobenzene	LB226894	µg/L	0.5	<0.5	0%	NA
1,4-dichlorobenzene	LB226894	µg/L	0.3	<0.3	0%	NA
1,2-dichlorobenzene	LB226894	µg/L	0.5	<0.5	0%	NA
1,2,4-trichlorobenzene	LB226894	µg/L	0.5	<0.5	0%	NA
1,2,3-trichlorobenzene	LB226894	µg/L	0.5	<0.5	0%	NA

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene	LB226894	µg/L	0.5	<0.5	0%	109%	111%
Toluene	LB226894	µg/L	0.5	<0.5	0%	109%	109%
Ethylbenzene	LB226894	µg/L	0.5	<0.5	0%	108%	105%
m/p-xylene	LB226894	µg/L	1	<1	0%	108%	104%
o-xylene	LB226894	µg/L	0.5	<0.5	0%	109%	106%
Styrene (Vinyl benzene)	LB226894	µg/L	0.5	<0.5	0%	NA	
Isopropylbenzene (Cumene)	LB226894	µg/L	0.5	<0.5	0%	NA	
n-propylbenzene	LB226894	µg/L	0.5	<0.5	0%	NA	
1,3,5-trimethylbenzene	LB226894	µg/L	0.5	<0.5	0%	NA	
tert-butylbenzene	LB226894	µg/L	0.5	<0.5	0%	NA	
1,2,4-trimethylbenzene	LB226894	µg/L	0.5	<0.5	0%	NA	
sec-butylbenzene	LB226894	µg/L	0.5	<0.5	0%	NA	
p-isopropyltoluene	LB226894	µg/L	0.5	<0.5	0%	NA	
n-butylbenzene	LB226894	µg/L	0.5	<0.5	0%	NA	

Nitrogenous Compounds

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Acrylonitrile	LB226894	µg/L	0.5	<0.5	0%	NA
2-nitropropane	LB226894	µg/L	100	<100		

Oxygenated Compounds

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Acetone (2-propanone)	LB226894	µg/L	10	<10	0%	NA
MtBE (Methyl-tert-butyl ether)	LB226894	µg/L	2	<1	0%	NA
Vinyl acetate	LB226894	µg/L	10	<10	0%	NA
MEK (2-butanone)	LB226894	µg/L	10	<10	0%	NA
MIBK (4-methyl-2-pentanone)	LB226894	µg/L	5	<5	0%	NA
2-hexanone (MBK)	LB226894	µg/L	5	<5	0%	NA

Polycyclic VOCs

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

VOCs in Water Method: ME-(AU)-[ENV]AN433 (continued)

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB226894	µg/L	0.5	<0.5	0%	NA	NA

Sulphonated Compounds

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Carbon disulfide	LB226894	µg/L	2	<2	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d4-1,2-dichloroethane (Surrogate)	LB226894	%	-	97%	2 - 3%	103%	109%
d8-toluene (Surrogate)	LB226894	%	-	95%	0 - 2%	101%	103%
Bromofluorobenzene (Surrogate)	LB226894	%	-	98%	0 - 1%	97%	99%

Totals

Parameter	QC Reference	Units	LOR	MB
Total Xylenes	LB226894	µg/L	1.5	<1.5
Total BTEX	LB226894	µg/L	3	<3
Total VOC	LB226894	µg/L	10	<10

Trihalomethanes

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Chloroform (THM)	LB226894	µg/L	0.5	<0.5	0%	105%
Bromodichloromethane (THM)	LB226894	µg/L	0.5	<0.5	0%	NA
Dibromochloromethane (THM)	LB226894	µg/L	0.5	<0.5	0%	NA
Bromoform (THM)	LB226894	µg/L	0.5	<0.5	0%	NA

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Volatile Petroleum Hydrocarbons in Water **Method: ME-(AU)-[ENV]AN433**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C6-C10	LB226894	µg/L	50	<50	0%	92%	89%
TRH C6-C9	LB226894	µg/L	40	<40	0%	81%	91%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d4-1,2-dichloroethane (Surrogate)	LB226894	%	-	97%	2 - 3%	103%	109%
d8-toluene (Surrogate)	LB226894	%	-	95%	0 - 2%	101%	103%
Bromofluorobenzene (Surrogate)	LB226894	%	-	98%	0 - 1%	97%	99%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene (F0)	LB226894	µg/L	0.5		0%	NA	NA
TRH C6-C10 minus BTEX (F1)	LB226894	µg/L	50	<50	0%	90%	87%

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4).
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). Where F2 is corrected for Naphthalene, the VOC data for Naphthalene is used.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoveerable Hydrocarbons - Silica (TRH-Silica) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
MA-1523	This method covers the analysis of per- and polyfluoroalkyl substances (PFAS) in aqueous, solid and biosolid samples and solvent extracts, determined as the total of linear and branched isomers. After spiking with isotopically labelled quantification surrogates and clean-up via SPE cartridges sample extracts are analysed by liquid chromatography/mass spectrometry (LC-MS/MS). PFAS concentrations are determined by isotope dilution quantification.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
***	Indicates that both * and ** apply.	NVL	Not Validated

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 calcuated 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

SE220656 R0

CLIENT DETAILS

Contact	ADAM SULLIVAN
Client	SULLIVAN ENVIRONMENTAL SCIENCES PTY. LIMITED
Address	PO BOX 5248 TURRAMURRA NSW 2074
Telephone	(Not specified)
Facsimile	(Not specified)
Email	ENQUIRIES@SULLIVAN-ES.COM.AU
Project	**SES_590 (Regents Park)**
Order Number	(Not specified)
Samples	10

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	**SE220656 R0**
Date Received	11 Jun 2021
Date Reported	21 Jun 2021

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	VOCs in Water	2 items
Surrogate	Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level	5 items

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	10 Water
Date documentation received	11/6/2021	Type of documentation received	COC
Number of eskies/boxes received		Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	17.0°C
Sufficient sample for analysis	Yes	Turnaround time requested	Standard

HOLDING TIME SUMMARY

SE220656 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

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GW01	SE220656.001	LB226721	11 Jun 2021	11 Jun 2021	09 Jul 2021	15 Jun 2021	09 Jul 2021	15 Jun 2021
QC01	SE220656.002	LB226721	11 Jun 2021	11 Jun 2021	09 Jul 2021	15 Jun 2021	09 Jul 2021	15 Jun 2021
GW02	SE220656.003	LB226721	11 Jun 2021	11 Jun 2021	09 Jul 2021	15 Jun 2021	09 Jul 2021	15 Jun 2021
GW03	SE220656.004	LB226721	11 Jun 2021	11 Jun 2021	09 Jul 2021	15 Jun 2021	09 Jul 2021	15 Jun 2021
GW04	SE220656.005	LB226721	11 Jun 2021	11 Jun 2021	09 Jul 2021	15 Jun 2021	09 Jul 2021	15 Jun 2021
GW05	SE220656.006	LB226721	11 Jun 2021	11 Jun 2021	09 Jul 2021	15 Jun 2021	09 Jul 2021	15 Jun 2021
Rinse_HA	SE220656.007	LB226721	11 Jun 2021	11 Jun 2021	09 Jul 2021	15 Jun 2021	09 Jul 2021	15 Jun 2021
Rinse_Pump	SE220656.008	LB226721	11 Jun 2021	11 Jun 2021	09 Jul 2021	15 Jun 2021	09 Jul 2021	15 Jun 2021

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GW01	SE220656.001	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
QC01	SE220656.002	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
GW02	SE220656.003	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
GW03	SE220656.004	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
GW04	SE220656.005	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
GW05	SE220656.006	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
Rinse_HA	SE220656.007	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
Rinse_Pump	SE220656.008	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GW01	SE220656.001	LB226776	11 Jun 2021	11 Jun 2021	08 Dec 2021	15 Jun 2021	08 Dec 2021	18 Jun 2021
QC01	SE220656.002	LB226776	11 Jun 2021	11 Jun 2021	08 Dec 2021	15 Jun 2021	08 Dec 2021	18 Jun 2021
GW02	SE220656.003	LB226776	11 Jun 2021	11 Jun 2021	08 Dec 2021	15 Jun 2021	08 Dec 2021	18 Jun 2021
GW03	SE220656.004	LB226776	11 Jun 2021	11 Jun 2021	08 Dec 2021	15 Jun 2021	08 Dec 2021	18 Jun 2021
GW04	SE220656.005	LB226776	11 Jun 2021	11 Jun 2021	08 Dec 2021	15 Jun 2021	08 Dec 2021	18 Jun 2021
GW05	SE220656.006	LB226776	11 Jun 2021	11 Jun 2021	08 Dec 2021	15 Jun 2021	08 Dec 2021	18 Jun 2021
Rinse_HA	SE220656.007	LB226776	11 Jun 2021	11 Jun 2021	08 Dec 2021	15 Jun 2021	08 Dec 2021	18 Jun 2021
Rinse_Pump	SE220656.008	LB226776	11 Jun 2021	11 Jun 2021	08 Dec 2021	15 Jun 2021	08 Dec 2021	18 Jun 2021

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GW01	SE220656.001	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
QC01	SE220656.002	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
GW02	SE220656.003	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
GW03	SE220656.004	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
GW04	SE220656.005	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
GW05	SE220656.006	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
Rinse_HA	SE220656.007	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021
Rinse_Pump	SE220656.008	LB226912	11 Jun 2021	11 Jun 2021	18 Jun 2021	17 Jun 2021	27 Jul 2021	21 Jun 2021

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GW01	SE220656.001	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
QC01	SE220656.002	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
GW02	SE220656.003	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
GW03	SE220656.004	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
GW04	SE220656.005	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
GW05	SE220656.006	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
Rinse_HA	SE220656.007	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
Rinse_Pump	SE220656.008	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
Trip Blank	SE220656.009	LB226894	02 Jun 2021	11 Jun 2021	09 Jun 2021	16 Jun 2021†	26 Jul 2021	17 Jun 2021
Trip Spike	SE220656.010	LB226894	02 Jun 2021	11 Jun 2021	09 Jun 2021	16 Jun 2021†	26 Jul 2021	17 Jun 2021

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GW01	SE220656.001	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
QC01	SE220656.002	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
GW02	SE220656.003	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
GW03	SE220656.004	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
GW04	SE220656.005	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021

HOLDING TIME SUMMARY

SE220656 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

Volatile Petroleum Hydrocarbons in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GW05	SE220656.006	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
Rinse_HA	SE220656.007	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
Rinse_Pump	SE220656.008	LB226894	11 Jun 2021	11 Jun 2021	18 Jun 2021	16 Jun 2021	26 Jul 2021	17 Jun 2021
Trip Blank	SE220656.009	LB226894	02 Jun 2021	11 Jun 2021	09 Jun 2021	16 Jun 2021†	26 Jul 2021	17 Jun 2021
Trip Spike	SE220656.010	LB226894	02 Jun 2021	11 Jun 2021	09 Jun 2021	16 Jun 2021†	26 Jul 2021	17 Jun 2021

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.

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	GW01	SE220656.001	%	40 - 130%	68
	QC01	SE220656.002	%	40 - 130%	56
	GW02	SE220656.003	%	40 - 130%	48
	GW03	SE220656.004	%	40 - 130%	56
	GW04	SE220656.005	%	40 - 130%	66
	GW05	SE220656.006	%	40 - 130%	52
	Rinse_HA	SE220656.007	%	40 - 130%	46
	Rinse_Pump	SE220656.008	%	40 - 130%	68
d14-p-terphenyl (Surrogate)	GW01	SE220656.001	%	40 - 130%	80
	QC01	SE220656.002	%	40 - 130%	68
	GW02	SE220656.003	%	40 - 130%	62
	GW03	SE220656.004	%	40 - 130%	74
	GW04	SE220656.005	%	40 - 130%	82
	GW05	SE220656.006	%	40 - 130%	66
	Rinse_HA	SE220656.007	%	40 - 130%	68
	Rinse_Pump	SE220656.008	%	40 - 130%	86
d5-nitrobenzene (Surrogate)	GW01	SE220656.001	%	40 - 130%	54
	QC01	SE220656.002	%	40 - 130%	44
	GW02	SE220656.003	%	40 - 130%	42
	GW03	SE220656.004	%	40 - 130%	50
	GW04	SE220656.005	%	40 - 130%	56
	GW05	SE220656.006	%	40 - 130%	44
	Rinse_HA	SE220656.007	%	40 - 130%	42
	Rinse_Pump	SE220656.008	%	40 - 130%	60

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level

Method: MA-1523

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
(13C2_PFTeDA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	140
	GW05	SE220656.006	%	10 - 150%	195 †
	Rinse_HA	SE220656.007	%	10 - 150%	146
	Rinse_Pump	SE220656.008	%	10 - 150%	138
(13C2-4:2 FTS) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	83
	GW05	SE220656.006	%	10 - 150%	64
	Rinse_HA	SE220656.007	%	10 - 150%	127
	Rinse_Pump	SE220656.008	%	10 - 150%	86
(13C2-6:2 FTS) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	66
	GW05	SE220656.006	%	10 - 150%	58
	Rinse_HA	SE220656.007	%	10 - 150%	105
	Rinse_Pump	SE220656.008	%	10 - 150%	80
(13C2-8:2 FTS) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	67
	GW05	SE220656.006	%	10 - 150%	53
	Rinse_HA	SE220656.007	%	10 - 150%	113
	Rinse_Pump	SE220656.008	%	10 - 150%	83
(13C2-PFDoA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	118
	GW05	SE220656.006	%	10 - 150%	140
	Rinse_HA	SE220656.007	%	10 - 150%	132
	Rinse_Pump	SE220656.008	%	10 - 150%	93
(13C2-PFHxDA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	183 †
	GW05	SE220656.006	%	10 - 150%	372 †
	Rinse_HA	SE220656.007	%	10 - 150%	269 †
	Rinse_Pump	SE220656.008	%	10 - 150%	221 †
(13C3-PFBS) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	90
	GW05	SE220656.006	%	10 - 150%	85
	Rinse_HA	SE220656.007	%	10 - 150%	117
	Rinse_Pump	SE220656.008	%	10 - 150%	93
(13C3-PFHxS) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	106
	GW05	SE220656.006	%	10 - 150%	94
	Rinse_HA	SE220656.007	%	10 - 150%	100
	Rinse_Pump	SE220656.008	%	10 - 150%	100
(13C4_PFOA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	104
	GW05	SE220656.006	%	10 - 150%	99

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.

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level (continued) **Method: MA-1523**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
(13C4_PFOA) Isotopically Labelled Internal Recovery Standard	Rinse_HA	SE220656.007	%	10 - 150%	99
	Rinse_Pump	SE220656.008	%	10 - 150%	101
(13C4-PFBA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	100
	GW05	SE220656.006	%	10 - 150%	102
	Rinse_HA	SE220656.007	%	10 - 150%	99
	Rinse_Pump	SE220656.008	%	10 - 150%	101
(13C4-PFHpA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	96
	GW05	SE220656.006	%	10 - 150%	84
	Rinse_HA	SE220656.007	%	10 - 150%	104
	Rinse_Pump	SE220656.008	%	10 - 150%	108
(13C5-PFHxA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	95
	GW05	SE220656.006	%	10 - 150%	83
	Rinse_HA	SE220656.007	%	10 - 150%	112
	Rinse_Pump	SE220656.008	%	10 - 150%	102
(13C5-PFPeA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	98
	GW05	SE220656.006	%	10 - 150%	136
	Rinse_HA	SE220656.007	%	10 - 150%	95
	Rinse_Pump	SE220656.008	%	10 - 150%	97
(13C6-PFDA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	103
	GW05	SE220656.006	%	10 - 150%	114
	Rinse_HA	SE220656.007	%	10 - 150%	122
	Rinse_Pump	SE220656.008	%	10 - 150%	121
(13C7-PFUdA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	112
	GW05	SE220656.006	%	10 - 150%	126
	Rinse_HA	SE220656.007	%	10 - 150%	113
	Rinse_Pump	SE220656.008	%	10 - 150%	83
(13C8-PFOS) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	95
	GW05	SE220656.006	%	10 - 150%	100
	Rinse_HA	SE220656.007	%	10 - 150%	95
	Rinse_Pump	SE220656.008	%	10 - 150%	100
(13C8-PFOSA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	60
	GW05	SE220656.006	%	10 - 150%	56
	Rinse_HA	SE220656.007	%	10 - 150%	83
	Rinse_Pump	SE220656.008	%	10 - 150%	82
(13C9-PFNA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	108
	GW05	SE220656.006	%	10 - 150%	108
	Rinse_HA	SE220656.007	%	10 - 150%	105
	Rinse_Pump	SE220656.008	%	10 - 150%	106
(D3-N-MeFOSA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	71
	GW05	SE220656.006	%	10 - 150%	66
	Rinse_HA	SE220656.007	%	10 - 150%	110
	Rinse_Pump	SE220656.008	%	10 - 150%	76
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	68
	GW05	SE220656.006	%	10 - 150%	58
	Rinse_HA	SE220656.007	%	10 - 150%	100
	Rinse_Pump	SE220656.008	%	10 - 150%	100
(D5-N-EtFOSA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	76
	GW05	SE220656.006	%	10 - 150%	74
	Rinse_HA	SE220656.007	%	10 - 150%	122
	Rinse_Pump	SE220656.008	%	10 - 150%	108
(D5-N-EtFOSAA) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	66
	GW05	SE220656.006	%	10 - 150%	65
	Rinse_HA	SE220656.007	%	10 - 150%	94
	Rinse_Pump	SE220656.008	%	10 - 150%	87
(D7-N-MeFOSE) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	65
	GW05	SE220656.006	%	10 - 150%	57
	Rinse_HA	SE220656.007	%	10 - 150%	106
	Rinse_Pump	SE220656.008	%	10 - 150%	102
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery Standard	GW02	SE220656.003	%	10 - 150%	65
	GW05	SE220656.006	%	10 - 150%	52
	Rinse_HA	SE220656.007	%	10 - 150%	104

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.

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level (continued)

Method: MA-1523

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery Standard	Rinse_Pump	SE220656.008	%	10 - 150%	95

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	GW01	SE220656.001	%	40 - 130%	102
	QC01	SE220656.002	%	40 - 130%	102
	GW02	SE220656.003	%	40 - 130%	102
	GW03	SE220656.004	%	40 - 130%	101
	GW04	SE220656.005	%	40 - 130%	101
	GW05	SE220656.006	%	40 - 130%	101
	Rinse_HA	SE220656.007	%	40 - 130%	100
	Rinse_Pump	SE220656.008	%	40 - 130%	103
	Trip Blank	SE220656.009	%	40 - 130%	100
	Trip Spike	SE220656.010	%	40 - 130%	96
d4-1,2-dichloroethane (Surrogate)	GW01	SE220656.001	%	40 - 130%	102
	QC01	SE220656.002	%	40 - 130%	101
	GW02	SE220656.003	%	40 - 130%	97
	GW03	SE220656.004	%	40 - 130%	101
	GW04	SE220656.005	%	40 - 130%	101
	GW05	SE220656.006	%	40 - 130%	99
	Rinse_HA	SE220656.007	%	40 - 130%	99
	Rinse_Pump	SE220656.008	%	40 - 130%	98
	Trip Blank	SE220656.009	%	40 - 130%	97
	Trip Spike	SE220656.010	%	40 - 130%	101
d8-toluene (Surrogate)	GW01	SE220656.001	%	40 - 130%	94
	QC01	SE220656.002	%	40 - 130%	97
	GW02	SE220656.003	%	40 - 130%	97
	GW03	SE220656.004	%	40 - 130%	97
	GW04	SE220656.005	%	40 - 130%	95
	GW05	SE220656.006	%	40 - 130%	95
	Rinse_HA	SE220656.007	%	40 - 130%	97
	Rinse_Pump	SE220656.008	%	40 - 130%	97
	Trip Blank	SE220656.009	%	40 - 130%	97
	Trip Spike	SE220656.010	%	40 - 130%	99

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	GW01	SE220656.001	%	40 - 130%	102
	QC01	SE220656.002	%	40 - 130%	102
	GW02	SE220656.003	%	40 - 130%	102
	GW03	SE220656.004	%	40 - 130%	101
	GW04	SE220656.005	%	40 - 130%	101
	GW05	SE220656.006	%	40 - 130%	101
	Rinse_HA	SE220656.007	%	40 - 130%	100
	Rinse_Pump	SE220656.008	%	40 - 130%	103
d4-1,2-dichloroethane (Surrogate)	GW01	SE220656.001	%	60 - 130%	102
	QC01	SE220656.002	%	60 - 130%	101
	GW02	SE220656.003	%	60 - 130%	97
	GW03	SE220656.004	%	60 - 130%	101
	GW04	SE220656.005	%	60 - 130%	101
	GW05	SE220656.006	%	60 - 130%	99
	Rinse_HA	SE220656.007	%	60 - 130%	99
	Rinse_Pump	SE220656.008	%	60 - 130%	98
d8-toluene (Surrogate)	GW01	SE220656.001	%	40 - 130%	94
	QC01	SE220656.002	%	40 - 130%	97
	GW02	SE220656.003	%	40 - 130%	97
	GW03	SE220656.004	%	40 - 130%	97
	GW04	SE220656.005	%	40 - 130%	95
	GW05	SE220656.006	%	40 - 130%	95
	Rinse_HA	SE220656.007	%	40 - 130%	97
	Rinse_Pump	SE220656.008	%	40 - 130%	97

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.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB226721.001	Mercury	mg/L	0.0001	<0.0001

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB226912.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	52
		2-fluorobiphenyl (Surrogate)	%	-	62
		d14-p-terphenyl (Surrogate)	%	-	74

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB226776.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB226912.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB226894.001	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5
		1,2-dichloropropane	µg/L	0.5	<0.5
		cis-1,3-dichloropropene	µg/L	0.5	<0.5
		trans-1,3-dichloropropene	µg/L	0.5	<0.5
		1,2-dibromoethane (EDB)	µg/L	0.5	<0.5
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5
		Chloromethane	µg/L	5	<5
		Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3
		Bromomethane	µg/L	10	<10
		Chloroethane	µg/L	5	<5
		Trichlorofluoromethane	µg/L	1	<1
		Iodomethane	µg/L	5	<5
		1,1-dichloroethene	µg/L	0.5	<0.5
		Dichloromethane (Methylene chloride)	µg/L	5	<5
		Allyl chloride	µg/L	2	<2
		trans-1,2-dichloroethene	µg/L	0.5	<0.5
		1,1-dichloroethane	µg/L	0.5	<0.5
		cis-1,2-dichloroethene	µg/L	0.5	<0.5

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.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB226894.001	Halogenated Aliphatics	Bromochloromethane	µg/L	0.5	<0.5
		1,2-dichloroethane	µg/L	0.5	<0.5
		1,1,1-trichloroethane	µg/L	0.5	<0.5
		1,1-dichloropropene	µg/L	0.5	<0.5
		Carbon tetrachloride	µg/L	0.5	<0.5
		Dibromomethane	µg/L	0.5	<0.5
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5
		1,1,2-trichloroethane	µg/L	0.5	<0.5
		1,3-dichloropropane	µg/L	0.5	<0.5
		Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5
		1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5
		cis-1,4-dichloro-2-butene	µg/L	1	<1
		1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5
		1,2,3-trichloropropane	µg/L	0.5	<0.5
		trans-1,4-dichloro-2-butene	µg/L	1	<1
		1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5
		Hexachlorobutadiene	µg/L	0.5	<0.5
	Halogenated Aromatics	Chlorobenzene	µg/L	0.5	<0.5
		Bromobenzene	µg/L	0.5	<0.5
		2-chlorotoluene	µg/L	0.5	<0.5
		4-chlorotoluene	µg/L	0.5	<0.5
		1,3-dichlorobenzene	µg/L	0.5	<0.5
		1,4-dichlorobenzene	µg/L	0.3	<0.3
		1,2-dichlorobenzene	µg/L	0.5	<0.5
		1,2,4-trichlorobenzene	µg/L	0.5	<0.5
		1,2,3-trichlorobenzene	µg/L	0.5	<0.5
	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		o-xylene	µg/L	0.5	<0.5
		Styrene (Vinyl benzene)	µg/L	0.5	<0.5
		Isopropylbenzene (Cumene)	µg/L	0.5	<0.5
		n-propylbenzene	µg/L	0.5	<0.5
		1,3,5-trimethylbenzene	µg/L	0.5	<0.5
		tert-butylbenzene	µg/L	0.5	<0.5
		1,2,4-trimethylbenzene	µg/L	0.5	<0.5
		sec-butylbenzene	µg/L	0.5	<0.5
		p-isopropyltoluene	µg/L	0.5	<0.5
		n-butylbenzene	µg/L	0.5	<0.5
	Nitrogenous Compounds	Acrylonitrile	µg/L	0.5	<0.5
	Oxygenated Compounds	Acetone (2-propanone)	µg/L	10	<10
		MtBE (Methyl-tert-butyl ether)	µg/L	2	<1
		Vinyl acetate	µg/L	10	<10
		MEK (2-butanone)	µg/L	10	<10
		MIBK (4-methyl-2-pentanone)	µg/L	5	<5
		2-hexanone (MBK)	µg/L	5	<5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Sulphonated	Carbon disulfide	µg/L	2	<2
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	97
		d8-toluene (Surrogate)	%	-	95
		Bromofluorobenzene (Surrogate)	%	-	98
	Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5
		Bromodichloromethane (THM)	µg/L	0.5	<0.5
		Dibromochloromethane (THM)	µg/L	0.5	<0.5
		Bromoform (THM)	µg/L	0.5	<0.5

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR

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.

Volatile Petroleum Hydrocarbons in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB226894.001		TRH C6-C9	µg/L	40	<40
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	97
		d8-toluene (Surrogate)	%	-	95
		Bromofluorobenzene (Surrogate)	%	-	98

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

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE220656.003	LB226721.014	Mercury	µg/L	0.0001	<0.0001	<0.0001	139	22

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE220656.004	LB226912.031		Naphthalene	µg/L	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	200	0
			Acenaphthylene	µg/L	0.1	<0.1	<0.1	200	0
			Acenaphthene	µg/L	0.1	<0.1	<0.1	200	0
			Fluorene	µg/L	0.1	<0.1	<0.1	200	0
			Phenanthrene	µg/L	0.1	<0.1	<0.1	200	0
			Anthracene	µg/L	0.1	<0.1	<0.1	200	0
			Fluoranthene	µg/L	0.1	<0.1	<0.1	200	0
			Pyrene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	200	0
			Chrysene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.3	0.3	30	4
			2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.3	30	10
			d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.4	30	8
SE220736.001	LB226912.030		Naphthalene	µg/L	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	200	0
			Acenaphthylene	µg/L	0.1	<0.1	<0.1	200	0
			Acenaphthene	µg/L	0.1	<0.1	<0.1	200	0
			Fluorene	µg/L	0.1	<0.1	<0.1	200	0
			Phenanthrene	µg/L	0.1	<0.1	<0.1	200	0
			Anthracene	µg/L	0.1	<0.1	<0.1	200	0
			Fluoranthene	µg/L	0.1	<0.1	<0.1	200	0
			Pyrene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	200	0
			Chrysene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.3	0.3	30	10
			2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.3	30	9
			d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.4	30	10

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE220656.008	LB226776.024	Arsenic, As	µg/L	1	<1	<1	200	0
		Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
		Chromium, Cr	µg/L	1	<1	<1	200	0
		Copper, Cu	µg/L	1	2	1	80	50
		Lead, Pb	µg/L	1	<1	<1	200	0
		Nickel, Ni	µg/L	1	5	5	36	6
		Zinc, Zn	µg/L	5	17	16	46	5

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Original	Duplicate	Parameter	Units	LOR

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

TRH (Total Recoverable Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE220656.004	LB226912.031		TRH C10-C14	µg/L	50	<50	<50	200	0
			TRH C15-C28	µg/L	200	<200	<200	200	0
			TRH C29-C36	µg/L	200	<200	<200	200	0
			TRH C37-C40	µg/L	200	<200	<200	200	0
			TRH C10-C40	µg/L	320	<320	<320	200	0
		TRH F Bands	TRH >C10-C16	µg/L	60	<60	<60	200	0
			TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	<60	200	0
			TRH >C16-C34 (F3)	µg/L	500	<500	<500	200	0
			TRH >C34-C40 (F4)	µg/L	500	<500	<500	200	0
SE220736.001	LB226912.030		TRH C10-C14	µg/L	50	<50	<50	200	0
			TRH C15-C28	µg/L	200	380	380	83	1
			TRH C29-C36	µg/L	200	380	420	80	11
			TRH C37-C40	µg/L	200	<200	<200	200	0
			TRH C10-C40	µg/L	320	760	810	71	6
		TRH F Bands	TRH >C10-C16	µg/L	60	<60	<60	200	0
			TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	<60	200	0
			TRH >C16-C34 (F3)	µg/L	500	640	670	106	4
			TRH >C34-C40 (F4)	µg/L	500	<500	<500	200	0

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE220656.006	LB226894.024	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	200	0
		Halogenated	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	200	0
		Aliphatics	Chloromethane	µg/L	5	<5	<5	200	0
			Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	200	0
			Bromomethane	µg/L	10	<10	<10	200	0
			Chloroethane	µg/L	5	<5	<5	200	0
			Trichlorofluoromethane	µg/L	1	<1	<1	200	0
			Iodomethane	µg/L	5	<5	<5	200	0
			1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	200	0
			Allyl chloride	µg/L	2	<2	<2	200	0
			trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			Bromochloromethane	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	200	0
			Dibromomethane	µg/L	0.5	<0.5	<0.5	200	0
			Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	200	0
			1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	200	0
			1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	200	0
			1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	200	0
			1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	200	0
			Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	200	0
		Halogenated	Chlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
		Aromatics	Bromobenzene	µg/L	0.5	<0.5	<0.5	200	0
			2-chlorotoluene	µg/L	0.5	<0.5	<0.5	200	0
			4-chlorotoluene	µg/L	0.5	<0.5	<0.5	200	0
			1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	200	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

VOCs in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE220656.006	LB226894.024	Halogenated	1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	200	0
		Aromatics	1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
		Monocyclic	Benzene	µg/L	0.5	<0.5	<0.5	200	0
		Aromatic	Toluene	µg/L	0.5	<0.5	<0.5	200	0
			Ethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			m/p-xylene	µg/L	1	<1	<1	200	0
			o-xylene	µg/L	0.5	<0.5	<0.5	200	0
			Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	200	0
			Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	200	0
			n-propylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			tert-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			sec-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	200	0
			n-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
		Nitrogenous	Acrylonitrile	µg/L	0.5	<0.5	<0.5	200	0
		Oxygenated	Acetone (2-propanone)	µg/L	10	<10	<10	200	0
		Compounds	MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<0.5	200	0
			Vinyl acetate	µg/L	10	<10	<10	200	0
			MEK (2-butanone)	µg/L	10	<10	<10	200	0
			MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	200	0
			2-hexanone (MBK)	µg/L	5	<5	<5	200	0
		Polycyclic	Naphthalene	µg/L	0.5	<0.5	<0.5	200	0
		Sulphonated	Carbon disulfide	µg/L	2	<2	<2	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	9.9	9.6	30	3
			d8-toluene (Surrogate)	µg/L	-	9.5	9.5	30	0
			Bromofluorobenzene (Surrogate)	µg/L	-	10.1	10.0	30	1
		Trihalomethan	Chloroform (THM)	µg/L	0.5	<0.5	<0.5	200	0
		es	Bromodichloromethane (THM)	µg/L	0.5	<0.5	<0.5	200	0
			Dibromochloromethane (THM)	µg/L	0.5	<0.5	<0.5	200	0
			Bromoform (THM)	µg/L	0.5	<0.5	<0.5	200	0
SE220691.001	LB226894.025	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	200	0
		Halogenated	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	200	0
		Aliphatics	Chloromethane	µg/L	5	<5	<5	200	0
			Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	200	0
			Bromomethane	µg/L	10	<10	<10	200	0
			Chloroethane	µg/L	5	<5	<5	200	0
			Trichlorofluoromethane	µg/L	1	<1	<1	200	0
			Iodomethane	µg/L	5	<5	<5	200	0
			1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	200	0
			Allyl chloride	µg/L	2	<2	<2	200	0
			trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			Bromochloromethane	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	200	0
			Dibromomethane	µg/L	0.5	<0.5	<0.5	200	0
			Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	200	0
			1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	200	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

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE220691.001	LB226894.025	Halogenated	Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	200	0
		Aliphatics	1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	200	0
			1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	200	0
			1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	200	0
			Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	200	0
		Halogenated	Chlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
		Aromatics	Bromobenzene	µg/L	0.5	<0.5	<0.5	200	0
			2-chlorotoluene	µg/L	0.5	<0.5	<0.5	200	0
			4-chlorotoluene	µg/L	0.5	<0.5	<0.5	200	0
			1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	200	0
			1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
		Monocyclic	Benzene	µg/L	0.5	<0.5	<0.5	200	0
		Aromatic	Toluene	µg/L	0.5	<0.5	<0.5	200	0
			Ethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			m/p-xylene	µg/L	1	<1	<1	200	0
			o-xylene	µg/L	0.5	<0.5	<0.5	200	0
			Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	200	0
			Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	200	0
			n-propylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			tert-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			sec-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	200	0
			n-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
		Nitrogenous	Acrylonitrile	µg/L	0.5	<0.5	<0.5	200	0
		Oxygenated	Acetone (2-propanone)	µg/L	10	<10	<10	200	0
		Compounds	MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<0.5	200	0
			Vinyl acetate	µg/L	10	<10	<10	200	0
			MEK (2-butanone)	µg/L	10	<10	<10	200	0
			MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	200	0
			2-hexanone (MBK)	µg/L	5	<5	<5	200	0
		Polycyclic	Naphthalene	µg/L	0.5	<0.5	<0.5	200	0
		Sulphonated	Carbon disulfide	µg/L	2	<2	<2	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.2	10.0	30	2
			d8-toluene (Surrogate)	µg/L	-	9.5	9.7	30	2
			Bromofluorobenzene (Surrogate)	µg/L	-	10.2	10.2	30	0
		Trihalomethan	Chloroform (THM)	µg/L	0.5	<0.5	<0.5	200	0
		es	Bromodichloromethane (THM)	µg/L	0.5	<0.5	<0.5	200	0
			Dibromochloromethane (THM)	µg/L	0.5	<0.5	<0.5	200	0
			Bromoform (THM)	µg/L	0.5	<0.5	<0.5	200	0

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE220656.006	LB226894.024		TRH C6-C10	µg/L	50	<50	<50	200	0
			TRH C6-C9	µg/L	40	<40	<40	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	9.9	9.6	30	3
			d8-toluene (Surrogate)	µg/L	-	9.5	9.5	30	0
			Bromofluorobenzene (Surrogate)	µg/L	-	10.1	10.0	30	1
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	<0.5	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	200	0
SE220691.001	LB226894.025		TRH C6-C10	µg/L	50	<50	<50	200	0
			TRH C6-C9	µg/L	40	<40	<40	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.2	10.0	30	2
			d8-toluene (Surrogate)	µg/L	-	9.5	9.7	30	2

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

Volatile Petroleum Hydrocarbons in Water (continued) **Method: ME-(AU)-[ENV]AN433**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE220691.001	LB226894.025	Surrogates	Bromofluorobenzene (Surrogate)	µg/L	-	10.2	10.2	30	0
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	<0.5	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	200	0

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.

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB226912.002		Naphthalene	µg/L	0.1	29	40	60 - 140	73
		Acenaphthylene	µg/L	0.1	30	40	60 - 140	75
		Acenaphthene	µg/L	0.1	32	40	60 - 140	79
		Phenanthrene	µg/L	0.1	31	40	60 - 140	78
		Anthracene	µg/L	0.1	33	40	60 - 140	82
		Fluoranthene	µg/L	0.1	35	40	60 - 140	88
		Pyrene	µg/L	0.1	35	40	60 - 140	88
		Benzo(a)pyrene	µg/L	0.1	33	40	60 - 140	83
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.3	0.5	40 - 130	56
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	62
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	78

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB226776.002		Arsenic, As	µg/L	1	21	20	80 - 120	104
		Cadmium, Cd	µg/L	0.1	21	20	80 - 120	104
		Chromium, Cr	µg/L	1	22	20	80 - 120	109
		Copper, Cu	µg/L	1	22	20	80 - 120	108
		Lead, Pb	µg/L	1	23	20	80 - 120	114
		Nickel, Ni	µg/L	1	21	20	80 - 120	104
		Zinc, Zn	µg/L	5	21	20	80 - 120	107

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB226912.002		TRH C10-C14	µg/L	50	1000	1200	60 - 140	85
		TRH C15-C28	µg/L	200	1100	1200	60 - 140	94
		TRH C29-C36	µg/L	200	1200	1200	60 - 140	102
	TRH F Bands	TRH >C10-C16	µg/L	60	1100	1200	60 - 140	90
		TRH >C16-C34 (F3)	µg/L	500	1200	1200	60 - 140	104
		TRH >C34-C40 (F4)	µg/L	500	580	600	60 - 140	97

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB226894.002	Halogenated	1,1-dichloroethene	µg/L	0.5	38	45.45	60 - 140	84
	Aliphatics	1,2-dichloroethane	µg/L	0.5	44	45.45	60 - 140	96
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	41	45.45	60 - 140	90
	Halogenated	Chlorobenzene	µg/L	0.5	45	45.45	60 - 140	100
	Monocyclic	Benzene	µg/L	0.5	50	45.45	60 - 140	109
	Aromatic	Toluene	µg/L	0.5	49	45.45	60 - 140	109
		Ethylbenzene	µg/L	0.5	49	45.45	60 - 140	108
		m/p-xylene	µg/L	1	98	90.9	60 - 140	108
		o-xylene	µg/L	0.5	49	45.45	60 - 140	109
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.3	10	60 - 140	103
		d8-toluene (Surrogate)	µg/L	-	10.1	10	70 - 130	101
		Bromofluorobenzene (Surrogate)	µg/L	-	9.7	10	70 - 130	97
	Trihalomethan	Chloroform (THM)	µg/L	0.5	48	45.45	60 - 140	105

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB226894.002		TRH C6-C10	µg/L	50	870	946.63	60 - 140	92
		TRH C6-C9	µg/L	40	670	818.71	60 - 140	81
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.3	10	60 - 140	103
		d8-toluene (Surrogate)	µg/L	-	10.1	10	70 - 130	101
		Bromofluorobenzene (Surrogate)	µg/L	-	9.7	10	70 - 130	97
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	570	639.67	60 - 140	90

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.

VOCs in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE220656.001	LB226894.023	Monocyclic Aromatic	Benzene	µg/L	0.5	51	<0.5	45.45	111
			Toluene	µg/L	0.5	49	<0.5	45.45	109
			Ethylbenzene	µg/L	0.5	48	<0.5	45.45	105
			m/p-xylene	µg/L	1	95	<1	90.9	104
			o-xylene	µg/L	0.5	48	<0.5	45.45	106
		Polycyclic	Naphthalene	µg/L	0.5	54	<0.5	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.9	10.2	-	109
			d8-toluene (Surrogate)	µg/L	-	10.3	9.4	-	103
			Bromofluorobenzene (Surrogate)	µg/L	-	9.9	10.2	-	99

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE220656.001	LB226894.023		TRH C6-C10	µg/L	50	840	<50	946.63	89
			TRH C6-C9	µg/L	40	750	<40	818.71	91
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.9	10.2	-	109
			d8-toluene (Surrogate)	µg/L	-	10.3	9.4	-	103
			Bromofluorobenzene (Surrogate)	µg/L	-	9.9	10.2	-	99
		VPH F Bands	Benzene (F0)	µg/L	0.5		<0.5	-	-
			TRH C6-C10 minus BTEX (F1)	µg/L	50	550	<50	639.67	87

MATRIX SPIKE DUPLICATES

SE220656 R0

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.

source: Sydney_20210611163936.pdf page: 1 SGS Ref: SE220656_COC

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

Page 1 of 1

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	Sullivan Environmental Sciences Pty Ltd	Project Name/No:	SES_590 (Regents Park)
Address:	PO Box 5248, Turramurra NSW 2074	Purchase Order No:	
		Results Required By:	Standard TAT
		Telephone:	0400500264
Contact Name:	Adam Sullivan	Facsimile:	
		Email Results:	adam@sullivan-es.com.au and sean@sullivan-es.com.au

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	CL10	VOC	PFAS (low level)	BTEXN
GW01	11/6/21	1	X			5	X			
QC01		2				5	X			
GW02		3				5	X	X	X	
GW03		4				4	X	X		
GW04		5				4	X	X		
GW05		6				5	X	X	X	
Rinse_HA		7				5	X		X	
Rinse_Pump		8				5	X		X	
Trip Blank/Trip Spike	2/6/21	9/10	X			2				X

SGS EHS Sydney COC
SE220656

Relinquished By: L.S. Adam Sullivan	Date/Time: 11/6/21 5:30pm	Received By:	Date/Time 11.6.21 5:15
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: (Yes)/ No	Temperature: Ambient / (Chilled) 17.0	Sample Cooler Sealed: (Yes)/ No	Laboratory Quotation No: **242708**

Comments: Please filter GW02 for metals.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Huong Crawford	Manager	Adam Atkinson
Client	SGS I&E SYDNEY	Laboratory	SGS Melbourne EH&S
Address	Unit 16, 33 Maddox Street Alexandria NSW 2015	Address	10/585 Blackburn Road Notting Hill Victoria 3168
Telephone	02 8594 0400	Telephone	+61395743200
Facsimile	02 8594 0499	Facsimile	+61395743399
Email	au.environmental.sydney@sgs.com	Email	Au.SampleReceipt.Melbourne@sgs.com
Project	**SES_590 (Regents Park)**	SGS Reference	**ME321013 R0**
Order Number	**SE220656**	Date Received	17 Jun 2021
Samples	10	Date Reported	21 Jun 2021

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(14420).

MA1523: Some surrogate recovery is outside of the acceptance criteria due to sample matrix interference.

SIGNATORIES

Adam ATKINSON
Australian Chemistry Manager

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	ME321013.001 Water 06 Nov 2021 SE220656.001	ME321013.002 Water 06 Nov 2021 SE220656.002	ME321013.003 Water 11 Jun 2021 SE220656.003	ME321013.004 Water 06 Nov 2021 SE220656.004
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level	**Method: MA-1523**	**Tested: 21/6/2021**					
Perfluorobutanoic acid (PFBA)	µg/L	0.0005		-	-	**0.016**	-
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005		-	-	**0.0008**	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005		-	-	**0.0040**	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005		-	-	**0.0017**	-
Perfluorooctanoic Acid (PFOA)	µg/L	0.0005		-	-	**0.0009**	-
Perfluorononanoic acid (PFNA)	µg/L	0.001		-	-	<0.001	-
Perfluorodecanoic acid (PFDA)	µg/L	0.001		-	-	<0.001	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.001		-	-	<0.001	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.001		-	-	<0.001	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.001		-	-	<0.001	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.001		-	-	<0.001	-
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.002		-	-	<0.002	-
Perfluorobutane sulfonate (PFBS)	µg/L	0.001		-	-	**0.002**	-
Perfluoropentane sulfonate (PFPeS)	µg/L	0.001		-	-	<0.001	-
Perfluorohexane sulfonate (PFHxS)	µg/L	0.0002		-	-	**0.0012**	-
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.0002		-	-	<0.0002	-
Perfluorooctane sulfonate (PFOS)	µg/L	0.0002		-	-	**0.0006**	-
Sum of PFHxS and PFOS	µg/L	0.0002		-	-	**0.0018**	-
Perfluorononane sulfonate (PFNS)	µg/L	0.0005		-	-	<0.0005	-
Perfluorodecane sulfonate (PFDS)	µg/L	0.0005		-	-	<0.0005	-
Perfluorododecane sulfonate (PFDoS)	µg/L	0.0005		-	-	<0.0005	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.0005		-	-	<0.0005	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.0005		-	-	<0.0005	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.0005		-	-	<0.0005	-
Perfluorooctane sulfonamide (PFOSA)	µg/L	0.002		-	-	<0.002	-
N-Methylperfluorooctane sulfonamide (N-MeFOSA)	µg/L	0.0025		-	-	<0.0025	-
N-Ethylperfluorooctane sulfonamide (N-EtFOSA)	µg/L	0.0025		-	-	<0.0025	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025		-	-	<0.0025	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025		-	-	<0.0025	-
N-Methylperfluorooctanesulfonamidoacetic acid	µg/L	0.0025		-	-	<0.0025	-
N-Ethylperfluorooctanesulfonamidoacetic Acid	µg/L	0.0025		-	-	<0.0025	-
Total PFAS (n=30)	µg/L	0.006		-	-	**0.027**	-
(13C4-PFBA) Isotopically Labelled Internal Recovery	%	-		-	-	**100**	-
(13C5-PFPeA) Isotopically Labelled Internal Recovery	%	-		-	-	**98**	-
(13C5-PFHxA) Isotopically Labelled Internal Recovery	%	-		-	-	**95**	-
(13C4-PFHpA) Isotopically Labelled Internal Recovery	%	-		-	-	**96**	-
(13C4_PFOA) Isotopically Labelled Internal Recovery	%	-		-	-	**104**	-
(13C9-PFNA) Isotopically Labelled Internal Recovery	%	-		-	-	**108**	-
(13C6-PFDA) Isotopically Labelled Internal Recovery	%	-		-	-	**103**	-
(13C7-PFUdA) Isotopically Labelled Internal Recovery	%	-		-	-	**112**	-
(13C2-PFDoA) Isotopically Labelled Internal Recovery	%	-		-	-	**118**	-
(13C2_PFTeDA) Isotopically Labelled Internal Recovery	%	-		-	-	**140**	-
(13C2-PFHxDA) Isotopically Labelled Internal Recovery	%	-		-	-	**183**	-
(13C3-PFBS) Isotopically Labelled Internal Recovery	%	-		-	-	**90**	-
(13C3-PFHxS) Isotopically Labelled Internal Recovery	%	-		-	-	**106**	-
(13C8-PFOS) Isotopically Labelled Internal Recovery	%	-		-	-	**95**	-
(13C2-4:2 FTS) Isotopically Labelled Internal Recovery	%	-		-	-	**83**	-
(13C2-6:2 FTS) Isotopically Labelled Internal Recovery	%	-		-	-	**66**	-
(13C2-8:2 FTS) Isotopically Labelled Internal Recovery	%	-		-	-	**67**	-
(13C8-PFOSA) Isotopically Labelled Internal Recovery	%	-		-	-	**60**	-
(D3-N-MeFOSA) Isotopically Labelled Internal Recovery	%	-		-	-	**71**	-
(D5-N-EtFOSA) Isotopically Labelled Internal Recovery	%	-		-	-	**76**	-
(D7-N-MeFOSE) Isotopically Labelled Internal Recovery	%	-		-	-	**65**	-
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery	%	-		-	-	**65**	-
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery	%	-		-	-	**68**	-
(D5-N-EtFOSAA) Isotopically Labelled Internal Recovery	%	-		-	-	**66**	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	ME321013.005 Water 06 Nov 2021 SE220656.005	ME321013.006 Water 11 Jun 2021 SE220656.006	ME321013.007 Water 11 Jun 2021 SE220656.007	ME321013.008 Water 11 Jun 2021 SE220656.008
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level	**Method: MA-1523**	**Tested: 21/6/2021**					
Perfluorobutanoic acid (PFBA)	µg/L	0.0005	-	**0.0034**	<0.0005	<0.0005
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	-	**0.0068**	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	-	**0.0088**	<0.0005	<0.0005
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	-	**0.0043**	<0.0005	<0.0005
Perfluorooctanoic Acid (PFOA)	µg/L	0.0005	-	**0.0044**	<0.0005	<0.0005
Perfluorononanoic acid (PFNA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluoroundecanoic acid (PFUnA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluorododecanoic acid (PFDoA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.001	-	<0.001	<0.001	<0.001
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.002	-	<0.002	<0.002	<0.002
Perfluorobutane sulfonate (PFBS)	µg/L	0.001	-	**0.003**	<0.001	<0.001
Perfluoropentane sulfonate (PFPeS)	µg/L	0.001	-	**0.003**	<0.001	<0.001
Perfluorohexane sulfonate (PFHxS)	µg/L	0.0002	-	**0.0079**	<0.0002	<0.0002
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.0002	-	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonate (PFOS)	µg/L	0.0002	-	**0.0003**	<0.0002	<0.0002
Sum of PFHxS and PFOS	µg/L	0.0002	-	**0.0082**	<0.0002	<0.0002
Perfluorononane sulfonate (PFNS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
Perfluorodecane sulfonate (PFDS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
Perfluorododecane sulfonate (PFDoS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.0005	-	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonamide (PFOSA)	µg/L	0.002	-	<0.002	<0.002	<0.002
N-Methylperfluorooctane sulfonamide (N-MeFOSA)	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
N-Ethylperfluorooctane sulfonamide (N-EtFOSA)	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
2-(N-Methylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
2-(N-Ethylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
N-Methylperfluorooctanesulfonamidoacetic acid	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
N-Ethylperfluorooctanesulfonamidoacetic Acid	µg/L	0.0025	-	<0.0025	<0.0025	<0.0025
Total PFAS (n=30)	µg/L	0.006	-	**0.042**	<0.0060	<0.0060
(13C4-PFBA) Isotopically Labelled Internal Recovery	%	-	-	**102**	**99**	**101**
(13C5-PFPeA) Isotopically Labelled Internal Recovery	%	-	-	**136**	**95**	**97**
(13C5-PFHxA) Isotopically Labelled Internal Recovery	%	-	-	**83**	**112**	**102**
(13C4-PFHpA) Isotopically Labelled Internal Recovery	%	-	-	**84**	**104**	**108**
(13C4_PFOA) Isotopically Labelled Internal Recovery	%	-	-	**99**	**99**	**101**
(13C9-PFNA) Isotopically Labelled Internal Recovery	%	-	-	**108**	**105**	**106**
(13C6-PFDA) Isotopically Labelled Internal Recovery	%	-	-	**114**	**122**	**121**
(13C7-PFUdA) Isotopically Labelled Internal Recovery	%	-	-	**126**	**113**	**83**
(13C2-PFDoA) Isotopically Labelled Internal Recovery	%	-	-	**140**	**132**	**93**
(13C2_PFTeDA) Isotopically Labelled Internal Recovery	%	-	-	**195**	**146**	**138**
(13C2-PFHxDA) Isotopically Labelled Internal Recovery	%	-	-	**372**	**269**	**221**
(13C3-PFBS) Isotopically Labelled Internal Recovery	%	-	-	**85**	**117**	**93**
(13C3-PFHxS) Isotopically Labelled Internal Recovery	%	-	-	**94**	**100**	**100**
(13C8-PFOS) Isotopically Labelled Internal Recovery	%	-	-	**100**	**95**	**100**
(13C2-4:2 FTS) Isotopically Labelled Internal Recovery	%	-	-	**64**	**127**	**86**
(13C2-6:2 FTS) Isotopically Labelled Internal Recovery	%	-	-	**58**	**105**	**80**
(13C2-8:2 FTS) Isotopically Labelled Internal Recovery	%	-	-	**53**	**113**	**83**
(13C8-PFOSA) Isotopically Labelled Internal Recovery	%	-	-	**56**	**83**	**82**
(D3-N-MeFOSA) Isotopically Labelled Internal Recovery	%	-	-	**66**	**110**	**76**
(D5-N-EtFOSA) Isotopically Labelled Internal Recovery	%	-	-	**74**	**122**	**108**
(D7-N-MeFOSE) Isotopically Labelled Internal Recovery	%	-	-	**57**	**106**	**102**
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery	%	-	-	**52**	**104**	**95**
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery	%	-	-	**58**	**100**	**100**
(D5-N-EtFOSAA) Isotopically Labelled Internal Recovery	%	-	-	**65**	**94**	**87**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	ME321013.009 Water 06 Feb 2021 SE220656.009	ME321013.010 Water 06 Feb 2021 SE220656.010
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level	**Method: MA-1523**	**Tested: 21/6/2021**			
Perfluorobutanoic acid (PFBA)	µg/L	0.0005		-	-
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005		-	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005		-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005		-	-
Perfluorooctanoic Acid (PFOA)	µg/L	0.0005		-	-
Perfluorononanoic acid (PFNA)	µg/L	0.001		-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.001		-	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.001		-	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.001		-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.001		-	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.001		-	-
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.002		-	-
Perfluorobutane sulfonate (PFBS)	µg/L	0.001		-	-
Perfluoropentane sulfonate (PFPeS)	µg/L	0.001		-	-
Perfluorohexane sulfonate (PFHxS)	µg/L	0.0002		-	-
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.0002		-	-
Perfluorooctane sulfonate (PFOS)	µg/L	0.0002		-	-
Sum of PFHxS and PFOS	µg/L	0.0002		-	-
Perfluorononane sulfonate (PFNS)	µg/L	0.0005		-	-
Perfluorodecane sulfonate (PFDS)	µg/L	0.0005		-	-
Perfluorododecane sulfonate (PFDoS)	µg/L	0.0005		-	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.0005		-	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.0005		-	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.0005		-	-
Perfluorooctane sulfonamide (PFOSA)	µg/L	0.002		-	-
N-Methylperfluorooctane sulfonamide (N-MeFOSA)	µg/L	0.0025		-	-
N-Ethylperfluorooctane sulfonamide (N-EtFOSA)	µg/L	0.0025		-	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025		-	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025		-	-
N-Methylperfluorooctanesulfonamidoacetic acid	µg/L	0.0025		-	-
N-Ethylperfluorooctanesulfonamidoacetic Acid	µg/L	0.0025		-	-
Total PFAS (n=30)	µg/L	0.006		-	-
(13C4-PFBA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C5-PFPeA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C5-PFHxA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C4-PFHpA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C4_PFOA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C9-PFNA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C6-PFDA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C7-PFUdA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C2-PFDoA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C2_PFTeDA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C2-PFHxDA) Isotopically Labelled Internal Recovery	%	-		-	-
(13C3-PFBS) Isotopically Labelled Internal Recovery	%	-		-	-
(13C3-PFHxS) Isotopically Labelled Internal Recovery	%	-		-	-
(13C8-PFOS) Isotopically Labelled Internal Recovery	%	-		-	-
(13C2-4:2 FTS) Isotopically Labelled Internal Recovery	%	-		-	-
(13C2-6:2 FTS) Isotopically Labelled Internal Recovery	%	-		-	-
(13C2-8:2 FTS) Isotopically Labelled Internal Recovery	%	-		-	-
(13C8-PFOSA) Isotopically Labelled Internal Recovery	%	-		-	-
(D3-N-MeFOSA) Isotopically Labelled Internal Recovery	%	-		-	-
(D5-N-EtFOSA) Isotopically Labelled Internal Recovery	%	-		-	-
(D7-N-MeFOSE) Isotopically Labelled Internal Recovery	%	-		-	-
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery	%	-		-	-
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery	%	-		-	-
(D5-N-EtFOSAA) Isotopically Labelled Internal Recovery	%	-		-	-

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level Method: MA-1523

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Perfluorobutanoic acid (PFBA)	LB042213	µg/L	0.0005	<0.0005	4%	NA
Perfluoropentanoic acid (PFPeA)	LB042213	µg/L	0.0005	<0.0005	12%	NA
Perfluorohexanoic acid (PFHxA)	LB042213	µg/L	0.0005	<0.0005	4%	NA
Perfluoroheptanoic acid (PFHpA)	LB042213	µg/L	0.0005	<0.0005	14%	103%
Perfluorooctanoic Acid (PFOA)	LB042213	µg/L	0.0005	<0.0005	22%	129%
Perfluorononanoic acid (PFNA)	LB042213	µg/L	0.001	<0.001	0%	150%
Perfluorodecanoic acid (PFDA)	LB042213	µg/L	0.001	<0.001	0%	142%
Perfluoroundecanoic acid (PFUnA)	LB042213	µg/L	0.001	<0.001	0%	147%
Perfluorododecanoic acid (PFDoA)	LB042213	µg/L	0.001	<0.001	0%	146%
Perfluorotridecanoic acid (PFTrDA)	LB042213	µg/L	0.001	<0.001	0%	150%
Perfluorotetradecanoic acid (PFTeDA)	LB042213	µg/L	0.001	<0.001	0%	144%
Perfluorohexadecanoic acid (PFHxDA)	LB042213	µg/L	0.002	<0.002	0%	NA
Perfluorobutane sulfonate (PFBS)	LB042213	µg/L	0.001	<0.001	0%	NA
Perfluoropentane sulfonate (PFPeS)	LB042213	µg/L	0.001	<0.001	0%	NA
Perfluorohexane sulfonate (PFHxS)	LB042213	µg/L	0.0002	<0.0002	38%	NA
Perfluoroheptane sulfonate (PFHpS)	LB042213	µg/L	0.0002	<0.0002	0%	NA
Perfluorooctane sulfonate (PFOS)	LB042213	µg/L	0.0002	<0.0002	89%	142%
Sum of PFHxS and PFOS	LB042213	µg/L	0.0002	<0.0002	26%	NA
Perfluorononane sulfonate (PFNS)	LB042213	µg/L	0.0005	<0.0005	0%	NA
Perfluorodecane sulfonate (PFDS)	LB042213	µg/L	0.0005	<0.0005	0%	NA
Perfluorododecane sulfonate (PFDoS)	LB042213	µg/L	0.0005	<0.0005	0%	NA
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	LB042213	µg/L	0.0005	<0.0005	0%	NA
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	LB042213	µg/L	0.0005	<0.0005	0%	NA
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	LB042213	µg/L	0.0005	<0.0005	0%	NA
Perfluorooctane sulfonamide (PFOSA)	LB042213	µg/L	0.002	<0.002	0%	78%
N-Methylperfluorooctane sulfonamide (N-MeFOSA)	LB042213	µg/L	0.0025	<0.0025	0%	NA
N-Ethylperfluorooctane sulfonamide (N-EtFOSA)	LB042213	µg/L	0.0025	<0.0025	0%	NA
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	LB042213	µg/L	0.0025	<0.0025	0%	NA
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	LB042213	µg/L	0.0025	<0.0025	0%	NA
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	LB042213	µg/L	0.0025	<0.0025	0%	NA
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	LB042213	µg/L	0.0025	<0.0025	0%	NA
Total PFAS (n=30)	LB042213	µg/L	0.006	<0.0060		
(13C4-PFBA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	100%	1%	98%
(13C5-PFPeA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	92%	2%	98%
(13C5-PFHxA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	106%	1%	119%
(13C4-PFHpA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	109%	3%	118%
(13C4_PFOA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	106%	4%	104%
(13C9-PFNA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	104%	8%	99%
(13C6-PFDA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	105%	9%	101%
(13C7-PFUdA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	93%	11%	82%
(13C2-PFDoA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	100%	12%	90%
(13C2_PFTeDA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	121%	5%	123%
(13C2-PFHxDA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	106%	37%	103%
(13C3-PFBS) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	101%	0%	130%
(13C3-PFHxS) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	102%	1%	100%
(13C8-PFOS) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	110%	6%	97%
(13C2-4:2 FTS) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	107%	11%	124%
(13C2-6:2 FTS) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	102%	12%	102%
(13C2-8:2 FTS) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	99%	7%	84%
(13C8-PFOSA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	89%	1%	96%
(D3-N-MeFOSA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	93%	5%	97%
(D5-N-EtFOSA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	103%	5%	94%
(D7-N-MeFOSE) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	89%	6%	110%
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	91%	2%	102%
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	103%	1%	97%
(D5-N-EtFOSAA) Isotopically Labelled Internal Recovery Standard	LB042213	%	-	107%	9%	96%

METHOD SUMMARY

ME321013 R0

METHOD	METHODOLOGY SUMMARY
MA-1523	This method covers the analysis of per- and polyfluoroalkyl substances (PFAS) in aqueous, solid and biosolid samples and solvent extracts, determined as the total of linear and branched isomers. After spiking with isotopically labelled quantification surrogates and clean-up via SPE cartridges sample extracts are analysed by liquid chromatography/mass spectrometry (LC-MS/MS). PFAS concentrations are determined by isotope dilution quantification.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
***	Indicates that both * and ** apply.	NVL	Not Validated

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 calcuated 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.

SAMPLE RECEIPT ADVICE

SE220656

CLIENT DETAILS

Contact	ADAM SULLIVAN
Client	SULLIVAN ENVIRONMENTAL SCIENCES PTY. LIMITED
Address	PO BOX 5248 TURRAMURRA NSW 2074
Telephone	(Not specified)
Facsimile	(Not specified)
Email	ENQUIRIES@SULLIVAN-ES.COM.AU
Project	**SES_590 (Regents Park)**
Order Number	(Not specified)
Samples	10

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
Samples Received	Fri 11/6/2021
Report Due	Mon 21/6/2021
SGS Reference	**SE220656**

SUBMISSION DETAILS

This is to confirm that 10 samples were received on Friday 11/6/2021. Results are expected to be ready by COB Monday 21/6/2021. Please quote SGS reference SE220656 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	10 Water
Date documentation received	11/6/2021	Type of documentation received	COC
Number of eskies/boxes received		Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	17.0°C
Sufficient sample for analysis	Yes	Turnaround time requested	Standard

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

PFAS subcontracted to SGS Melbourne, Unit 10/585 Blackburn Road Notting Hill VIC 3168, NATA Accreditation Number 2562, Site number 14420. Results may be delayed.

SAMPLE RECEIPT ADVICE

SE220656

CLIENT DETAILS

Client SULLIVAN ENVIRONMENTAL SCIENCES PTY. LIMITED Project SES_590 (Regents Park)

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	PAH (Polynuclear Aromatic Hydrocarbons) in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	GW01	1	22	7	9	11	7
002	QC01	1	22	7	9	11	7
003	GW02	1	22	7	9	78	7
004	GW03	1	22	7	9	78	7
005	GW04	1	22	7	9	78	7
006	GW05	1	22	7	9	78	7
007	Rinse_HA	1	22	7	9	11	7
008	Rinse_Pump	1	22	7	9	11	7
009	Trip Blank	-	-	-	-	11	-
010	Trip Spike	-	-	-	-	11	-

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE220656

CLIENT DETAILS

Client SULLIVAN ENVIRONMENTAL SCIENCES PTY. LIMITED Project SES_590 (Regents Park)

SUMMARY OF ANALYSIS

No.	Sample ID	Per- and Polyfluoroalkyl Substances (PFAS) in
003	GW02	56
006	GW05	56
007	Rinse_HA	56
008	Rinse_Pump	56

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

APPENDIX D

Permeability Test Results

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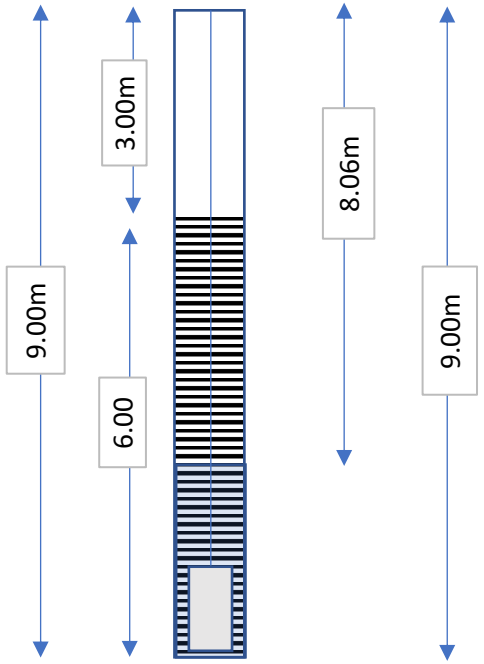
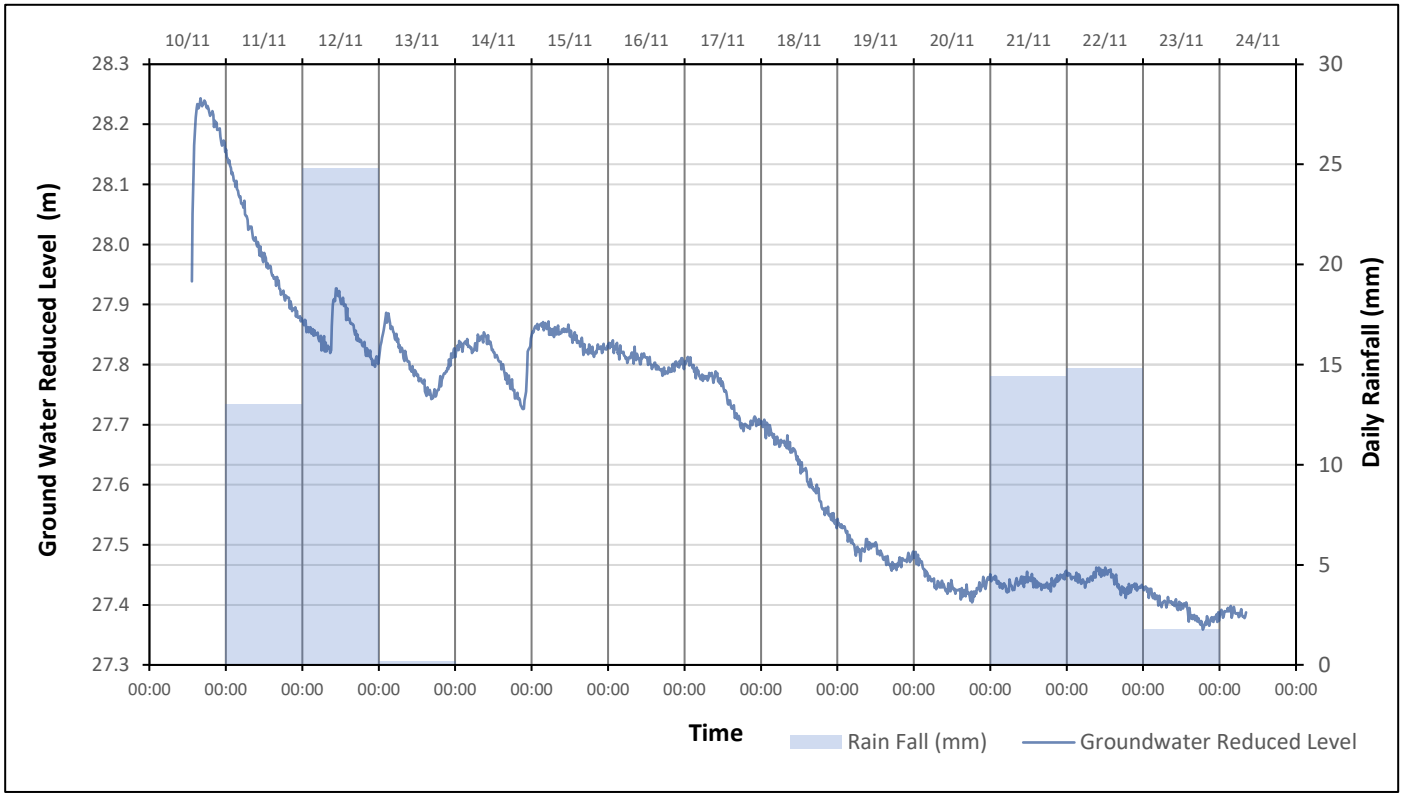
Groundwater Monitoring

Client :	Sonsari Pty Ltd	**Location:**	BH01
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	10/11/21 - 24/11/21
Test Method :	-	**Tested By :**	MS

Test	BH01				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	8.06	**Solid Casing Length(L)**	m	3
Casing Radius (r_c)	m	0.025	**Screened Length (L_e)**	m	6
Borehole Radius (r_w)	m	0.05	**Existing Ground RL**	m	36

Well and Logger Details	
Time	10/11/2021 13:32





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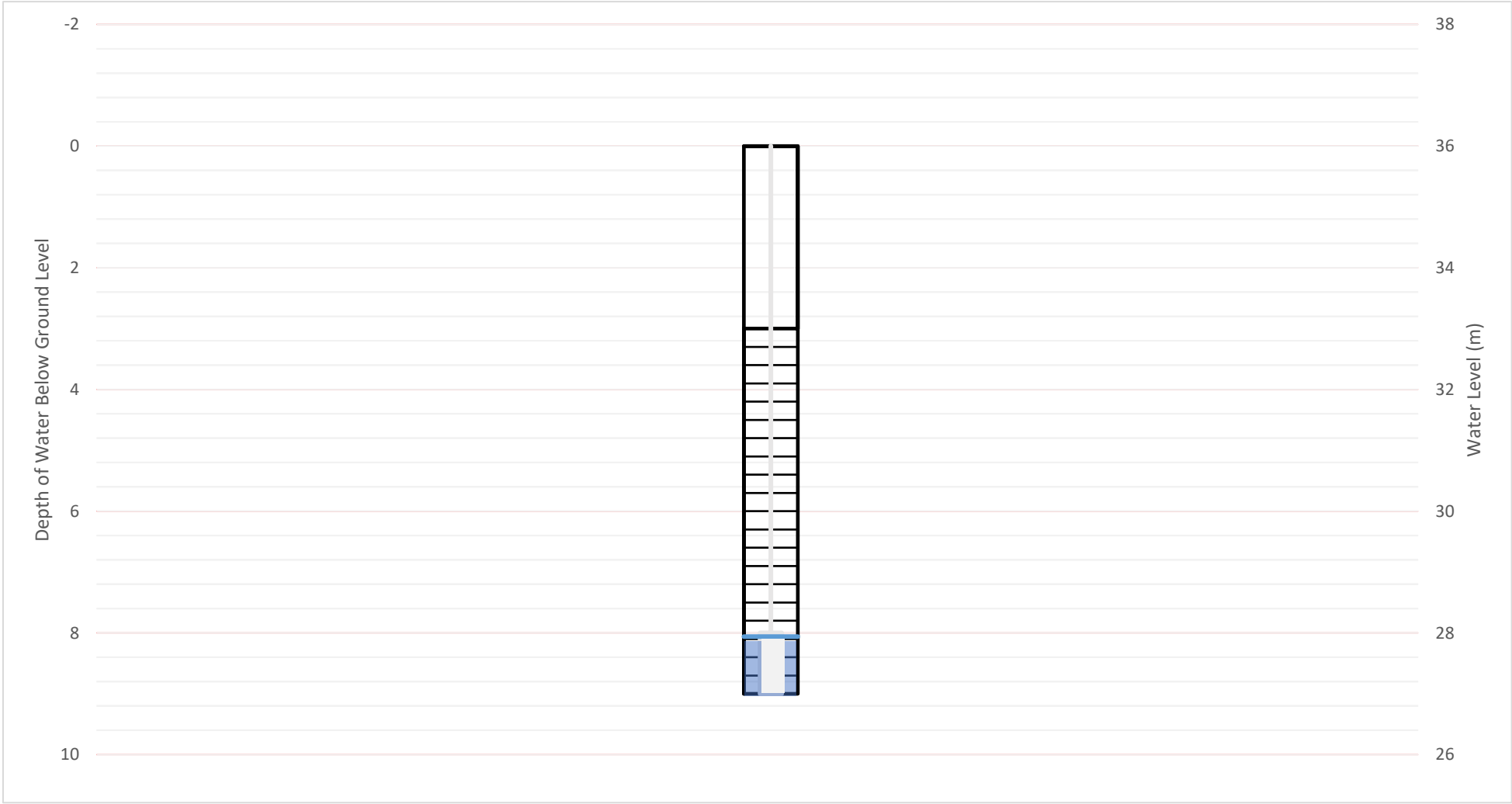
Scaled Well and Logger Details		
Ground RL	m	36
Solid Length	m	3
Slotted Length	m	6
Logger Install Depth	m	9
Initial Water Level	m	8.06



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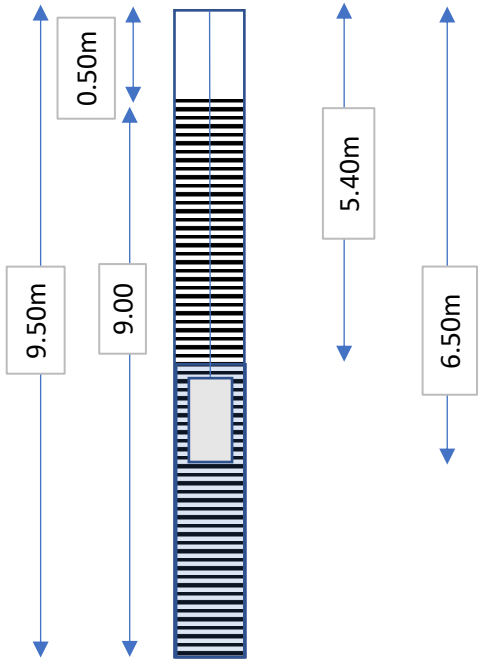
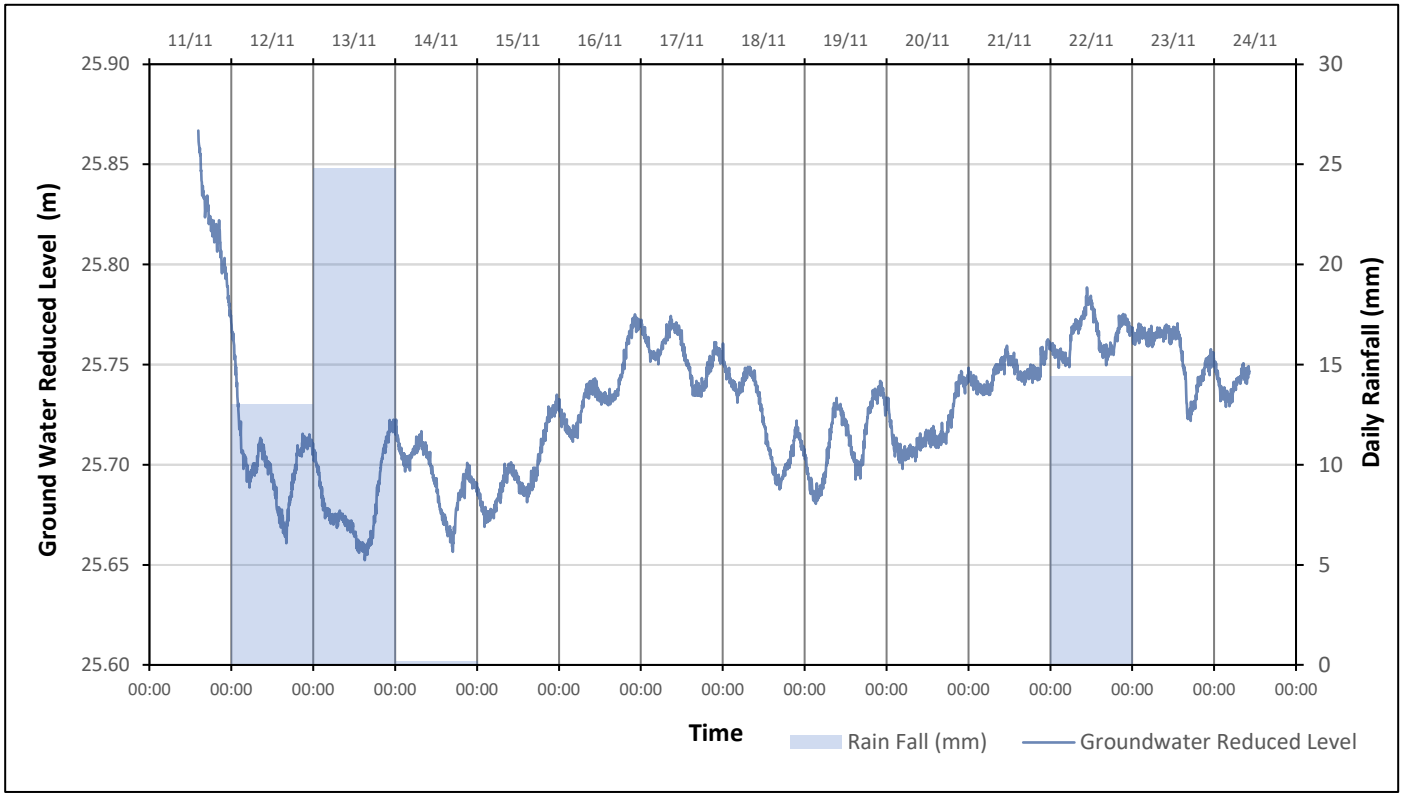
Groundwater Monitoring

Client :	Sonsari Pty Ltd	**Location:**	BH05
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	11/11/21 - 24/11/21
Test Method :	-	**Tested By :**	AH

Test	BH05				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	5.4	**Solid Casing Length(L)**	m	0.5
Casing Radius (r_c)	m	0.025	**Screened Length (L_e)**	m	9
Borehole Radius (r_w)	m	0.05	**Existing Ground RL**	m	31.3

Well and Logger Details	
Time	11/11/2021 14:25





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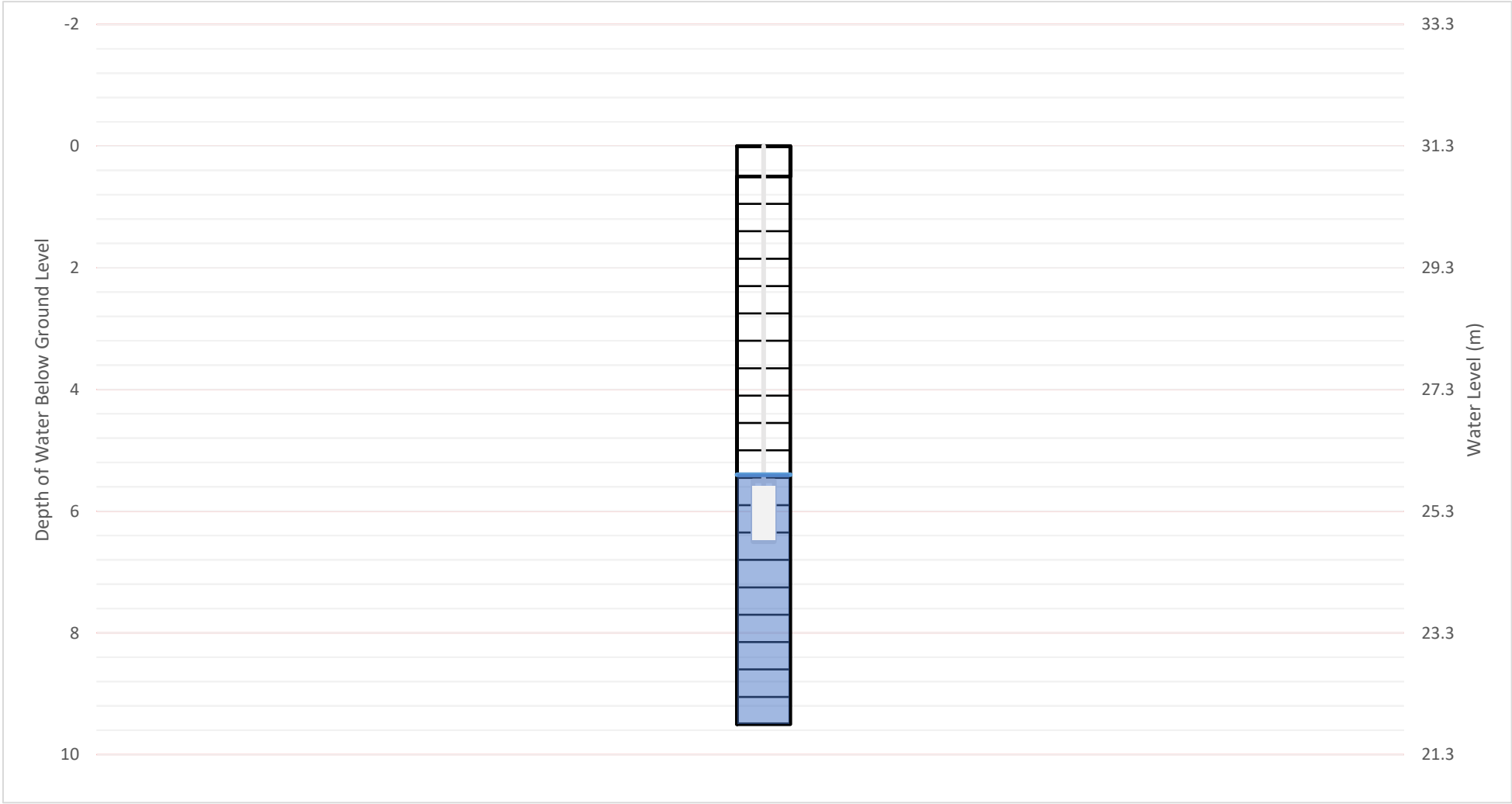
Scaled Well and Logger Details		
Ground RL	m	31.3
Solid Length	m	0.5
Slotted Length	m	9
Logger Install Depth	m	6.5
Initial Water Level	m	5.4



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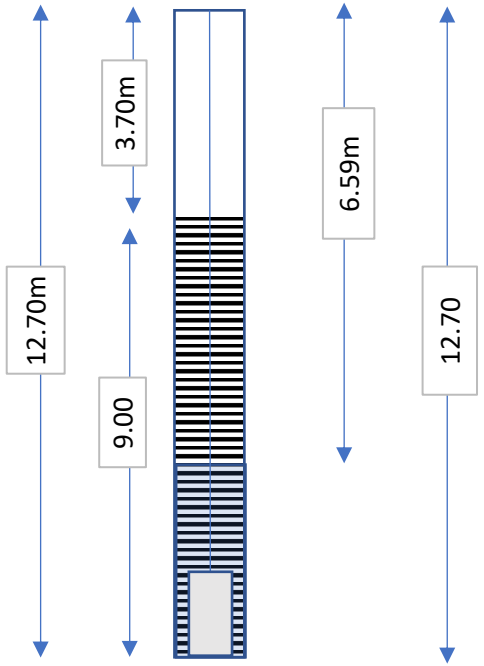
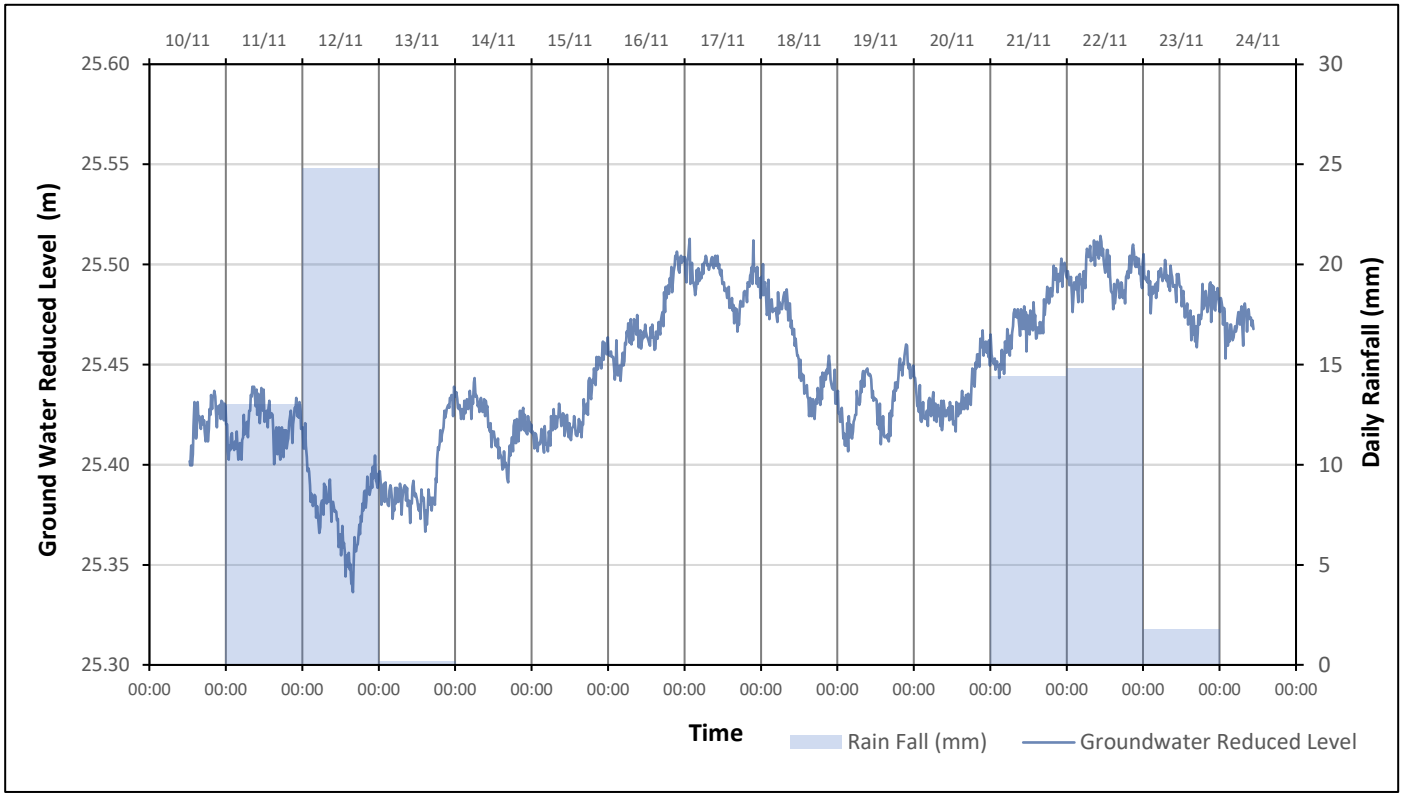
Groundwater Monitoring

Client :	Sonsari Pty Ltd	**Location:**	BH07
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	11/11/21 - 23/11/21
Test Method :	-	**Tested By :**	MS

Test	BH07				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	6.59	**Solid Casing Length(L)**	m	3.7
Casing Radius (r_c)	m	0.025	**Screened Length (L_e)**	m	9
Borehole Radius (r_w)	m	0.05	**Existing Ground RL**	m	32

Well and Logger Details	
Time	10/11/2021 12:52





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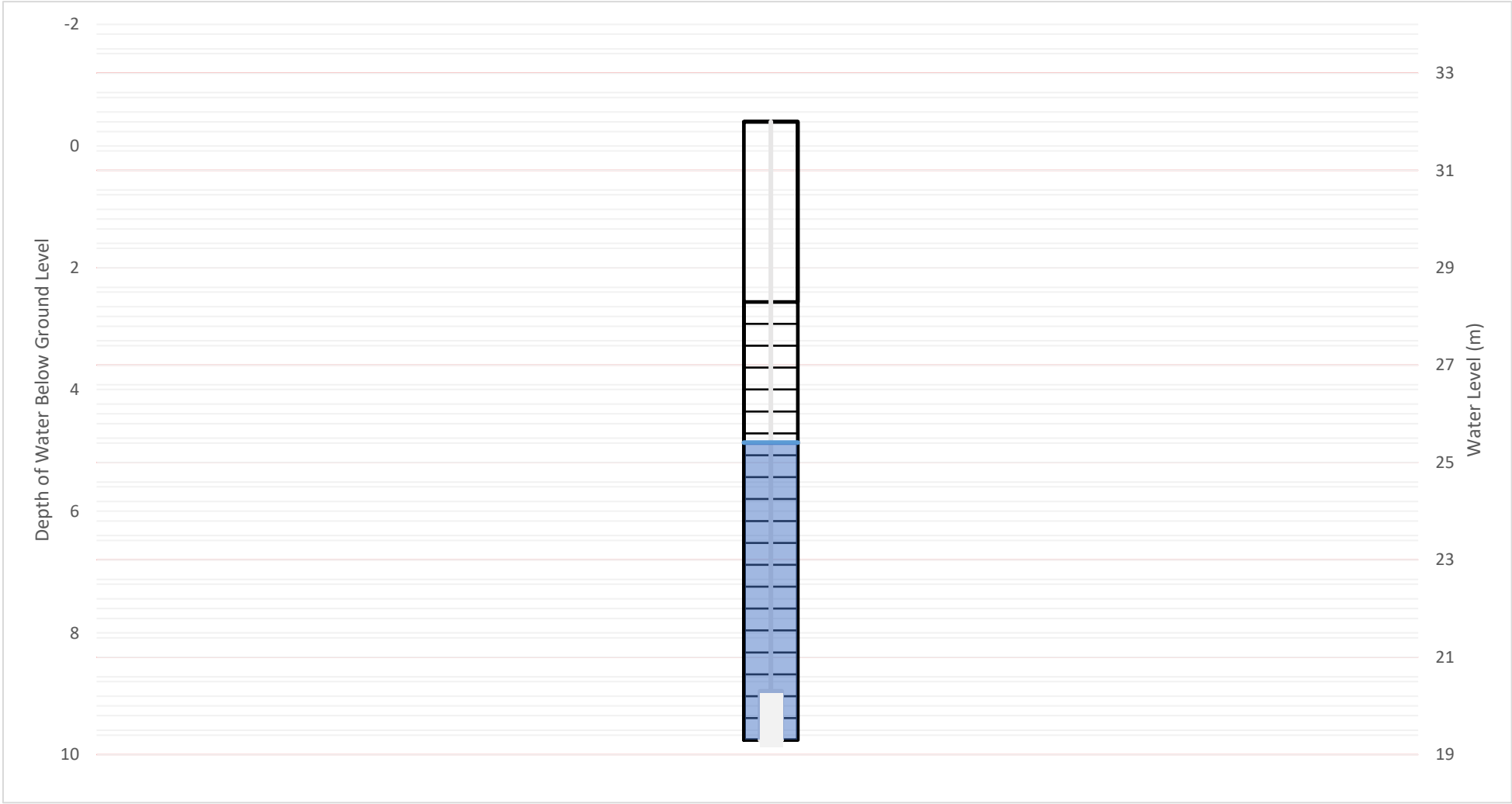
Scaled Well and Logger Details		
Ground RL	m	32
Solid Length	m	3.7
Slotted Length	m	9
Logger Install Depth	m	12.7
Initial Water Level	m	6.59



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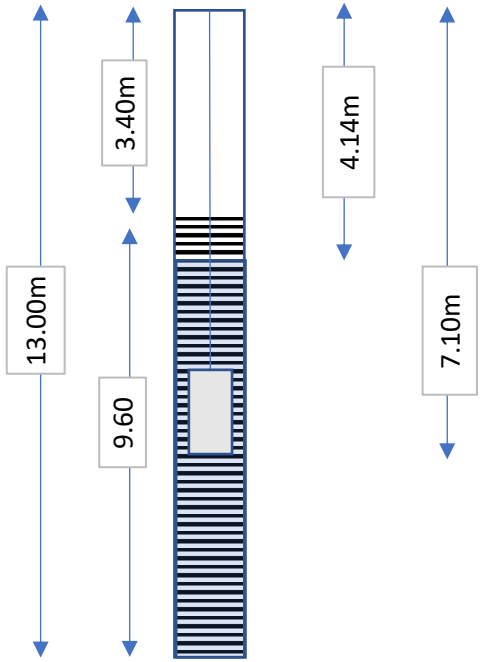
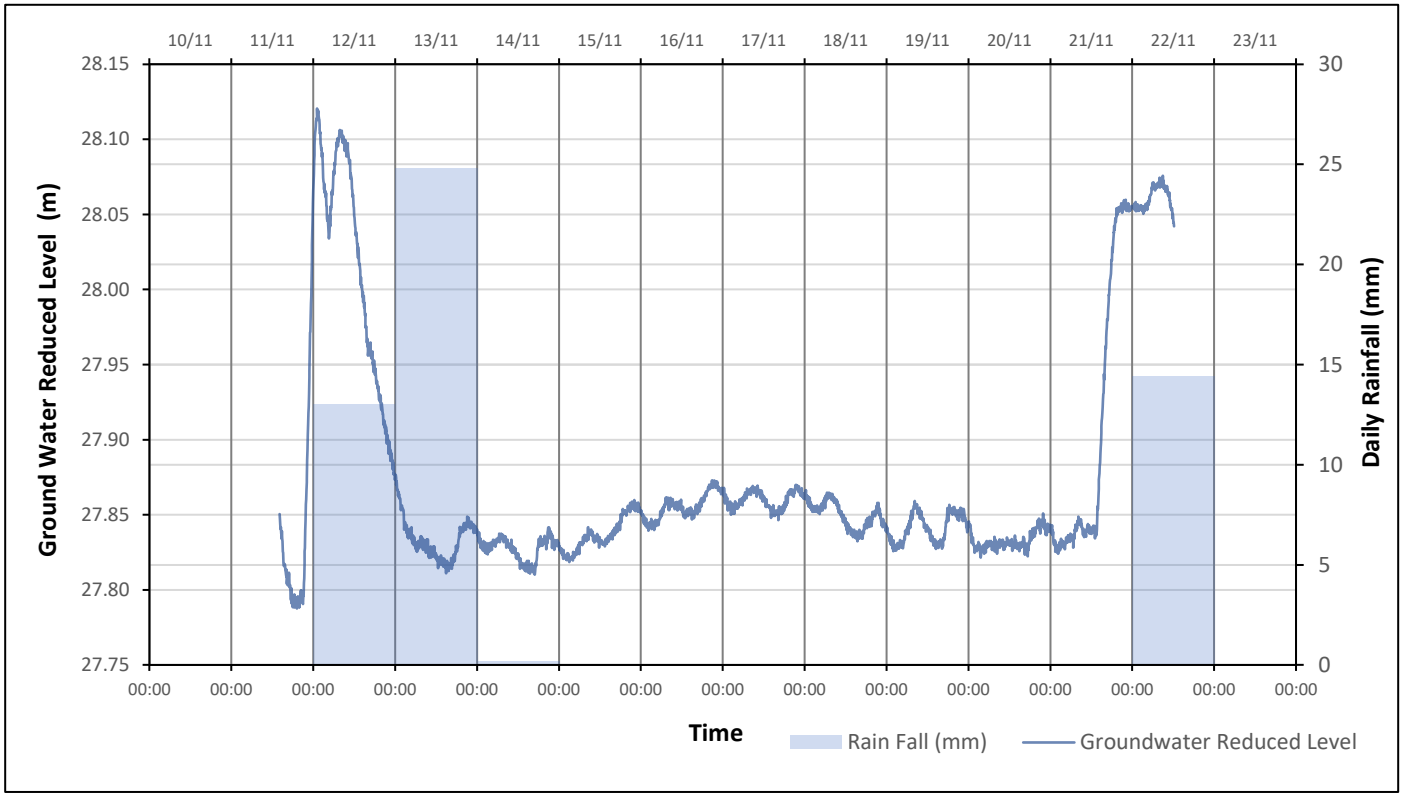
Groundwater Monitoring

Client :	Sonsari Pty Ltd	**Location:**	BH11
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	11/11/21 - 23/11/21
Test Method :	-	**Tested By :**	AH

Test	BH11				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	4.14	**Solid Casing Length(L)**	m	3.4
Casing Radius (r_c)	m	0.025	**Screened Length (L_e)**	m	9.6
Borehole Radius (r_w)	m	0.05	**Existing Ground RL**	m	31.3

Well and Logger Details	
Time	11/11/2021 14:15





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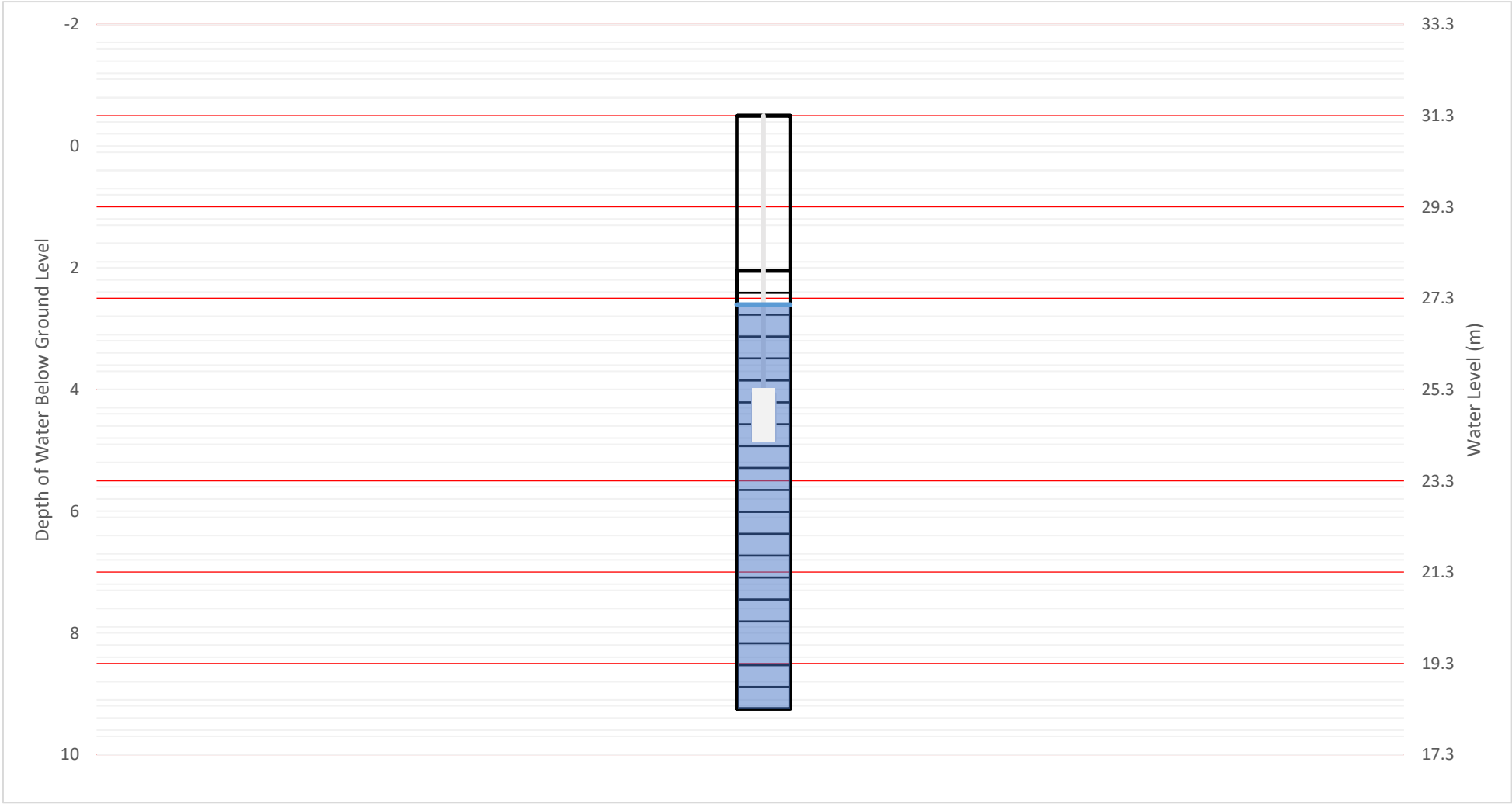
Scaled Well and Logger Details		
Ground RL	m	31.3
Solid Length	m	3.4
Slotted Length	m	9.6
Logger Install Depth	m	7.1
Initial Water Level	m	4.14



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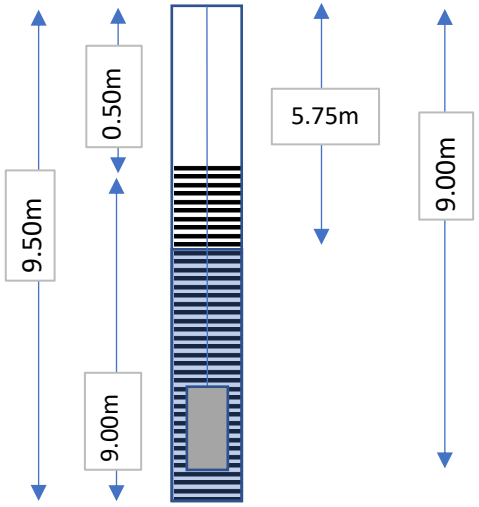
Rising Head Permeability Test Report

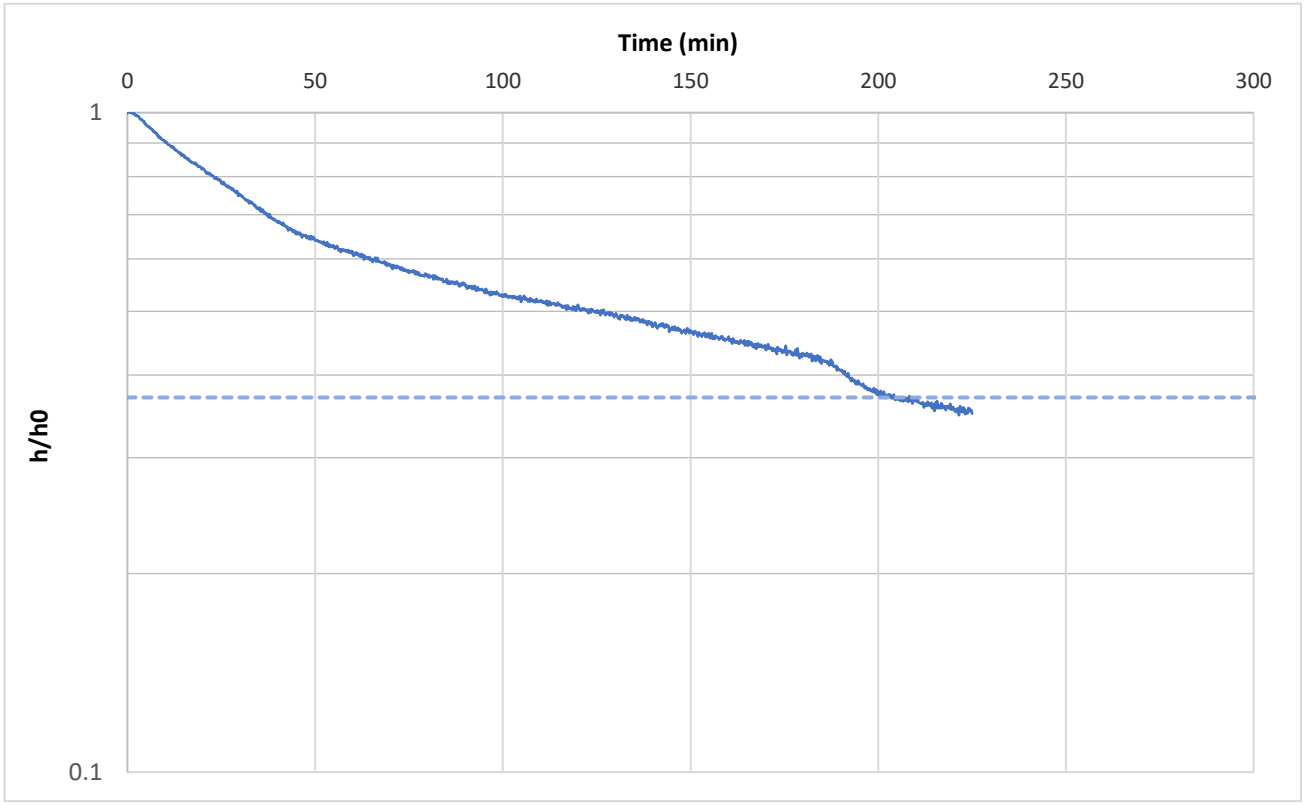
Client :	Sonsari Pty Ltd	**Location:**	BH05
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	24/11/2021
Test Method :	Hvorslev's Method (1951)	**Tested By :**	MS

Test	**BH05**				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	5.75	**Solid Casing Length (L)**	m	0.5
Groundwater Depth at t=0s	m	8.34	**Screened Length (L_e)**	m	9
Casing Radius (r_c)	m	0.025	**Characteristic Time (t_0)**	min	205.6666667
Borehole Radius (r_w)	m	0.05	**Hydraulic Conductivity (k)**	m/day	**0.0013**

$$K = \frac{r_c^2 \cdot \ln\left(\frac{L_e}{r_w}\right)}{2 \cdot L_e \cdot t_0}$$

Logger Details	
Time	10:22am





alliance

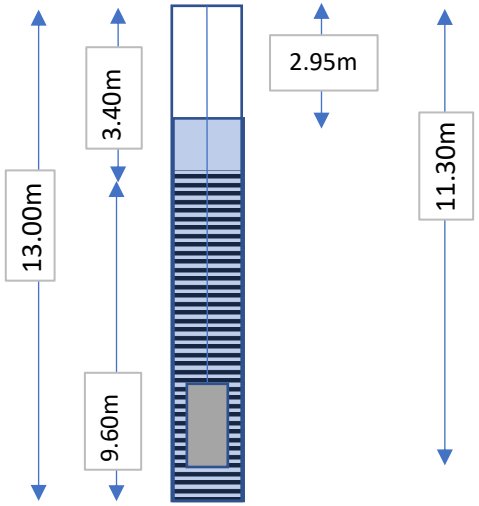
Rising Head Permeability Test Report

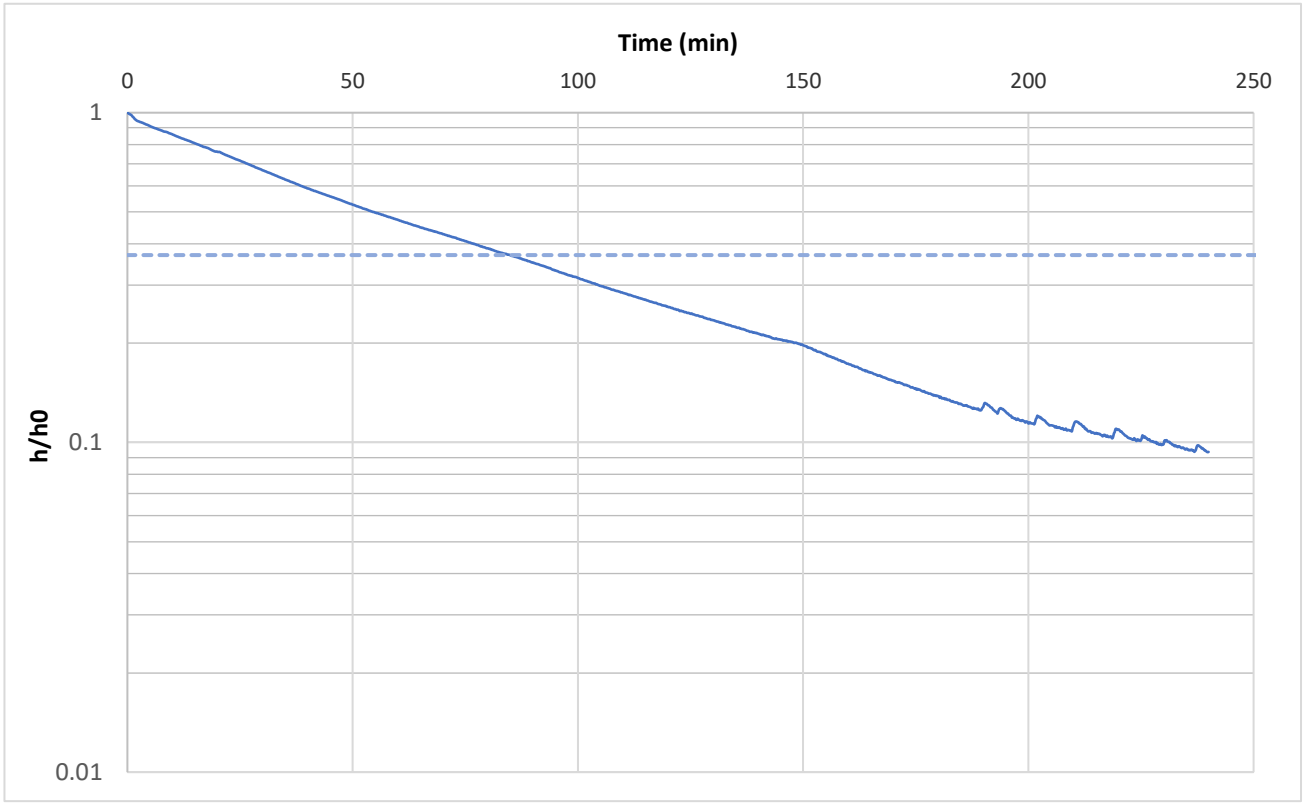
Client :	Sonsari Pty Ltd	**Location:**	BH11
Project :	Proposed Multistorey Development	**Job Number :**	13087
Test Location:	(refer to drawing 13087-GR-1-A)	**Test Date :**	24/11/2021
Test Method :	Hvorslev's Method (1951)	**Tested By :**	MS

Test	**BH11**				
Borehole Data	**Unit**	**Value**	**Borehole Data**	**Unit**	**Value**
Initial Ground Water Depth (bgs)	m	2.95	**Solid Casing Length (L)**	m	3.4
Groundwater Depth at t=0s	m	8.7	**Screened Length (L_e)**	m	9.6
Casing Radius (r_c)	m	0.025	**Characteristic Time (t_0)**	min	85
Borehole Radius (r_w)	m	0.05	**Hydraulic Conductivity (k)**	m/day	**0.0029**

$$K = \frac{r_c^2 \cdot \ln\left(\frac{L_e}{r_w}\right)}{2 \cdot L_e \cdot t_0}$$

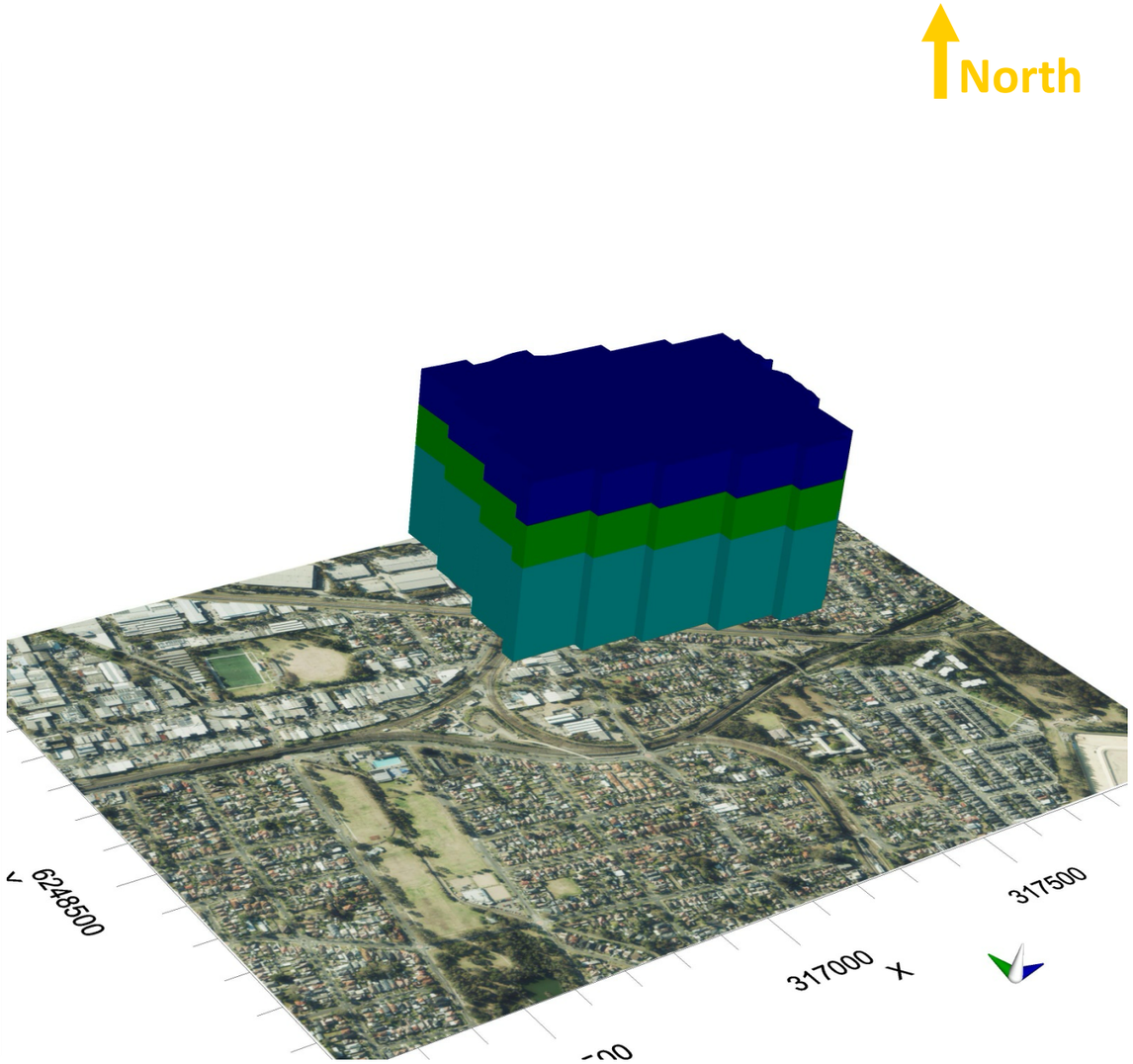
Logger Details	
Time	9:10am





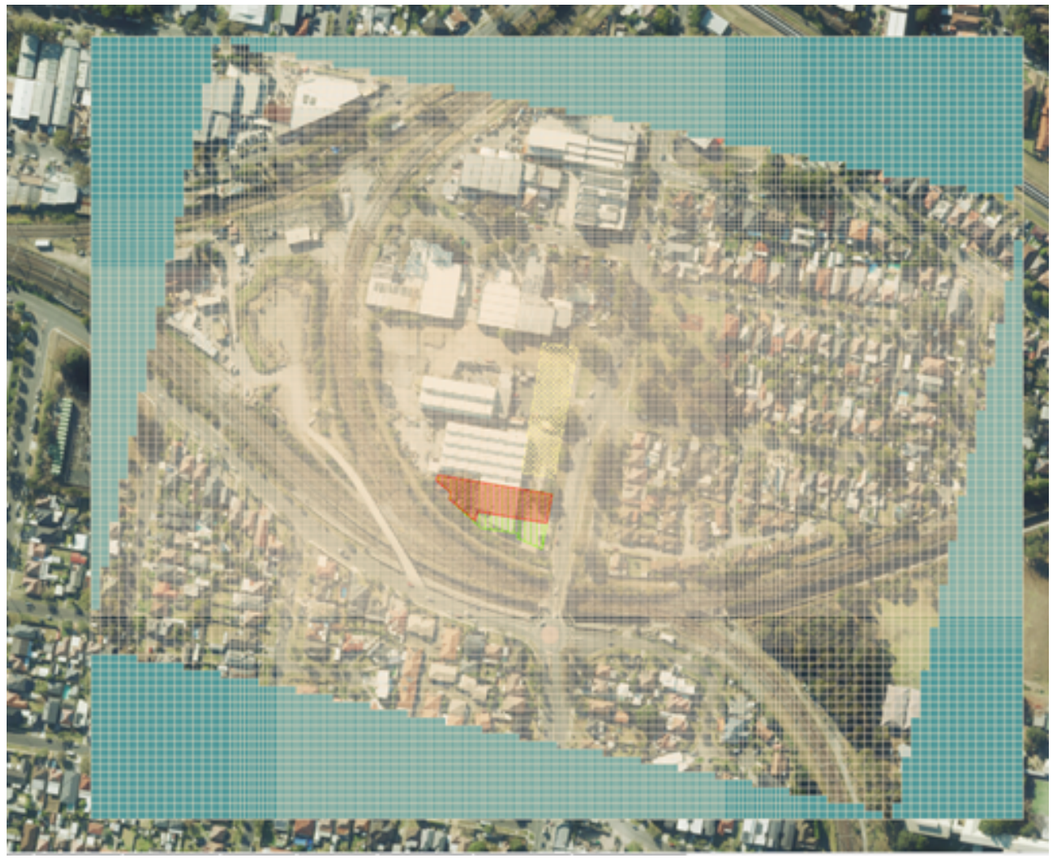
APPENDIX E

Groundwater Modelling Results



PROJECT DETAILS	Proposed Residential Development (Stage 3 , Building C)
Project Title	Groundwater Impact Assessment (GIA)
Project No.	IRP- 104
Client	City of Canterbury Bankstown
Site Address	30-46 Auburn Road, Regents Park NSW 2143

DRAWING DETAILS Drawing 1. Stage 3 - Model Design Geometry			
Appendix E	1	Rev No.	0
Scale	NA	Size	A4
Produce by	RO	Date	15/02/2024
Authorize to release by	IR	Date	26/02/2024



Model Scenario 1: Open Excavation

North

Model Scenario 2: Soldier pile wall with shotcrete infill around the basement excavation for building A and B,

LEGEND

Cutt-off wall around building C

PROJECT DETAILS	Proposed Residential Development (Stage 3, Building C)
Project Title	Groundwater Impact Assessment (GIA)
Project No.	IRP- 104
Client	City of Canterbury Bankstown
Site Address	30-46 Auburn Road, Regents Park NSW 2143

DRAWING DETAILS	Drawing 2. Stage 3 - Model Design Geometry		
Appendix E	1	Rev No.	0
Scale	NA	Size	A4
Produce by	RO	Date	15/02/2024
Authorize to release by	IR	Date	26/02/2024

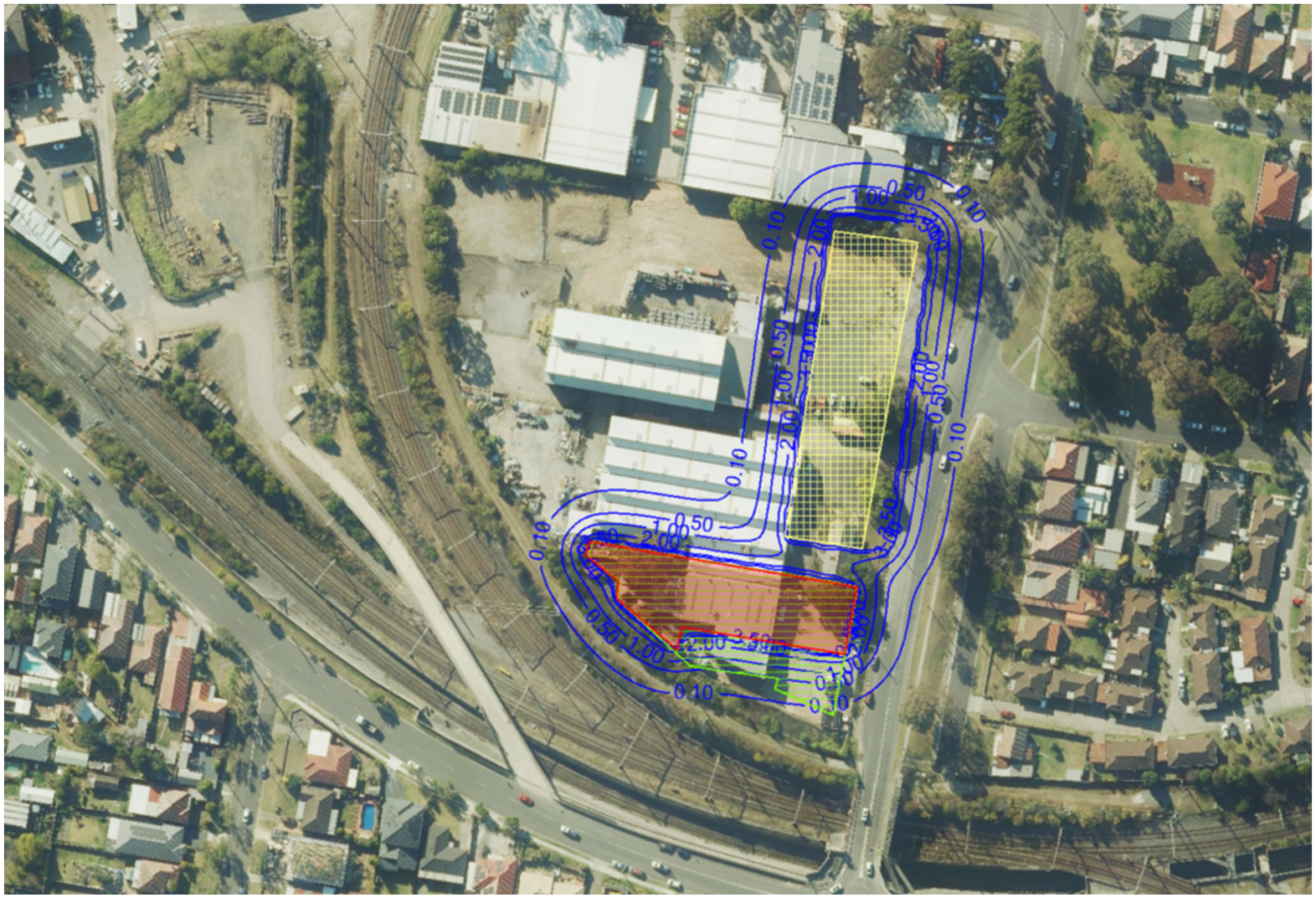
LEGEND

Groundwater Contour and Flow Direction pre- construction

PROJECT DETAILS	**Proposed Residential Development (Stage 3, Building C)**		**DRAWING DETAILS: Drawing 3 - Groundwater Contour map and Flow Directions pre-construction**		
Project Title	Groundwater Impact Assessment (GIA)		**Appendix E**	1	Rev No. 0
Project No.	IRP- 104		Scale	NA	Size A4
Client	City of Canterbury Bankstown		Produce by	RO	Date 15/02/2024
Site Address	30-46 Auburn Road, Regents Park NSW 2143		Authorize to release by	IR	Date 26/02/2024

North

PROJECT DETAILS C)	Proposed Residential Development (Stage 3, Building		DRAWING DETAILS: Drawing 4 -Drawdown for Model Run 1			
Project Title	Groundwater Impact Assessment (GIA)		**Appendix E**	1	Rev No.	0
Project No.	IRP- 104		Scale	NA	Size	A4
Client	City of Canterbury Bankstown		Produce by	RO	Date	15/02/2024
Site Address	30-46 Auburn Road, Regents Park NSW 2143		Authorize to release by	IR	Date	26/02/2024



PROJECT DETAILS	Proposed Residential Development (Stage 3, Building C)
Project Title	Groundwater Impact Assessment (GIA)
Project No.	IRP- 104
Client	City of Canterbury Bankstown
Site Address	30-46 Auburn Road, Regents Park NSW 2143

DRAWING DETAILS: Drawing 5 - Drawdown for Model Run 2			
Appendix E	1	Rev No.	0
Scale	NA	Size	A4
Produce by	RO	Date	15/02/2024
Authorize to release by	IR	Date	26/02/2024

North

PROJECT DETAILS	Proposed Residential Development (Stage 3, Building C)
Project Title	Groundwater Impact Assessment (GIA)
Project No.	IRP- 104
Client	City of Canterbury Bankstown
Site Address	30-46 Auburn Road, Regents Park NSW 2143

DRAWING DETAILS Drawing 6: Drawdown for Model Run 3			
Appendix E	1	Rev No.	0
Scale	NA	Size	A4
Produce by	RO	Date	15/02/2024
Authorize to release by	IR	Date	26/02/2024

PROJECT DETAILS	Proposed Residential Development (Stage 3, Building C)		DRAWING DETAILS Drawing 7: Drawdown for Model Run 4			
Project Title	Groundwater Impact Assessment (GIA)		**Appendix E**	1	Rev No.	0
Project No.	IRP- 104		Scale	NA	Size	A4
Client	City of Canterbury Bankstown		Produce by	RO	Date	15/02/2024
Site Address	30-46 Auburn Road, Regents Park NSW 2143		Authorize to release by	IR	Date	26/02/2024

APPENDIX F

Important Information About Your Report

Critical Information About This Report

- ## PROJECT-SPECIFIC SCOPE OF WORK

The environmental report ("the report") has been prepared following the scope of services as set out in the contract/proposal, or as otherwise agreed verbally or by email correspondence, between the Client and IROS AUSTRALIA ("IROS"), for the specific site investigated. The scope of work may have been limited by a range of factors such as time, budget, accessibility and/or site disturbance constraints or even limited by instructions from the Client. The report should not be used if there have been changes to the project without first consulting with IROS to assess if the report's recommendations are still valid and applicable. IROS does not accept responsibility for problems that occur due to project changes if they are not consulted.

- ## RELIANCE ON DATA

IROS has relied on data/information provided by the Client and other individuals and organisations to prepare the report. Such data may include but is not limited to surveys, analyses, designs, maps, figures, statistics, photographs, and plans. IROS 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, discussions, conclusions and/or recommendations ("conclusions") are based in whole or part on the data, IROS will not be liable for incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented, or otherwise not fully disclosed to IROS.

- ## LIMITATIONS OF THIS INVESTIGATION

The investigation program undertaken is a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions. An engineering opinion is rendered about overall subsurface conditions and their likely behaviour regarding the proposed development. The data derived from the site investigation program and subsequent laboratory testing are extrapolated across the site to form an inferred geological model. Despite the 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.

- ## IMPORTANT INFORMATION ABOUT ENVIRONMENTAL LOGS

Groundwater logs, borehole and test pit logs are prepared by environmental scientists, engineers or consultants based upon interpretation of field conditions and laboratory evaluation of field samples. The engineering (environmental) 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. Therefore, the recommendations in the report can only be regarded as preliminary. IROS should be retained during the project implementation to assess if the report's recommendations are valid and whether or not changes should be considered as the project proceeds.

Logs are usually provided in our reports, and these should not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Some contractors can still misinterpret the logs during /procurement process/bid preparation if separated from the body of the assessment report. If this occurs, delays,

disputes and unanticipated costs may result. In all cases, it is necessary to refer to the rest of the report to understand the assessment properly. Please note that Environmental Logs are not suitable for geotechnical purposes as they have not been peer-reviewed by a Geotechnical Engineer. It is strongly recommended that an experienced geotechnical engineer be engaged to confirm the inferred subsurface conditions during construction and advise significantly different subsurface conditions.

• TIME-DEPENDENT SUBSURFACE CONDITIONS (SOIL/WATER)

Subsurface conditions are influenced by natural geological and hydrogeological processes and human activities. The report is based on conditions that existed at the time of subsurface exploration. Subsurface conditions can be modified drastically by changing natural forces or man-made influences. Construction operations adjacent to the site and events such as floods, groundwater level fluctuations, utility leakage, water extraction for irrigation or industrial uses, subsurface wastewater disposal, construction related dewatering may also affect subsurface conditions, thus the continuing adequacy of a report. IROS should be kept appraised of any such events and should be consulted to determine if any additional tests are necessary.

Soil and groundwater contaminant concentrations may vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities, and fill material placement or removal. The conclusions of an assessment report may have been affected by the above factors if a time has elapsed prior to the commencement of the proposed development.

• 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 IROS 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 THIS REPORT

 Where information from the accompanying report is to be included in contract documents or engineering specifications for the project, the entire report should be included to minimise the likelihood of misinterpretation from the information/data.

• REPORTS REVIEW OR REVISIONS

IROS should review this report, and if necessary, revise if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details include size, configuration, location, the orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, e.g., the addition of basement levels; or
- Ownership of the site changes.

IROS will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since the completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by IROS to the new site owners, who will be informed of

the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that intended initially without first conferring with the consultant. Changing the nature of the land use will alter the contamination exceedances criteria requirements and subsequently changes the human /ecological risk assessment level.

- **CLIENT BENEFIT ONLY**

The report has been prepared for the benefit of the Client and no other party. IROS assumes no responsibility and will not be liable to any other person or organisation (private or public) for or about 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 IROS 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 about such matters.

- **TO BE READ AS A WHOLE**

As also mentioned above, the report as a whole presents the site assessment and must not be copied in part or altered in any way. This includes but is not limited to appendices, Logs, figures, drawings, test results, photographs, any historical information etc., integrated into our reports are developed by professionals based on their interpretation of field logs (assembled by field personnel) and/or laboratory evaluation of field samples, and/or government websites for collecting historical information. These data should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

- **PARTIAL USE OF REPORT**

Where the report's recommendations are only partially followed, there may be significant implications for the project, leading to complications and problems. Consult IROS if you do not intend to follow all of the report recommendations to assess the implications. IROS does not accept responsibility for problems that develop where the report recommendations have only been partially followed if they have not been consulted.

OTHER LIMITATIONS

IROS will not be liable to update or revise the report to take into account any events, emergent circumstances, or facts occurring or becoming apparent after the date of the report. Although the information provided by a site assessment can reduce exposure to the risk of contamination, no environmental site assessment can eliminate the risk. Even a detailed and rigorous professional assessment will not detect all contamination present on a site. Contaminants may be present in areas that were not surveyed or sampled or migrate to areas that showed no contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

IROS AUSTRALIA

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