Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Geotechnical Desktop Study

Botany Aquatic Centre - Stage 1
2 Myrtle Street, Botany

Prepared for
CO-OP Studio Pty Ltd

Project 201489.00
April 2021

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	201489.00	Document No.	R.001.Rev0
Document title	Report on Geotechnical Desktop Study Botany Aquatic Centre - Stage 1		
Site address	2 Myrtle Street, Botany		
Report prepared for	CO-OP Studio Pty Ltd		
File name	201489.00.R.001.Rev0		

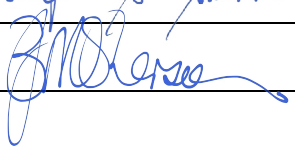
Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Delfa Sarabia	Bruce McPherson	1 April 2021

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	-	Steven Donaghey, CO-OP Studio Pty Ltd

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

	Signature	Date
Author		1 April 2021
Reviewer		1 April 2021

bsi. ISO 9001 Quality Management
FS 604853

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Table of Contents

Page

Report on Geotechnical Desktop Study
Botany Aquatic Centre - Stage 1
2 Myrtle Street, Botany

1. Introduction

This report presents the results of a geotechnical desktop study carried out for the proposed Stage 1 development at Botany Aquatic Centre, 2 Myrtle Street, Botany. The site is shown on Drawing 1, Appendix B. The investigation was commissioned by CO-OP Studio Pty Ltd (CO-OP) and was undertaken in accordance with the Douglas Partners Pty Ltd (DP) email proposal dated 8 February 2021.

The investigation was carried out to provide information on subsurface soil and groundwater conditions for planning, design and submission with a Development Application (DA) to Bayside Council, for the proposed Stage 1 upgrades. The proposed upgrades include water slides, an outdoor aqua play area (i.e. splash pads), single storey change room and associated plant room.

In 2020, DP carried out a geotechnical investigation (Project No. 99679.00) for the larger aquatic centre area (refer Drawing 1, Appendix B). This report summarises the results of this previous investigation where relevant to the current site and proposed development scheme.

DP carried out a contamination investigation in conjunction with the geotechnical investigation, the results of which are reported separately (ref: DP Project 201489.01).

2. Site Description

The larger site is bounded by Myrtle Street to the south, a playground to the west, an ARTC rail corridor to the north-east, a warehouse to the north-west and covers an area of approximately 3 hectares. The site is generally on relatively level ground typically ranging from RL7 m to RL8 m Australian Height Datum (AHD), except on the mound around the existing swimming pool and towards the northern boundary of the site where the ground is between RL8 m to RL10 m AHD.

At the time of 2020 investigation, approximately all of the western half of the site was occupied with facilities and the eastern half was grass covered with trees scattered in the area. The western half of the site was occupied by an on-grade car park, a grandstand, single storey brick reception and amenities building and two swimming pools.

The Stage 1 development area, as shown in Drawing 1 in Appendix B, comprises two sites that are located towards the north eastern side of the larger site (open area) and the southern side where kids pool with shelter and concrete pathway are currently located.

3. Geology

Reference to the Sydney 1:100,000 Geological Series Sheet indicates that the site is underlain by Quaternary sediments comprising medium to fine grained marine sands. In this part of Botany, these sediments typically overlie Hawkesbury Sandstone at depth.

4. Previous Investigation

The 2020 investigation included the following investigation locations in the vicinity of the Stage 1 development area:

- Three cone penetration tests (CPT2, CPT4 and CPT6) to depths of 15.5 m to 16.0 m;
- Ten boreholes to maximum depths of 6 m – BH6 and BH9 to BH12 for combined geotechnical and contamination investigations and BH18 to BH20, BH22 and BH40, primarily just for contamination investigation;
- Groundwater monitoring wells in BH6 and BH9.

The abovementioned test locations are shown on Drawing 2 in Appendix B.

The surface levels and coordinates at the test locations were measured using Differential Global Positioning System (DGPS).

5. Field Work Results

5.1 CPT and Boreholes

CPT results and borehole logs are presented in Appendix C together with notes explaining descriptive terms and classification methods used. Further information on the CPT method and interpretation of CPT results are given on the information sheets also included in Appendix C.

For the CPT results the inferred soil stratification, based on the measured friction ratio, is shown on each of the results sheets.

The sequence of subsurface materials encountered within the boreholes, in increasing depth order, may be summarised as follows:

Fill: encountered at all locations to depths of 0.55 m to 1.9 m. The fill included mostly variably compacted silty sand with sandstone and igneous gravels, bitumen, concrete and brick gravels. The fill was encountered to a greater depth (2 m) at the boreholes and CPTs located on the mounded areas;

Natural Sand: generally loose or medium dense to depths of 4.8 m to 7.7 m, then medium dense to dense or dense to very dense. All boreholes were terminated on the loose to medium dense sand at maximum depths of 6 m below the existing ground surface. A medium dense sand with very stiff to hard clayey interbeds was encountered at depths of 6.6 m to 10 m with thicknesses ranging from 1.2 m to 4.0 m. Below the sand and clay interbeds, sand described as medium dense to very dense was encountered. CPT refusal was encountered within the very dense, likely cemented sand at depths of 15.5 m to 16.0 m below the ground surface.

5.2 Groundwater

Groundwater levels encountered in the boreholes and CPTs were measured at depths of 1.3 m to 2.9 m below ground surface level and are summarised in Table 1 below. Groundwater levels from boreholes without groundwater wells were measured during soil sampling from 8 May 2020 to 19 May 2020. Groundwater levels from combined boreholes and monitoring wells were taken during groundwater sampling from 22 May 2020 and 28 May 2020. Groundwater levels from CPTs were measured after withdrawal of CPT rods on 12 May 2020. Groundwater measurements in the wells (denoted "GW" in Table 1) are considered to be more accurate, as the water levels observed during drilling or in the CPT holes may not have stabilised.

Table 1: Summary of Groundwater Levels Observed in Boreholes and CPTs

Borehole/CPT	Groundwater Depth (m)	Groundwater Elevation (m AHD)
BH6/GW6	2.85	5.15
BH9/GW9	1.9	5.5
BH10	1.5	5.9
BH11	1.65	5.75
BH12	2.15	5.45
BH18	2.0	5.5
BH19	1.3	6.1
BH40	2.4	5.8
CPT2	1.6	5.7
CPT4	3.25	4.25
CPT6	2.3	5.3

It is important to note that groundwater levels do fluctuate due to climatic, seasonal and other factors.

6. Laboratory Testing

Some of soil samples selected for laboratory testing from the boreholes were subject to following tests:

- California Bearing Ratio (CBR) - 4 day soaked and Standard Compaction;
- Particle size distribution; and
- Soil aggressivity suite (pH, Electrical Conductivity, Chloride and Sulphate)

The laboratory test certificates are presented in Appendix D. Summaries of the test results are presented in Tables 2 and 3.

Table 2: Summary CBR and Particle Size Distribution Tests

Sample ID	CBR (%)	MDD* (t/m^3)	OMC* (%)	Gravel (%)	Sand (%)	Silt and Clay (%)
BH6 1.9-2.0 m	-	-	-	0	95	5
BH9 0.6-1.35 m	11	1.74	13.5	2	94	4
BH10 0.9-1.0 m	-	-	-	0	97	3
BH11 0.7-1.35 m	13	1.75	14.5	1	95	4
BH12 0.75-1.5 m	10	1.72	11.5	2	94	4

*MDD = Maximum Dry Density; OMC = Optimum Moisture Content

Table 3: Summary of Soil Aggressivity Test Results

Sample ID	pH	Electrical Conductivity (µS/cm)	Chloride (mg/kg)	Sulphate (mg/kg)
BH10 0.9-1.0 m	6.8	11	<10	<10
BH12 3.5-3.95 m	6.7	10	<10	<10

7. Geotechnical Model

The interpreted depths and levels at the top of the various soil layers are shown in Table 4.

Table 4: Summary of Material Strata Levels in Boreholes and CPTs

Unit	Description	Depth (RL) to Top of Unit (m/m AHD)	Approximate Thickness (m)
Unit 1	Fill	Surface (RL7.3 to RL8.2)	0.55 to 1.9
Unit 2a	Sand – Loose and Medium Dense	0.55 to 1.9 (RL6.4 to RL5.8)	3.2 to 6.5
Unit 2b	Sand – Medium Dense to Very Dense	4.8 to 7.7 (RL-0.1 to RL2.6)	0.6 to 3.9
Unit 3	Interbedded Medium Dense Sand and Very Stiff to Hard Clay	6.6 to 10.0 (RL-2.7 to RL0.9)	1.2 to 4.0
Unit 4a	Sand – Medium Dense to Very Dense	9.5 to 13.5 (RL-1.9 to RL-6.2)	3.3 to 5.3 absent in CPT2
Unit 4b	Sand – Dense to Very Dense	13.5 to 14.8 (RL-6.2 to RL-7.2)	Not penetrated to base of unit

Notes: - Bracketed numbers are the Reduced Level (m AHD) for the top of the unit.

Groundwater was observed at depths of between 1.3 m to 2.9 m (RL 4.3 m to RL 6.1 m AHD) in the groundwater wells installed at the site. Groundwater flows in a generally south-westerly direction towards Mill Stream, converging with Mill Pond and draining to Botany Bay.

It should be noted that groundwater will fluctuate with climatic conditions and is likely to rise following periods of extended wet weather. Merrick (1999) and others refer to fluctuations on up to 2 m in groundwater levels in the Botany Basin.

8. Comments

8.1 Proposed Development

It is understood that the proposed Stage 1 development is to include the construction of water slides, an outdoor aqua play areas (i.e. splash pads), single-storey change room and associated plant room building. As all structures are to be on-grade it is understood that there will be minimal changes to existing site levels, other than associated for general levelling purposes and otherwise minimal excavation of soils for foundations and supports.

The proposed Stage 1 works is also understood to comprise the demolition of an existing kids pool and associated structures in the south of the existing aquatic centre.

8.2 Excavation Conditions and Batter Slopes

The proposed excavation is minimal and that the existing site levels will largely be maintained.

Excavations are, however, expected to penetrate through fill and possibly natural sands which should be readily achieved using conventional earthmoving equipment such as tracked excavators.

Groundwater is not expected to be encountered for the proposed bulk excavation, although following the prolonged period of heavy rainfall in March 2021, it is possible that the groundwater level could have risen to within one metre of the ground surface, or even higher. It would be prudent to investigate the groundwater level immediately prior to bulk or detailed excavation works, given the potential for large rises in the Basin.

Trafficability on the sandy soils during bulk earthworks will generally require the use of tracked plant and machinery. Trafficability after bulk excavation could be improved by placement of a layer of compacted crushed concrete or similar.

It is recommended to use temporary batter slopes of 1.5H:1V (Horizontal: Vertical) in both fill and sandy soils, provided they remain above the groundwater table.

All excavated materials will need to be disposed of in accordance with the provisions of the current legislation and guidelines including the Waste Classification Guidelines (NSW EPA 2014) and in accordance with any recommendations provided in the DP Contamination Investigation report.

8.3 Dilapidation Surveys

Dilapidation surveys should be undertaken on surrounding structures and infrastructure (e.g. rail line, pavements, etc.) prior to commencing work on the site to document any existing defects so that any claims for damage due to construction related activities (e.g. earthworks compaction/rolling, pile driving, etc.) can be accurately assessed. The appropriate extent of dilapidation surveys may be better assessed once details of the proposed development and construction methods have been confirmed.

8.4 Subgrade Preparation and Earthworks

The following site preparation and earthworks are recommended for the site:

- Prepare the area by stripping all vegetation, topsoil and any unsuitable materials such as putrescible waste, foreign materials, and building rubble.
- Proof roll the stripped surface with a minimum 10 tonne (deadweight) roller with the final pass observed by a geotechnical engineer. The subgrade should be compacted to a minimum dry density ratio of 98 % Standard.
- Any soft or heaving areas identified must be treated with engineered fill.
- Engineered fill should be a good quality or 'select' material such as ripped sandstone. Alternatively, site won materials can be used as engineered fill subject to environmental requirements and the removal of any deleterious or oversize (> 100mm) material.
- Place engineered fill in 300 mm thick horizontal layers and compact to a minimum 98% Standard Maximum Dry Density (SMDD) at moisture contents within 2% of Standard Optimum Moisture Content (SOMC).
- Fill within 0.3 m depth of pavement subgrades should be compacted to at least 100% SMDD.
- A maximum safe batter slope of 2H:1V could be used for the construction of engineered fill platforms and allowance should be made for protection against erosion. Good practice generally involves overfilling at least one metre and then 'trimming back' to form well compacted material in batters.
- All earthworks should be carried out in accordance with the requirements of AS3798 – Guidelines on Earthworks for Commercial and Residential Developments.

Site landscaping should be designed to prevent ponding of water on the finished surface. Subsurface drainage should also be provided.

Heavy plant (e.g. piling rigs) may be required to operate on the site for which it is recommended that a working platform be constructed atop the prepared subgrade. The platform should be constructed from good quality (high strength durable) granular material with low fines, such as recycled concrete or high strength crushed rock. The thickness of the platform should be assessed once specific details of the heavy plant operating within the site are known.

8.5 Foundations

8.5.1 Shallow Foundations

Shallow footings such as strip or pad footings founded on natural sands Unit 2a could be used depending on the footing size, depth of embedment and depth to groundwater. As a guide, footings 1 m by 1 m in area and 0.5 m deep founded on Unit 2a sand could be designed for an allowable bearing 100 kPa. Higher allowable bearing capacities may be used for larger and/or more deeply embedded footings. Design of footings will also need to consider total and differential settlements. Further geotechnical review and analysis can be provided once details of applied loads are confirmed.

If higher loads or stringent settlement criteria are required, the following sections present foundation options that may be considered.

8.5.2 Raft Slabs and Piled Raft

Consideration may be given to the use of a raft slab foundation. However, this will be subject to detailed review and analysis of bearing pressures and settlements once more specific details of the founding level, column layout and slab loadings have been confirmed.

Details of structural loads were not available at the time of preparing this report. As a guide, for raft slab foundations, preliminary settlement analyses have been carried out assuming a distributed slab load of 20 kPa, with a loaded area of 20 m by 20 m. Based on the results of the analyses, preliminary design of raft slabs to support column and floor loadings may be based on a modulus of subgrade reaction (k_s) value of the order of 2 to 4 kPa/mm for the broadly loaded area. Settlements of between 5-10 mm could therefore be expected under the assumed uniform load above. It is noted that the k_s value (which is not strictly a soil parameter) is very dependent on the size of the loaded area and the rigidity of the raft system.

Construction of the raft slabs should incorporate subgrade preparation as outlined in Section 8.4. It is also suggested that a 150 mm thick layer of good quality granular material such as recycled concrete or crushed rock (e.g. DGB20. DGB40) should be placed and compacted over the prepared surface, particularly at the more heavily loaded areas. The granular layer will help to confine the sandy soils and improve the compaction and density of the surface soils.

A piled raft foundation may also be considered to reduce differential settlements, if required.

Further geotechnical analysis and possibly investigation at specific load/column locations, and advice will be required in relation to the design and construction of both raft slabs and piled raft slabs, if these are to be considered.

8.5.3 Piled Foundations

The alternative to shallow foundations is to support the structural loads on piles founded within the dense sands in Unit 4a or 4b which is typically at depths of approximately 13 m to 14 m below the existing ground surface level. Piles founded above Unit 4a and 4b will achieve lower capacities and will need to consider the proximity to clay layers and the impact of these layers on the bearing capacity and settlement performance of the piles.

Driven piles are technically suitable for the site and would minimise the volumes of waste material to be removed off-site. However, the noise and vibration constraints due to nearby residential properties, rail infrastructure and buried services at this site may preclude the use of driven pile types. Confirmation of the sensitivity of the buried services and structures to vibrations will be required to assess this option. Continuous Flight Auger (CFA), concrete-injected piles could be considered for this site, as could cast-in-situ screwed concrete pile types. These types of piles are all associated with relatively low levels of noise and vibration. Screwed cast-in-situ piles are a reinforced concrete pile that involves lateral displacement of the soil during installation, more efficiently using the in-situ capacity of the soil. CFA piles, however, involve the complete replacement of the soil column, thus producing cuttings and spoil, and is classified as a "non-displacement" pile type in AS 2159-2009. There is no soil displacement and accordingly, lower parameters for shaft adhesion and end bearing are appropriate.

It is noted that CFA piles are a proprietary product and pile construction is considered to be a "blind" drilling technique. Soil decompression can occur during CFA piling when a strong stratum is encountered. This occurs when the augers continue to rotate but the rate of auger progression decreases, displacing soil from around the auger upwards towards the surface. Decompression can cause weakening and settlement of the soils adjacent to the pile and should be avoided by monitoring auger speed and progression closely. Construction of CFA piles should be witnessed and certified by the piling contractor. A geotechnical engineer should regularly attend site during piling works, to observe the CFA drilling techniques and to confirm the founding depths of the piles with the pile design.

Conventional open bored piles will not be appropriate due to the potential for soil collapse and groundwater inflow.

Table 5 presents preliminary design parameters for the design of CFA piles.

Table 5: Design Parameters for CFA Piles

Unit	Max. Allowable End-Bearing Pressure[b,c] (kPa)	Max. Allowable Shaft Adhesion[a,d] (kPa)	Max. Ultimate End-Bearing Pressure[b,c] (kPa)	Max. Ultimate Shaft Adhesion[a,d] (kPa)*	Young's Modulus, E (MPa)
2a – Sand L and MD	400[c]	15	1,250[c]	25	20
2b – Sand MD to VD	800[c]	30	2,500[c]	50	40
3 – Interbedded Sand and Clay	NA[c]	30	NA[c]	50	20
4a – Sand MD to VD	1,500	60	3,500	100	60
4b – Sand D to VD	2,500	120	6,000	200	160

Notes:

(a) Shaft adhesion should only be adopted where piles have a minimum embedment of at least 2 pile diameters into the relevant bearing stratum.

(b) To adopt these end bearing values piles should have a minimum embedment of 0.5 m into the relevant bearing stratum, with a minimum founding depth of 3.0 m.

(c) Piles end bearing above Unit 3 or above clay lenses or interbeds (i.e. in Units 2a or 2b) require detailed geotechnical assessment.

(d) For uplift load, the shaft adhesion should be factored down by 0.6 and due consideration should be given to 'cone pull-out' failure mechanisms.

For limit state design a geotechnical reduction factor (ϕ_g) is applied to the ultimate geotechnical pile capacity assessed using the ultimate parameters above. In accordance with AS2159-2009, ϕ_g is dependent on assignment of an Average Risk Rating (ARR) which takes into account various geotechnical uncertainties, redundancy of the foundation system, construction supervision, and the quantity and type of pile testing. The assessment of ϕ_g therefore depends on the structural design of the foundation system as well as the design and construction method, and testing (if any) to be required by the designer and done by the piling contractor. Where pile load testing is undertaken, be it static or dynamic, it may be possible to adopt a higher ϕ_g value that results in a more economical design. To assist with preliminary design, a ϕ_g value of 0.4 could be adopted, assuming no pile load testing. Once the pile designer has evaluated the ARR, this value could be revised.

The use of limit state design also requires that serviceability performance of the foundation system be assessed, including pile group interaction effects. Such assessment should be carried out by an experienced geotechnical professional using well-established and soundly based methods. The elastic modulus values above may be adopted for such assessment, but it should be recognised that the accuracy of settlement prediction is a function of construction methodology as well as the assessed values of material stiffness, both of which can have inherent uncertainty. Therefore, the accuracy of settlement predictions may be no better than ± 50%. Where foundation settlement is critical to the performance of the structure, serviceability pile load testing should be carried out to confirm the design assumptions and/or assess prediction accuracy.

Particular care will be required if piles are founded within three pile diameters (i.e. 3xD) of the Unit 3 clay layers, or any other weaker clay seams or other lenses. Specific geotechnical assessment should be carried out if consideration is given to founding piles within the Unit 2a or 2b soil units. Piles should not be founded within Unit 3 due to the generally lower bearing pressures available for clay stratum.

Steel screw piles may be considered subject to confirmation of their load carrying capacity and durability but are unlikely to be suitable for relatively high column loads. Steel screw piles are a proprietary product, and as such information on their installation and load carrying capacity must be obtained from the specialist contractor. Based on previous experience with steel screw piles, a maximum working capacity (vertical load) of about 500 kN to 600 kN is usually achievable. Higher capacities may be possible, however, it would be prudent to carry out a load testing programme to prove the load capacities of heavily loaded piles and ensure that excessive settlements do not occur under load. For preliminary design purposes, the maximum end bearing pressures given in Table 5 may be adopted for the design of steel screw piles.

8.6 Pavement Design

The results of the investigation have indicated that the subgrade for the site consists of sandy fill. Laboratory testing of the sandy fill provided CBR values of 10% to 13%.

Based on the above, a design CBR value of 10% may be adopted for pavement thickness design on compacted sandy material.

During construction, verification CBR testing should be undertaken of the actual subgrade materials to confirm that the conditions are consistent with the design. The design CBR is intended to control, but not eliminate possible areas of weaker subgrade, which would require treatment if encountered.

In practice, the performance of the pavements is often governed by construction control and by the moisture regimes within the subgrade and pavement layers, with pavement design assuming that conditions remain at equilibrium levels over the life of the pavement. Therefore, the design of suitable surface and subsurface drainage for the site will be important to ensure suitable pavement performance. The design, construction and maintenance of surface and subsurface drainage systems should be undertaken in accordance with the relevant guides.

8.7 Soil Aggressivity

The soil aggressivity test results were assessed in accordance with Australian Standard AS2159-2009 Piling – "Design and Installation". Chemical test results indicate a 'moderate' exposure classification to buried concrete elements and a 'mild' exposure classification to buried steel elements. The presence of variable fill materials over the upper soil profile would suggest that the limited aggressivity testing regime undertaken may not capture the full variability of the site conditions. It would therefore be considered prudent to adopt at least a 'moderate' exposure classification for the design of all buried structural elements (steel or concrete).

8.8 Seismic Design

Based on AS1170.4-2007 – Structural design actions Part 2: Earthquake actions in Australia" the following parameters should be adopted for seismic design:

- Seismic Hazard Factor (Z) - 0.08
- Sub-Soil Class C_e – Shallow soil site

The Earthquake Design Category could then be assessed based on a Probability Factor, k_p, (which is related to an Annual Probability of being Exceeded) as defined in Table 3.1 of AS 1170.4 – 2007).

9. Limitations

DP has prepared this report for this project at Botany in accordance with DP's proposal dated 8 February 2021 and acceptance received from CO-OP dated 9 February 2021. The work was carried out under CO-OP's Subconsultancy Agreement Project 100239. This report is provided for the exclusive use of CO-OP for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope for work for this investigation/report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Please refer to DP Contamination Investigation report Ref: Project 99679.01.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the geotechnical components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Drawings

LOCALITY MAP

Notes:
1. Basemap from metromap.com.au (dated 4/12/2020)

Legend

- Stage 1 Boundary (the site)
- Previous Investigation Area (DP 2020)
- Geotechnical Borehole Locations (DP 2020)
- Environmental Borehole Locations (DP 2020)
- Test Pit (Prensa 2018)
- Borehole (Prensa 2018)

0 25 50 75 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	CO-OP Studio Pty Ltd		
OFFICE:	Sydney	DRAWN BY:	JJH
SCALE:	1:1250 @ A3	DATE:	11.03.2021

TITLE: **Site Overview and Previous Test Locations**
Botany Aquatic Centre Stage 1
Corner Myrtle and Jasmine Streets, Botany, NSW

N

PROJECT No:	201489.01
DRAWING No:	1
REVISION:	1

LOCALITY MAP

Notes:
1. Basemap from metromap.com.au (dated 4/12/2020)

Legend

- Stage 1 Boundary (the site)
- Geotechnical Borehole Locations (DP 2020)
- Environmental Borehole Locations (DP 2020)
- Test Pit (Prensa 2018)
- Borehole (Prensa 2018)

0 10 20 30 m

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Geotechnics / Environment / Groundwater

CLIENT:	CO-OP Studio Pty Ltd		
OFFICE:	Sydney	DRAWN BY:	JJH
SCALE:	1:750 @ A3	DATE:	11.03.2021

TITLE: **Stage 1 - Previous Test Locations**
Botany Aquatic Centre Stage 1
Corner Myrtle and Jasmine Streets, Botany, NSW

N

PROJECT No:	201489.01
DRAWING No:	1
REVISION:	1

Appendix C

Borehole Logs and CPT Plots

Sampling Methods

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Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (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	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- ‘Moist, dry of plastic limit’ or ‘w <PL’ (i.e. hard and friable or powdery).
- ‘Moist, near plastic limit’ or ‘w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- ‘Moist, wet of plastic limit’ or ‘w >PL’ (i.e. soils usually weakened and free water forms on the hands when handling).
- ‘Wet’ or ‘w ≈LL’ (i.e. near the liquid limit).
- ‘Wet’ or ‘w >LL’ (i.e. wet of the liquid limit).

Symbols & Abbreviations

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Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

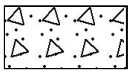
Symbols & Abbreviations

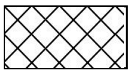
Graphic Symbols for Soil and Rock

General

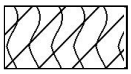

Asphalt

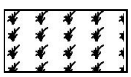

Road base

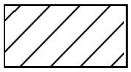

Concrete

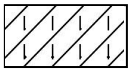

Filling

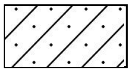
Soils


Topsoil

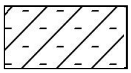

Peat

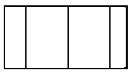

Clay

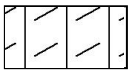

Silty clay

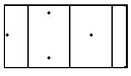

Sandy clay

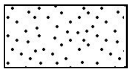

Gravelly clay

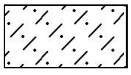

Shaly clay

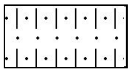

Silt


Clayey silt


Sandy silt

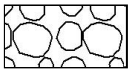

Sand

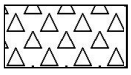

Clayey sand


Silty sand


Gravel

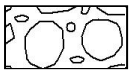

Sandy gravel


Cobbles, boulders

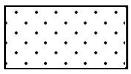

Talus

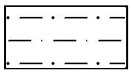
Sedimentary Rocks

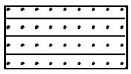

Boulder conglomerate

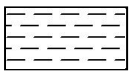

Conglomerate


Conglomeratic sandstone

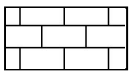

Sandstone


Siltstone

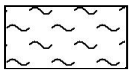

Laminite

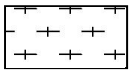

Mudstone, claystone, shale

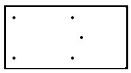

Coal


Limestone

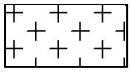
Metamorphic Rocks

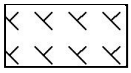

Slate, phyllite, schist

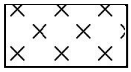

Gneiss

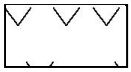

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Cone Penetration Tests

Douglas Partners

Introduction

The Cone Penetration Test (CPT) is a sophisticated soil profiling test carried out in-situ. A special cone shaped probe is used which is connected to a digital data acquisition system. The cone and adjoining sleeve section contain a series of strain gauges and other transducers which continuously monitor and record various soil parameters as the cone penetrates the soils.

The soil parameters measured depend on the type of cone being used, however they always include the following basic measurements

- Cone tip resistance q_c
- Sleeve friction f_s
- Inclination (from vertical) i
- Depth below ground z

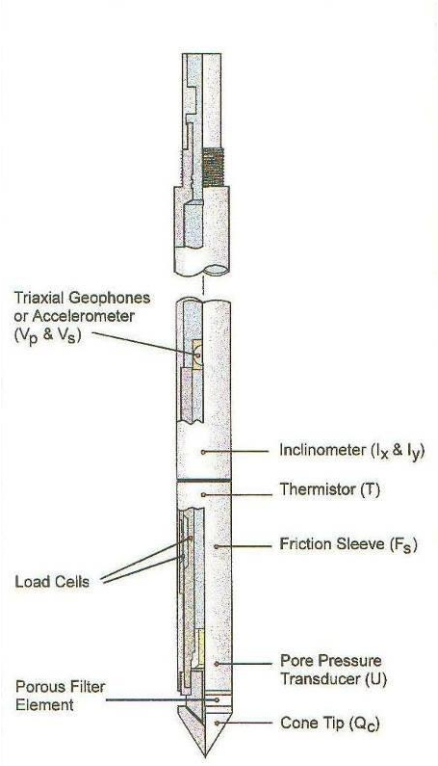


Figure 1: Cone Diagram

The inclinometer in the cone enables the verticality of the test to be confirmed and, if required, the vertical depth can be corrected.

The cone is thrust into the ground at a steady rate of about 20 mm/sec, usually using the hydraulic rams of a purpose built CPT rig, or a drilling rig. The testing is carried out in accordance with the Australian Standard AS1289 Test 6.5.1.

Figure 2: Purpose built CPT rig

The CPT can penetrate most soil types and is particularly suited to alluvial soils, being able to detect fine layering and strength variations. With sufficient thrust the cone can often penetrate a short distance into weathered rock. The cone will usually reach refusal in coarse filling, medium to coarse gravel and on very low strength or better rock. Tests have been successfully completed to more than 60 m.

Types of CPTs

Douglas Partners (and its subsidiary GroundTest) owns and operates the following types of CPT cones:

Type	Measures
Standard	Basic parameters (q_c, f_s, i & z)
Piezocone	Dynamic pore pressure (u) plus basic parameters. Dissipation tests estimate consolidation parameters
Conductivity	Bulk soil electrical conductivity (σ) plus basic parameters
Seismic	Shear wave velocity (V_s), compression wave velocity (V_p), plus basic parameters

Strata Interpretation

The CPT parameters can be used to infer the Soil Behaviour Type (SBT), based on normalised values of cone resistance (Qt) and friction ratio (Fr). These are used in conjunction with soil classification charts, such as the one below (after Robertson 1990)

Cone Penetration Tests

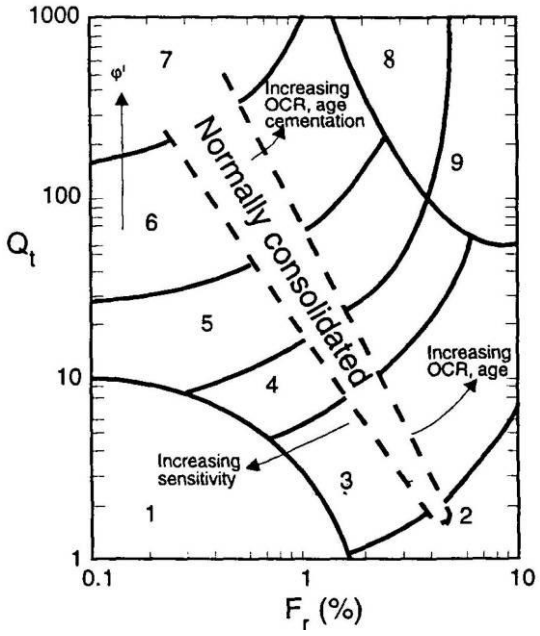


Figure 3: Soil Classification Chart

DP's in-house CPT software provides computer aided interpretation of soil strata, generating soil descriptions and strengths for each layer. The software can also produce plots of estimated soil parameters, including modulus, friction angle, relative density, shear strength and over consolidation ratio.

DP's CPT software helps our engineers quickly evaluate the critical soil layers and then focus on developing practical solutions for the client's project.

Engineering Applications

There are many uses for CPT data. The main applications are briefly introduced below:

Settlement

CPT provides a continuous profile of soil type and strength, providing an excellent basis for settlement analysis. Soil compressibility can be estimated from cone derived moduli, or known consolidation parameters for the critical layers (eg. from laboratory testing). Further, if pore pressure dissipation tests are undertaken using a piezocone, in-situ consolidation coefficients can be estimated to aid analysis.

Pile Capacity

The cone is, in effect, a small scale pile and, therefore, ideal for direct estimation of pile capacity. DP's in-house program ConePile can analyse most pile types and produces pile capacity versus depth plots. The analysis methods are based on proven static theory and empirical studies, taking account of scale effects, pile materials and method of installation. The results are expressed in limit state format, consistent with the Piling Code AS2159.

Dynamic or Earthquake Analysis

CPT and, in particular, Seismic CPT are suitable for dynamic foundation studies and earthquake response analyses, by profiling the low strain shear modulus G_0. Techniques have also been developed relating CPT results to the risk of soil liquefaction.

Other Applications

Other applications of CPT include ground improvement monitoring (testing before and after works), salinity and contaminant plume mapping (conductivity cone), preloading studies and verification of strength gain.

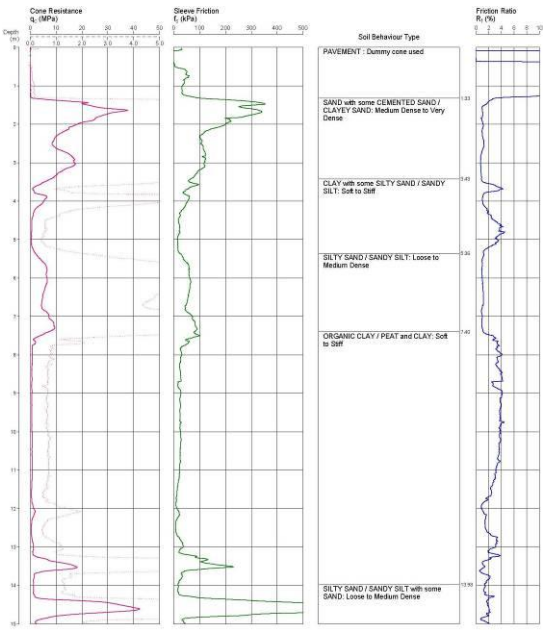


Figure 4: Sample Cone Plot

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.2 AHD
EASTING: 333834
NORTHING: 6243014
DIP/AZIMUTH: 90°/--

BORE No: BH1
PROJECT No: 99679.00
DATE: 8/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.25	CONCRETE SLAB: 250mm thick, up to 20mm aggregate, 8mm reinforcement at 150mm depth							
		FILL/SAND: fine to medium, dark brown, with fine to medium gravel (igneous), moist, apparently variably compacted		A/E	0.25		PID = 8 ppm		
				A/E	0.4 0.45		PID = 8 ppm		
	0.55	SAND SP: fine to medium, pale grey and brown, dry, loose, aeolian			0.5				
8				A/E	0.9		PID = 6 ppm		
	1	Below 1.1m: grading to brown to dark brown, trace silt		S	1.0		4,4,5 N = 9		1
					1.45				
9		Below 1.6m: grading to pale brown and brown, moist		A	1.9				
	2	Below 2.1m: grading to pale grey			2.0				2
		Below 2.35m: wet						08-05-20	
10				S	2.5		1,3,3 N = 6		
	2.95	Bore discontinued at 2.95m Target depth reached			2.95				3
11	4								4
12	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** Uncased

TYPE OF BORING: Diatube to 0.25m, Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.95m

WATER OBSERVATIONS: Free groundwater observed at 2.35m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.2 AHD
EASTING: 333822
NORTHING: 6243058
DIP/AZIMUTH: 90°/--

BORE No: BH2
PROJECT No: 99679.00
DATE: 8/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		ASPHALT							
	0.15	FILL/Gravelly SAND: fine to medium, dark brown, trace gravel (concrete) and clay, moist, apparently variably compacted		A/E	0.15–0.2		PID = 7 ppm		
				A/E	0.4–0.5		PID = 7 ppm		
	0.7	FILL/SAND: fine to medium, pale grey and dark brown, trace fine gravel (igneous), moist, apparently poorly compacted		A/E	0.9–1.0				
	1.15	SAND SP: fine to medium, pale brown, moist, loose, aeolian		S/E			3,2,4 N = 6 PID = 7 ppm		
		Below 1.4m: grading to dark brown, trace silt			1.45				
		Below 1.6m: grading to brown		E	1.6–1.7				
				A	1.8–1.9				
		Below 1.95m: grading to pale grey							
		Below 2.4m: wet			2.5			▼ 08-05-20	
				S			4,4,4 N = 8		
	2.95	Bore discontinued at 2.95m Target depth reached			2.95				

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.95m

WATER OBSERVATIONS: Free groundwater observed at 2.40m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.0 AHD
EASTING: 333808
NORTHING: 6243107
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 99679.00
DATE: 8/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
7	0.03	ASPHALT (good condition)		A	0.05		PID = 5 ppm		
		FILL/Gravelly SAND: fine to medium, dark brown, trace clay and silt, moist, apparently variably compacted			0.1				
				E	0.2				
					0.25				
				A/E	0.5		PID = 6 ppm		
	0.65				0.6				
		FILL/SAND: fine to medium, dark brown, trace gravel (igneous), moist, apparently poorly compacted		B					
8	1				0.9		PID = 8 ppm		1
				A/E	1.0				
	1.1			S/E	1.1				
		SAND SP: fine to medium, pale grey, moist, loose to medium dense, aeolian		S	1.15		3,4,8 N = 12		
				S	1.3				
				S			PID = 6 ppm		
					1.45				
		Below 1.7m: grading to brown and dark brown, trace silt							
				A/E	1.9		PID = 9 ppm		
9	2				2.0				2
		Below 2.4m: wet						▼ 08-05-20	
					2.5				
				S			3,3,5 N = 8		
10	2.95	Bore discontinued at 2.95m			2.95				
	3	Target depth reached							3
11	4								4
12	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.95m

WATER OBSERVATIONS: Free groundwater observed at 2.4m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.4 AHD
EASTING: 333885
NORTHING: 6243022
DIP/AZIMUTH: 90°/--

BORE No: BH4
PROJECT No: 99679.00
DATE: 11/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
9	0	FILL/Silty SAND: fine to medium, dark grey and brown, with rootlets, trace gravel (igneous), moist, variably compacted		A/E	0.05 0.15		PID = 9 ppm		
		Below 0.4m: with gravel (sandstone)		A/E	0.5 0.6		PID = 10 ppm		
	1			A/E	0.9 1.0		PID = 10 ppm		1
10	1.5	SAND SP: fine to medium, pale grey, moist, loose, aeolian		S/E	1.45		4,3,2 N = 5 PID = 10 ppm		
	2	Below 2.1m: grading to brown and dark brown, trace silt		A/E	1.9 2.0		PID = 10 ppm		2
11		Below 2.7m: grading to pale brown		S	2.5		4,3,4 N = 7		
	2.95	Bore discontinued at 2.95m Target depth reached			2.95				
12	3								3
	4								4
13									
	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.95m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.4 AHD
EASTING: 333877
NORTHING: 6243050
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 99679.00
DATE: 11/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
9	0.8	FILL/Silty SAND: fine to medium, dark brown, trace rootlets and gravel, moist, apparently poorly compacted		A/E	0.05–0.15		PID = 6 ppm		
				A/E*	0.5–0.6		PID = 10 ppm		
10	1.8	FILL/Gravelly SAND: fine to medium, brown and dark brown, with clay, moist, variably compacted		A/E	0.9–1.0		PID = 9 ppm		
				A/E	1.45		19,30,15 N = 45 PID = 12 ppm		
		At 1.4m: with brick fragments							
11	2.95	SAND SP: fine to medium, pale grey, moist, medium dense, aeolian		A/E	1.9–2.0				
				A	2.4–2.5				
		Below 2.65m: grading to brown and dark brown, trace silt		S	2.95		6,4,6 N = 10 PID = 7 ppm		
12		Bore discontinued at 2.95m Target depth reached							
13									

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.95m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. * Field replicate BD4/110520 taken at 0.5-0.6m.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.0 AHD
EASTING: 333921
NORTHING: 6243021
DIP/AZIMUTH: 90°/--

BORE No: BH6/GW6
PROJECT No: 99679.00
DATE: 12/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.16	CONCRETE SLAB: 160mm diameter, <20mm aggregate, 10mm reinforcement at 110mm depth							Flush gatic cover and well cap
		FILL/Silty SAND: fine to medium, dark brown, with gravel, bitumen and ceramic fragments, moist, apparently poorly compacted		A/E	0.2 0.25		PID = 3 ppm		Concrete from 0m to 0.2m
				A/E	0.5 0.6		PID = 2 ppm		Sand backfill from 0.2m to 0.5m
	0.7	SAND SP: fine to medium, pale grey, moist, medium dense, aeolian		A/E	0.9 1.0		PID = 3 ppm		Bentonite from 0.5m to 1.2m
9	1			S			10,17,12 N = 29		Plain PVC casing from 0.1m to 2m
		Below 1.45m: grading to brown, trace silt			1.45				
				A	1.9 2.0				
10	2	Below 2.2m: grading to pale grey							
				S	2.5		4,5,6 N = 11		
					2.95			22-05-20	
11	3			S	3.5		6,7,5 N = 12		Sand backfill from 1.2m to 6m
					3.95				
12	4			S	4.5		5,7,8 N = 15		Slotted screen from 2.5m to 6m
					4.95				
13	5	Below 5.5m: dense		S	5.5		11,16,26 N = 42		
	6.0	Bore discontinued at 6.0m Target depth reached			5.95				End cap

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** HW to 3.5m

TYPE OF BORING: Diatube to 0.16m, Solid Flight Auger (TC-bit) to 2.5m, Rotary to 6.0m

WATER OBSERVATIONS: No free groundwater observed whilst augering and free groundwater observed at 2.85m in the well on 22/05/2020

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.8 AHD
EASTING: 333903
NORTHING: 6243055
DIP/AZIMUTH: 90°/--

BORE No: BH7
PROJECT No: 99679.00
DATE: 11/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.05	FILL/Silty SAND: fine to medium, dark brown, trace rootlets and gravel, moist, apparently poorly compacted		A/E	0.05 0.15		PID = 8 ppm		
		Below 0.2m: grading to grey and dark grey							
	0.5			A/E	0.5 0.6		PID = 8 pm		
		Below 0.7m: with clay nodules, concrete fragments and gravel							
9	1			A/E	0.9 1.0		PID = 8 ppm		1
	1.3			S/E			4,4,4 N = 8 PID = 12 ppm		
		SAND SP: fine to medium, pale grey, moist, loose, aeolian			1.45				
10	2			A/E	1.9 2.0		PID = 5 ppm		2
		Below 2.3m: grading to dark brown and brown, trace silt							
					2.5				
		Below 2.7m: wet		S/E			3,4,6 N = 10	▼ 11-05-20	
	2.95				2.95				
11	3	Bore discontinued at 2.95m Target depth reached							3
12	4								4
	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** Uncased

TYPE OF BORING: Hand Auger to 0.4m, Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.95m

WATER OBSERVATIONS: Free groundwater observed at 2.7m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.2 AHD
EASTING: 333896
NORTHING: 6243093
DIP/AZIMUTH: 90°/--

BORE No: BH8
PROJECT No: 99679.00
DATE: 11/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
9	0	FILL/Silty SAND: fine to medium, dark brown, with rootlets, trace gravel, moist, variably compacted		A/E*	0.05 0.15		PID = 11 ppm		
		Below 0.4m: with bitumen fragments		A/E	0.4 0.5		PID = 11 ppm		
		Below 0.8m: with gravel (sandstone) and PVC fragments, trace clay		A/E	0.9 1.0		PID = 15 ppm 4/140 refusal		
1	1	At 0.95m: with concrete fragments At 1.1m: bitumen band		A/E	1.14				1
				A/E	1.4 1.5		PID = 14 ppm		
10	1.8	SAND SP: fine to medium, pale brown, moist, medium dense, aeolian		A/E	1.9 2.0				
2	2	Below 2.3m: dark brown and brown, trace silt		A/E	2.4 2.5		PID= 15 ppm		2
11				S			13,12,9 N = 21		
	2.95	Bore discontinued at 2.95m Target depth reached			2.95				
3	3								3
12	4								4
13	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** Uncased

TYPE OF BORING: Hand Auger to 0.4m, Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.95m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. * Field replicate BD2/110520 taken at 0.05-0.15m.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.4 AHD
EASTING: 333895
NORTHING: 6243124
DIP/AZIMUTH: 90°/--

BORE No: BH9/GW9
PROJECT No: 99679.00
DATE: 12/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.35	FILL/Silty SAND: fine to medium, dark brown, with rootlets, trace gravel, moist, apparently poorly compacted		A/E	0.1 0.15		PID = 1 ppm		Flush gatic cover and well cap Concrete from 0m to 0.2m Sand backfill from 0.2m to 0.4m
	0.65	FILL/Gravelly SAND: fine to medium, trace silt, bitumen fragments and clay, moist, apparently well compacted		A/E	0.5 0.6		PID = 2 ppm		
		Bulk sample: 0.6-1.3m							
		SAND SP: fine to medium, pale grey, moist, loose, aeolian		A/E	0.9 1.0		PID = 1 ppm		Bentonite from 0.4m to 1.3m Plain PVC casing from 0.1m to 1.9m
9	1			A/E			3,4,5 N = 9		
		Below 1.3m: grading to brown and dark brown, trace silt			1.45				
	2	Below 1.9 m: wet			2.0			12-05-20	
				A/E			2,4,4 N = 8		
10		Below 2.5m: grading to pale brown			2.45				
	3				3.15				
				S			5,4,5 N = 9		
11					3.55				Sand backfill from 1.3m to 6m
	4	Below 4m: medium dense			4.0				Slotted screen from 1.9m to 6m
				S/E			5,6,7 N = 13 PID = <1 ppm		
12					4.45				
	5				5.5				
				S/E			7,11,15 N = 26 PID = <1 ppm		
	6.0	Bore discontinued at 6.0m Target depth reached			5.95				End cap

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** HW to 3.5m

TYPE OF BORING: Hand Auger to 0.5m, Solid Flight Auger (TC-bit) to 2.5m, Rotary to 6.0m

WATER OBSERVATIONS: Free groundwater observed at 1.9m during drilling and in the well on 22/05/2020

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.4 AHD
EASTING: 333929
NORTHING: 6243125
DIP/AZIMUTH: 90°/--

BORE No: BH10
PROJECT No: 99679.00
DATE: 11/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.25	FILL/Silty SAND: fine to medium, dark brown, with rootlets, moist, apparently poorly compacted		A/E	0.05 0.1		PID = 18 ppm		
	0.55	FILL/SAND: fine to medium, pale grey and dark grey, with gravel and a trace of rootlets, moist, apparently well compacted		A/E*	0.4 0.5		PID = 13 ppm		
		SAND SP: fine to medium, pale brown, moist, very loose to loose then loose, aeolian		A/E	0.9 1.0		PID = 16 ppm		
		Below 1.1m: grading to brown and dark brown		S/E			2,2,2 N = 4		
		Below 1.5m: wet			1.45			▼ 11-05-20	
		Below 2.2m: grading to pale grey		S/E	2.5		2,3,5 N = 8		
	2.95	Bore discontinued at 2.95m Target depth reached			2.95				

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** Uncased

TYPE OF BORING: Hand Auger to 0.5m, Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.95m

WATER OBSERVATIONS: Free groundwater observed at 1.5m

REMARKS: Location coordinates are in MGA94 Zone 56. * Field replicate BD1/110520 taken at 0.4-0.5m.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.4 AHD
EASTING: 333938
NORTHING: 6243092
DIP/AZIMUTH: 90°/--

BORE No: BH11
PROJECT No: 99679.00
DATE: 11/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.05	FILL/Silty SAND: fine to medium, dark brown, with rootlets, moist, apparently poorly compacted		A/E	0.05–0.15		PID = 11.5 ppm		
		Below 0.4m: with bitumen fragments and igneous gravel, strong hydrocarbon odour		A/E*	0.4–0.5		PID = 36 ppm		
	0.7	SAND SP: fine to medium, pale grey, moist, medium dense, aeolian			0.7				
	1			A/E B	0.9–1.0		PID = 14 ppm		1
9				S/E	1.35–1.45		10,9,8 N = 17		
		Below 1.3m: brown to dark brown, trace silt							
		Below 1.65m: wet						11-05-20	
	2								2
10				S/E	2.5		3,3,8 N = 11		
	3				2.95				3
11									
	4			S/E	4.0		8,10,16 N = 26		4
	4.45	Bore discontinued at 4.45m Target depth reached			4.45				
12	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** Uncased

TYPE OF BORING: Hand Auger to 0.3m, Solid Flight Auger (TC-bit) to 4.0m, SPT to 4.45m

WATER OBSERVATIONS: Free groundwater observed at 1.65m

REMARKS: Location coordinates are in MGA94 Zone 56. * Field replicate BD3/110520 taken at 0.4-0.5m.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.6 AHD
EASTING: 333948
NORTHING: 6243041
DIP/AZIMUTH: 90°/--

BORE No: BH12
PROJECT No: 99679.00
DATE: 12/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.1	FILL/Silty SAND: fine to medium, dark brown, trace gravel, moist, apparently poorly compacted		A/E	0.1 0.2		PID = <1 ppm		
		Below 0.3m: with gravel, trace brick fragments and metal, apparently well compacted		A/E	0.5 0.6		PID = <1 ppm		
	0.7	SAND SP: fine to medium, pale grey, moist, loose to medium dense, aeolian			0.75				
	1			A/E	0.9 1.0		PID = 3 ppm		1
9				B S/E			7,8,10 N = 18 PID = <1 ppm		
		Below 1.35m: grading to brown and dark brown			1.45 1.5				
		Below 1.75m: grading to pale brown							
	2							▼ 12-05-20	2
10		Below 2.15m: wet							
		Below 2.5m: loose			2.5				
				S/E			2,3,4 N = 7 PID = <1 ppm		
	3				2.95				3
11					3.5				
				S			2,3,4 N = 7 PID = <1 ppm		
	3.95				3.95				
12		Bore discontinued at 4.45m Target depth reached							
	4								4
	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** RB **CASING:** Uncased

TYPE OF BORING: Hand Auger to 0.5m, Solid Flight Auger (TC-bit) to 3.5m, SPT to 3.95m

WATER OBSERVATIONS: Free groundwater observed at 2.15m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.3 AHD
EASTING: 333818
NORTHING: 6243036
DIP/AZIMUTH: 90°/--

BORE No: BH13
PROJECT No: 99679.00
DATE: 15/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.2	ASPHALT (good condition)							
	0.3	ROADBASE							
		FILL/SAND: fine to coarse, grey and dark grey, trace fine gravel (igneous), moist		E	0.3 0.4		PID = 1 ppm		
					0.5				
				S/E			5,6,6 N = 12 PID = 1 ppm		
	1.0	SAND SP: fine to medium, pale grey, moist, loose, aeolian			0.95				
		Below 1.3m: grading to pale yellow		E	1.4 1.5		PID = 2 ppm		
				S/E			2,3,4 N = 7 PID = 2 ppm		
		Below 1.8m: grading to orange-brown							
	1.95	Bore discontinued at 1.95m Target depth reached			1.95				

RIG: Explora **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m, SPT to 1.95m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.1 AHD
EASTING: 333806
NORTHING: 6243076
DIP/AZIMUTH: 90°/--

BORE No: BH14
PROJECT No: 99679.00
DATE: 15/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.2	ASPHALT (good condition)							
	0.5	ROADBASE							
	0.7	VOID							
		FILL/SAND: fine to coarse, grey and dark brown, trace fine gravel (igneous), moist		S/E	1.0		1,0,0 N = 0 PID = 1 ppm		
	1.5	SAND SP: fine to medium, pale grey, moist, loose to medium dense, aeolian			1.45				
				E	1.9 2.0		PID = <1 ppm		
		Below 2.2: wet						15-05-20	
				E	2.4 2.5		PID = 1 ppm		
		Below 2.8m: grading to pale yellow		S/E			3,4,6 N = 10 PID = 1 ppm		
	2.95	Bore discontinued at 2.95m Target depth reached			2.95				

RIG: Explora **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.95m

WATER OBSERVATIONS: Free groundwater observed at 2.2m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.3 AHD
EASTING: 333841
NORTHING: 6243043
DIP/AZIMUTH: 90°/--

BORE No: BH15
PROJECT No: 99679.00
DATE: 18/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	ASPHALT (good condition)							
		ROADBASE							
	0.4	FILL/Silty SAND: fine to coarse, dark brown, trace fine to medium gravel (asphaltic and igneous) and clay, dry, strong hydrocarbon odour		E	0.4 0.5		PID = 4 ppm		
				E	0.9 1.0		PID = 2 ppm		
	1.0	SAND SP: fine to medium, pale grey to dark grey, hydrocarbon odour, dry, loose, aeolian		S/E			2,2,4 N = 6 PID = 3 ppm		
				E	1.4 1.45		PID = 3 ppm		
	1.5	Bore discontinued at 1.5m Target depth reached			1.5				

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.2 AHD
EASTING: 333825
NORTHING: 6243091
DIP/AZIMUTH: 90°/--

BORE No: BH16
PROJECT No: 99679.00
DATE: 18/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	ASPHALT (good condition)							
	0.2	ROADBASE							
		FILL/Silty SAND: fine to coarse, dark brown, trace fine to medium gravel (asphaltic and igneous), moist		E	0.2 0.4		PID = 2 ppm		
				E	0.9		PID = 3 ppm		
	1.0	SAND SP: fine to medium, pale grey to dark grey, dry, loose, aeolian		S/E	1.0		1,3,4 N = 7 PID = 2 ppm		
				E	1.4 1.45		PID = 2 ppm		
	1.5	Bore discontinued at 1.5m Target depth reached			1.5				

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 6.8 AHD
EASTING: 333793
NORTHING: 6243119
DIP/AZIMUTH: 90°/--

BORE No: BH17/GW17
PROJECT No: 99679.00
DATE: 15/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
7	0.2	ASPHALT (good condition)							Flush gatic cover and well cap Asphalt from 0m to 0.05m Sand backfill from 0.05m to 0.3m
	0.35	ROADBASE							
		FILL/Silty SAND: fine to coarse, pale brown to brown, with clay, trace fine gravel (igneous), moist, hydrocarbon odour		E	0.4 0.5		PID = 11 ppm		
				S/E			5,2,2 N = 4 PID = 6 ppm		
	0.9			E	0.9 0.95		PID = 4 ppm		
8	1	FILL/SAND: fine to coarse, pale grey and grey, trace fine gravel (igneous), moist			1.0				Plain PVC casing from 0.05m to 2m Bentonite from 0.3m to 2.1m
				E	1.4 1.5		PID = 4 ppm		
				S/E			1,3,4 N = 7 PID = 3 ppm		
				E	1.9 1.95		PID = 3 ppm	15-05-20	
9	2	2.0 SAND SW: fine to coarse, pale brown, wet, loose, aeolian			2.0				
				E	2.4 2.5		PID = 3 ppm		
				S/E			2,2,3 N = 5 PID = 3 ppm		
10	3				2.95				
		Below 3.5m: grading to pale yellow-grey			3.5				
				S/E			2,3,5 N = 8 PID = 1 ppm		
	4				3.95				Slotted screen from 2m to 6m Sand backfill from 2.1m to 6m
11		Below 4.5m: grading to pale yellow, loose to medium dense			4.5				
				S/E			3,7,10 N = 17 PID = 1 ppm		
	5				4.95				
					5.5				
				S/E			1,2,4 N = 6 PID = 1 ppm		
	6.0	Bore discontinued at 6.0m Target depth reached			5.95				End cap

RIG: Explora **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 6.0m.

WATER OBSERVATIONS: Free groundwater observed at 2m during drilling and at 2.1m in the well on 20/05/2020

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.5 AHD
EASTING: 333904
NORTHING: 6243114
DIP/AZIMUTH: 90°/--

BORE No: BH18
PROJECT No: 99679.00
DATE: 19/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.0	FILL/Silty SAND: fine to medium, dark brown, with clay, roots and rootlets, moist		E	0.0–0.1		PID = 1 ppm		
	0.4	Below 0.4m: with fine gravel (asphaltic)		E	0.4–0.5		PID = 2 ppm		
	0.5	FILL: Sandy GRAVEL/FLY ASH: with clinker and fine to medium asphaltic gravel		S/E	0.59		25/90 refusal PID = 2 ppm		
	0.8	SAND SP: fine to medium, pale grey to grey, moist, loose, aeolian		E	0.9–1.0		PID = 3 ppm		
9	1.5	Below 1.5m: grading to pale grey, orange and dark red-brown		E	1.5–1.6		PID = 4 ppm		
		Below 1.8m: grading to yellow to pale yellow							
		Below 2m: wet						19-05-20	
10		Below 2.5m: grading to pale yellow-grey, loose to medium dense							
11									
12	4.0	Bore discontinued at 4.0m Target depth reached							

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Hand Auger to 0.5m, Solid Flight Auger (TC-bit) to 4m

WATER OBSERVATIONS: Free groundwater observed at 2m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.4 AHD
EASTING: 333934
NORTHING: 6243118
DIP/AZIMUTH: 90°/--

BORE No: BH19
PROJECT No: 99679.00
DATE: 19/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Silty SAND: fine to medium, dark brown, with clay, roots and rootlets, trace gravel (asphaltic) and clinker, moist, strong hydrocarbon odour		E	0.0 0.1		PID = 7 ppm		
	0.4	Below 0.1m: grading to brown FILL: Sandy GRAVEL/FLY ASH: with clinker and fine to coarse asphaltic gravel		E S	0.4 0.5 0.6		PID = 16 ppm 25/100 refusal PID = 11 ppm		
	1.0	SAND SP: fine to medium, pale yellow-grey, slight hydrocarbon odour, moist, loose, aeolian		E	1.0 1.1		PID = 1 ppm	▼ 19-05-20	
		Below 1.3m: grading to yellow-orange, odourless, wet		E	1.4		PID = 1 ppm		
	1.5	Bore discontinued at 1.5m Target depth reached			1.5				

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m

WATER OBSERVATIONS: Free groundwater observed at 1.3m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.4 AHD
EASTING: 333945
NORTHING: 6243099
DIP/AZIMUTH: 90°/--

BORE No: BH20
PROJECT No: 99679.00
DATE: 19/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.0	FILL/Silty SAND: fine to medium, dark brown, with clay, roots and rootlets, trace gravel (asphaltic), moist		E	0.0 0.1		PID = 2 ppm		
		Below 0.1m: grading to brown							
		Below 0.4m: with fine gravel (asphaltic)		E	0.4 0.5		PID = 2 ppm		
	0.6	SAND SP: fine to medium, pale yellow-grey, moist, medium dense, aeolian		S/E			8,9,10 N = 19 PID = 1 ppm		
1					0.95				1
	1.2			E	1.1 1.2		PID = 1 ppm		
		Bore discontinued at 1.2m Target depth reached							
9	2								2
10	3								3
11	4								4
12	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.2m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.8 AHD
EASTING: 3339823
NORTHING: 6243108
DIP/AZIMUTH: 90°/--

BORE No: BH21
PROJECT No: 99679.00
DATE: 19/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.0	FILL/Silty SAND: fine to coarse, dark brown, with clay, trace gravel (asphaltic), clinker, roots and rootlets, moist		E	0.0 0.1		PID = 1 ppm		
	0.4	FILL: Sandy GRAVEL/FLY ASH: with clinker		E	0.4 0.5		PID = 2 ppm		
	0.6	SAND SP: fine to medium, pale yellow, moist, loose to medium dense, aeolian		S/E			4,4,6 N = 10 PID = 2 ppm		
9	1				0.95 1.0				1
	1.1			E	1.1		PID = 1 ppm		
		Bore discontinued at 1.1m Target depth reached							
10	2								2
11	3								3
12	4								4
	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.1m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.4 AHD
EASTING: 333949
NORTHING: 6243075
DIP/AZIMUTH: 90°/--

BORE No: BH22
PROJECT No: 99679.00
DATE: 19/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Silty SAND: fine to medium, dark brown, with clay, roots and rootlets, trace fine gravel (asphaltic) and clinker, moist, strong hydrocarbon odour		E	0.0 0.1		PID = 2 ppm		
	0.4	Below 0.1m: grading to brown FILL: Sandy GRAVEL/FLY ASH: with fine to medium asphaltic gravel , clinker and clay, strong hydrocarbon odour		E	0.4 0.5		PID = 7 ppm		
		Between 0.5m-0.8m: with concrete		S/E			25,13,15 N = 28 PID = 3 ppm		
	1.0	SAND SP: fine to medium, pale yellow-grey and grey to dark grey, moist, loose to medium dense, aeolian		E	0.95 1.0 1.1		PID = 1 ppm		
	1.5	Bore discontinued at 1.5m Target depth reached		E	1.4 1.5		PID = 1 ppm		

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.5 AHD
EASTING: 333947
NORTHING: 6243057
DIP/AZIMUTH: 90°/--

BORE No: BH23
PROJECT No: 99679.00
DATE: 19/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.0	FILL/Silty SAND: fine to medium, dark brown, with clay, roots and rootlets, trace fine gravel (asphaltic), moist		E	0.0 0.1		PID = 3 ppm		
		Below 0.1m: grading to brown							
	0.4	FILL: Sandy GRAVEL/FLY ASH: with fine to medium asphaltic gravel and clinker		E	0.4 0.5		PID = 2 ppm		
				S/E			6,8,10 N = 18 PID = 2 ppm		
	0.9	SAND SP: fine to medium, pale yellow-grey and grey to dark grey, moist, loose to medium dense, aeolian		E	0.9 0.95 1.0		PID = 2 ppm		
		Below 1.3m: grading to brown and dark grey							
9		Below 1.4m: grading to dark brown and dark grey		E	1.4		PID = 2 ppm		
	1.5	Bore discontinued at 1.5m Target depth reached			1.5				
10									
11									
12									

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.7 AHD
EASTING: 333919
NORTHING: 6243048
DIP/AZIMUTH: 90°/--

BORE No: BH24
PROJECT No: 99679.00
DATE: 19/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.0	FILL/SAND: fine to coarse, dark brown, with silt, trace roots and rootlets, moist		E	0.0 0.1		PID = 2 ppm		
	0.4	FILL: Sandy GRAVEL/FLY ASH: with fine to medium asphaltic gravel and clinker		E S/E	0.4 0.5		PID = 3 ppm 22,14,7 N = 21 PID = 13 ppm		
	0.9	SAND SP: fine to medium, pale yellow-grey and grey to dark grey, moist, loose to medium dense, aeolian		E	0.9 0.95 1.0		PID = 4 ppm		
9	1	Below 1.4m: grading to dark brown, dark grey and orange, trace clay		E	1.4 1.5		PID = 2 ppm		1
	2	Below 2m: grading to pale yellow to yellow							2
10		Below 2.3m: wet						19-05-20	
	3	Below 3m: grading to yellow-grey							3
11									
	4	4.0 Bore discontinued at 4.0m Target depth reached							4
12									
	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Hand Auger to 0.5m, Solid Flight Auger (TC-bit) to 4m

WATER OBSERVATIONS: Free groundwater observed at 2.3m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.4 AHD
EASTING: 333891
NORTHING: 6243040
DIP/AZIMUTH: 90°/--

BORE No: BH25
PROJECT No: 99679.00
DATE: 19/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
9	0.0	FILL/Silty SAND: fine to medium, dark brown, with clay, roots and rootlets, moist		E	0.0 0.1		PID = 2 ppm		
	0.4	FILL/SAND: fine to coarse, brown to dark brown, trace roots and rootlets, moist		E S/E	0.4 0.5		PID = 4 ppm 1,1,R refusal SPT = refusal on 3rd blow		
	0.8	FILL: Sandy GRAVEL/FLY ASH: with fine to medium asphaltic gravel, clinker and red-brown clay, strong hydrocarbon odour			0.8		PID = 2 ppm		
1	1.0	FILL/SAND: fine to coarse, dark brown, trace clinker, clay, roots and rootlets, moist		E	0.9 1.0		PID = 2 ppm		1
10	1.6	SAND SP: fine to medium, pale grey to dark grey, moist, loose to medium dense, aeolian Below 1.8m: fine to coarse, grading to dark brown, red-brown and pale grey		E S/E E	1.4 1.5 1.9 1.95		PID = 17 ppm 11,13,11 N = 24 PID = 6 ppm PID = 4 ppm		
2	2.1	Bore discontinued at 2.1m Target depth reached			2.0				2
11									
3									3
12									
4									4
13									
5									5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Hand Auger to 0.5m, Solid Flight Auger (TC-bit) to 2.1m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.4 AHD
EASTING: 333980
NORTHING: 6243023
DIP/AZIMUTH: 90°/--

BORE No: BH26
PROJECT No: 99679.00
DATE: 18/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
9	0.0	FILL/Silty SAND: fine to coarse, brown to dark brown, with fine to medium gravel (asphaltic), roots and rootlets, dry		E	0.0 0.1		PID = 1 ppm		
				E	0.4 0.5		PID = 1 ppm		
		At 0.7m: with fly ash		S/E			6,8,8 N = 16 PID = 1 ppm		
	0.9	SAND SP: fine to medium, pale yellow, pale grey and dark grey, moist, loose to medium dense, aeolian		E	0.9 0.95 1.0		PID = 2 ppm		
				E	1.4 1.5		PID = 2 ppm		
10	1.5	Bore discontinued at 1.5m Target depth reached							
11									
12									
13									

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.4 AHD
EASTING: 333889
NORTHING: 6243033
DIP/AZIMUTH: 90°/--

BORE No: BH27
PROJECT No: 99679.00
DATE: 19/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Silty SAND: fine to medium, dark brown, with clay, roots and rootlets, moist		E	0.0 0.1		PID = 3 ppm		
	0.4	FILL/SAND: fine to coarse, brown to dark brown, trace clinker, clay, roots and rootlets, moist		E	0.4 0.5		PID = 2 ppm		
				S/E			2,1,2 N = 3 PID = 1 ppm		
					0.8 0.9				
	1			E	1.0		PID = 1 ppm		1
				E	1.4 1.5		PID = 3 ppm		
				S/E			12,12,18 N = 30 PID = 2 ppm		
	1.8	SAND SP: fine to medium, pale grey and dark grey, moist, loose to medium dense, aeolian Below 2m: grading to dark red-brown, brown and orange			1.95				
	2			E	2.0 2.1		PID = 2 ppm		2
				E	2.4		PID = 2 ppm		
	2.5	Bore discontinued at 2.5m Target depth reached			2.5				
	3								3
	4								4
	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Hand Auger to 0.5m, Solid Flight Auger (TC-bit) to 2.5m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.7 AHD
EASTING: 334038
NORTHING: 6243032
DIP/AZIMUTH: 90°/--

BORE No: BH28
PROJECT No: 99679.00
DATE: 15/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
9	0.3	FILL/Silty SAND: fine to medium, brown and grey, trace rootlets, moist							
		At 0.3m: concrete boulders encountered Bore discontinued at 0.3m Refusal on concrete							

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** JH **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 0.3m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.7 AHD
EASTING: 334036
NORTHING: 6243031
DIP/AZIMUTH: 90°/--

BORE No: BH28A
PROJECT No: 99679.00
DATE: 15/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Silty SAND: fine to medium, brown and grey, trace rootlets, moist		E*	0.0		PID = <1 ppm		
					0.2				
9					0.3				
		At 0.4m: trace clinker		E			PID = 1 ppm		
					0.5				
		At 0.7m: with roots, clinker, ceramic and plastic		S/E			3,3,7 N = 10 PID = 1 ppm		
	1	Below 0.9m: grading to brown with pale grey			0.95				1
				E	1.0		PID = 1 ppm		
	1.1	FILL/SAND : fine to medium, pale grey, moist, medium dense			1.1				
10				S/E			4,8,11 N = 19 PID = 1 ppm		
		Below 1.4m: grading to very pale grey			1.4				
				E	1.45		PID = 1 ppm		
					1.5				
				E	1.9		PID = <1 ppm		
	2	2.0 Bore discontinued at 2.0m Refusal on concrete			2.0				2
11									
	3								3
12									
	4								4
13									
	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** JH **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 2m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. * Field replicate BD1/20200515 taken at 0-0.2m.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.6 AHD
EASTING: 334061
NORTHING: 6243035
DIP/AZIMUTH: 90°/--

BORE No: BH29
PROJECT No: 99679.00
DATE: 15/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Silty SAND: fine to medium, brown and grey, trace rootlets, moist		E	0.0		PID = <1 ppm		
					0.2				
				E	0.3		PID = 1 ppm		
		Below 0.5m: trace gravel (sandstone)			0.5				
				S/E			5,6,7 N = 13 PID = 1 ppm		
					0.95				
				E	1.0		PID = 1 ppm		
	1.2				1.1				
		SAND SP: fine to medium, pale grey to dark grey, moist, medium dense, aeolian		S/E			9,8,11 N = 19 PID = 2 ppm		
					1.45				
				E	1.5		PID = <1 ppm		
		Below 1.7m: grading to pale grey and mottled orange-brown			1.7				
					2.0				
		Below 2.2m: grading to mottled yellow and orange-brown		S/E			11,9,10 N = 19 PID = 2 ppm		
	2.45	Bore discontinued at 2.45m Target depth reached			2.45				

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** JH **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.45m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 9.7 AHD
EASTING: 334076
NORTHING: 6243042
DIP/AZIMUTH: 90°/--

BORE No: BH30/GW30
PROJECT No: 99679.00
DATE: 13/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
10	0.0	FILL/Silty SAND: fine to coarse, dark brown, with roots and rootlets, trace gravel (igneous) and clinker, moist		E	0.0		PID = 4 ppm		Flush gatic cover and well cap Concrete from 0m to 0.1m
					0.2				
				E	0.3		PID = 6 ppm		Coarse sand from 0.1m to 0.75m
	0.55	SAND SW: fine to coarse, pale to dark grey, moist, loose to medium dense, aeolian		S/E	0.5		6,8,9 N = 17 PID = <1 ppm		
				E	0.9		PID = 3 ppm		
1	1				0.95 1.0			1	Plain PVC casing from 0.1m to 1.9m
11		Below 1.2m: grading to red-brown Below 1.3m: grading to pale orange-brown		E	1.2		PID = 2 ppm		Bentonite from 0.75m to 1.8m
				S/E	1.5		3,5,4 N = 9 PID = 3 ppm		
2	2	Below 1.9m: wet			1.95			13-05-20	
12				S/E	2.5		3,4,7 N = 11 PID = 2 ppm		
	3				2.95			2	
13				S/E	3.5		7,7,8 N = 15 PID = 2 ppm		
	4	Below 3.7m: grading to pale grey			3.95			3	Sand backfill from 1.8m to 6m Slotted screen from 1.9m to 6m
14				S/E	4.5		2,5,12 N = 17 PID = 2 ppm		
	5	Below 4.55m: grading to pale yellow-grey			4.95			4	
				S/E	5.5		6,13,21 N = 34 PID = 2 ppm		
	6.0	Bore discontinued at 6.0m Target depth reached			5.95			5	End cap

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 6.0m

WATER OBSERVATIONS: Free groundwater observed at 1.9m during drilling and at 2.0m in the well on 22/05/2020

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.3 AHD
EASTING: 333985
NORTHING: 6243048
DIP/AZIMUTH: 90°/--

BORE No: BH31
PROJECT No: 99679.00
DATE: 18/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Silty SAND: fine to coarse, dark brown, with clay, roots and rootlets, moist		E	0.0 0.1		PID = 2 ppm		
				E	0.4 0.5		PID = 2 ppm		
	0.55	SAND SP: fine to medium, pale grey and dark grey, moist, loose, aeolian		S/E			7,4,4 N = 8 PID = 2 ppm		
				E	0.95		PID = 2 ppm		
	1.05	Bore discontinued at 1.05m Target depth reached			1.05				

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.05m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.2 AHD
EASTING: 334010
NORTHING: 6243042
DIP/AZIMUTH: 90°/--

BORE No: BH32
PROJECT No: 99679.00
DATE: 18/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.0	FILL/Silty SAND: fine to coarse, dark brown and orange, with roots and rootlets, trace fine to medium gravel (asphaltic) and clay, moist		E	0.0		PID = 2 ppm		
					0.3				
				E*	0.4		PID = 2 ppm		
					0.5				
				S/E			3,2,2 N = 4 PID = 1 ppm		
	0.9				0.95				
1		FILL/SAND: fine to coarse, pale yellow and yellow, dry Below 1m: grading to dark brown and grey, with silt, trace fine gravel (igneous) and PVC, dry		E	1.0		PID = 1 ppm		1
					1.3				
				E	1.5		PID = 2 ppm		
	1.6				1.6				
9		SAND SP: fine to medium, pale grey to grey, dry, medium dense, aeolian Below 1.8m: grading to orange and brown to red-brown, moist		S/E			7,11,10 N = 21 PID = 1 ppm		
2					1.95				2
				E	2.0		PID = 1 ppm		
	2.1	Bore discontinued at 2.1m Target depth reached			2.1				
10	3								3
11	4								4
12	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.1m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. * Field replicate BD6/20200518 taken at 0.4-0.5m.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.8 AHD
EASTING: 334034
NORTHING: 6243066
DIP/AZIMUTH: 90°/--

BORE No: BH33
PROJECT No: 99679.00
DATE: 18/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
9	0.0	FILL/Silty SAND: fine to coarse, dark brown, trace bark, roots and rootlets, moist		E*	0.0		PID = 1 ppm		
	0.3	At 0.3m: trace coarse gravel (asphaltic), hydrocarbon odour			0.3				
				E	0.4 0.5		PID = 3 ppm		
				S/E			2,2,7 N = 9 PID = 1 ppm		
10	1	Below 0.9m: trace medium gravel (asphaltic)		E	0.9 0.95		PID = 2 ppm		1
					1.0				
				E	1.4 1.5		PID = 2 ppm		
		Below 1.5m: with pale grey and red clay nodules		S/E			8,12,10 N = 22 PID = 1 ppm		
	1.8	SAND SP: fine to medium, pale grey to grey, moist, medium dense, aeolian		E	1.9 1.95		PID = 1 ppm		
11	2				2.0				2
		Below 2.4m: grading to orange-brown and grey, loose		E	2.4 2.5		PID = 1 ppm		
				S/E			3,4,4 N = 8 PID = 1 ppm		
	2.95	Below 2.9m: wet			2.95			18-05-20	
12	3	Bore discontinued at 2.95m Target depth reached							3
13	4								4
	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.5m, SPT to 2.95m

WATER OBSERVATIONS: Free groundwater observed at 2.9m

REMARKS: Location coordinates are in MGA94 Zone 56. * Field replicate BD3/20200518 taken at 0-0.3m.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.5 AHD
EASTING: 334062
NORTHING: 6243055
DIP/AZIMUTH: 90°/--

BORE No: BH34
PROJECT No: 99679.00
DATE: 15/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
9	0.0	FILL/Silty SAND: fine to medium, brown, trace gravel (igneous) and roots, dry		E*	0.0		PID = <1 ppm		
					0.2				
	0.3	FILL/Sandy GRAVEL: fine, dark grey and brown, trace roots, dry		E	0.3		PID = <1 ppm		
					0.5				
	0.7	SAND SP: fine to medium, pale grey, moist, medium dense, aeolian		S/E			9,5,7 N = 12 PID = 1 ppm		
1				E	0.95		PID = <1 ppm		1
					1.1				
10				E	1.4		PID = 1 ppm		
					1.5				
		Below 1.7m: mottled brown and orange		S/E			7,10,12 N = 22 PID = 1 ppm		
2	1.95	Bore discontinued at 1.95m Target depth reached			1.95				2
11									
3									3
12									
4									4
13									
5									5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** JH **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m, SPT to 1.95m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. * Field replicate BD2/20200515 taken at 0-0.2m.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.6 AHD
EASTING: 333994
NORTHING: 6243080
DIP/AZIMUTH: 90°/--

BORE No: BH35
PROJECT No: 99679.00
DATE: 18/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.0	FILL/Silty SAND: fine to coarse, dark brown, with clay, bark, roots and rootlets, trace fine gravel (sandstone), tile and geofabric, moist		E	0.0 0.1		PID = 2 ppm		
				E	0.4 0.5		PID = 3 ppm		
				S/E			12,12,12 N = 24 PID = 2 ppm		
				E	0.9 0.95		PID = 2 ppm		
9	1.0	SAND SP: fine to medium, pale grey and dark grey, moist, loose to medium dense, aeolian Below 1.2m: grading to orange and brown to red-brown			1.0				
				E	1.4		PID = 2 ppm		
	1.5	Bore discontinued at 1.5m Target depth reached			1.5				

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 9 AHD
EASTING: 334017
NORTHING: 6243058
DIP/AZIMUTH: 90°/--

BORE No: BH36
PROJECT No: 99679.00
DATE: 18/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
9	0	FILL/Silty SAND: fine to coarse, pale yellow and dark brown, with roots and rootlets, trace gravel (asphaltic) and bark, moist		E	0.0		PID = 5 ppm		
					0.3				
				E*	0.4		PID = 2 ppm		
		At 0.5m: fly ash, concrete and fine to medium gravel (asphaltic)			0.5				
				S/E			11,10,9 N = 19 PID = 1 ppm		
10	1			E	0.9 0.95		PID = 4 ppm		1
					1.0				
				E	1.4		PID = 2 ppm		
		Below 1.5m: with fine to coarse gravel (sandstone) and clay			1.5				
				S/E			2,3,5 N = 8 PID = 1 ppm		
11	2			E	1.9 1.95		PID = 2 ppm		2
					2.0				
	2.4	SAND SP: fine to medium, orange-brown and grey, moist, loose to medium dense, aeolian		E	2.4		PID = 1 ppm		
		At 2.5m: tree root encountered			2.5				
				S			SPT = refusal on tree root		
		Below 2.9m: wet			2.9			▼	
12	3			E	2.95		PID = 2 ppm	18-05-20	3
	3.0	Bore discontinued at 3.0m Target depth reached			3.0				
13	4								4
14	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 3m

WATER OBSERVATIONS: Free groundwater observed at 2.9m

REMARKS: Location coordinates are in MGA94 Zone 56. * Field replicate BD4/20200518 taken at 0.4-0.5m. Unable to conduct SPT at 2.5-2.95m due to refusal on tree root.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8 AHD
EASTING: 334043
NORTHING: 6243072
DIP/AZIMUTH: 90°/--

BORE No: BH37
PROJECT No: 99679.00
DATE: 15/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8		FILL/Silty SAND: fine to medium, brown, trace concrete and rootlets, moist		E	0.0		PID = 2 ppm		
					0.2				
				E	0.3		PID = <1 ppm		
					0.5				
				S/E			6,5,6 N = 11 PID = <1 ppm		
	0.8								
9	1	SAND SP: fine to medium, pale grey, moist, loose to medium dense, aeolian		E	0.95		PID = <1 ppm		1
					1.1				
		Below 1.5m: grading to mottled brown and orange			1.5				
				S/E			4,5,5 N = 10 PID = <1 ppm		
		Below 1.8m: grading to pale yellow, moist							
10	1.95 2	Bore discontinued at 1.95m Target depth reached			1.95				2
11	3								3
12	4								4
13	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** JH **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m, SPT to 1.95m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 7.7 AHD
EASTING: 333999
NORTHING: 6243086
DIP/AZIMUTH: 90°/--

BORE No: BH38
PROJECT No: 99679.00
DATE: 18/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.0	FILL/Silty SAND: fine to coarse, dark brown, with clay, roots and rootlets, trace fine gravel (sandstone) and bark, moist		E	0.0–0.1		PID = 1 ppm		
				E	0.4–0.5		PID = 2 ppm		
				S/E			7,11,23 N = 34 PID = 2 ppm		
		At 0.8m: ~50mm diameter timber particle board with PVC outer shell		E	0.9–1.0		PID = 2 ppm		
9	1.3	SAND SP: fine to medium, pale grey, orange and brown to red-brown, moist, loose, aeolian		E	1.4–1.5		PID = 2 ppm		
				S/E			5,4,5 N = 9 PID = 2 ppm		
		Below 1.9m: wet		E	1.9–2.0		PID = 2 ppm	18-05-20	
10	2.0	Bore discontinued at 2.0m Target depth reached							
11									
12									

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.9m

WATER OBSERVATIONS: Free groundwater observed at 1.9m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.8 AHD
EASTING: 334024
NORTHING: 6243067
DIP/AZIMUTH: 90°/--

BORE No: BH39
PROJECT No: 99679.00
DATE: 18/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Silty SAND: fine to coarse, dark brown, trace medium gravel (asphaltic), roots and rootlets, moist		E*	0.0		PID = 1 ppm		
					0.3				
				E	0.4 0.5		PID = 1 ppm		
		At 0.6m: trace concrete		S/E			5,5,10 N = 15 PID = 1 ppm		
				E	0.9 0.95		PID = 1 ppm		
					1.0				
		Below 1.4m: with fine to medium gravel (asphaltic) and fine gravel (sandstone), trace clay		E	1.4 1.5		PID = 1 ppm		
				S/E			4,5,5 N = 10 PID = 1 ppm		
	1.95			E	1.9 1.95		PID = 1 ppm		
		SAND SP: fine to medium, pale grey, dark grey and dark brown, moist, medium dense, aeolian			2.0				
		Below 2.4m: with orange		E	2.4 2.5		PID = 1 ppm		
				S/E			6,6,6 N = 12 PID = 1 ppm		
	2.95	Below 2.9m: grading to pale yellow to yellow, wet			2.95			18-05-20	
		Bore discontinued at 2.95m Target depth reached							

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.9m, SPT to 2.95m

WATER OBSERVATIONS: Free groundwater observed at 2.9m

REMARKS: Location coordinates are in MGA94 Zone 56. * Field replicate BD5/20200518 taken at 0-0.3m.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: CO-OP Studio Pty Ltd
PROJECT: Botany Aquatic Centre
LOCATION: 2 Myrtle Street, Botany

SURFACE LEVEL: 8.2 AHD
EASTING: 333905
NORTHING: 6243098
DIP/AZIMUTH: 90°/--

BORE No: BH40
PROJECT No: 99679.00
DATE: 19/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
9	0.0	FILL/Silty SAND: fine to medium, dark brown, with clay, roots and rootlets, moist		E	0.0 0.1		PID = 1 ppm		
		Below 0.5m: grading to dark red-brown, brown and orange		E	0.4 0.5		PID = 1 ppm		
				S/E			2,1,1 N = 2 PID = 1 ppm		
	1	At 1m: scrap cable encountered Below 1m: with fine to medium gravel (asphaltic)		E	0.9 0.95 1.0		PID = 1 ppm		1
				E	1.4 1.5		PID = 2 ppm		
10				S/E			5,5,4 N = 9 PID = 2 ppm		
	1.9	SAND SP: fine to medium, pale grey and dark grey, moist, loose, aeolian		E	1.9 1.95 2.0		PID = 1 ppm		
	2								2
		Below 2.3m: grading to dark red-brown and orange Below 2.4m: wet		E	2.4		PID = 1 ppm	▼	
	2.5	Bore discontinued at 2.5m Target depth reached			2.5			19-05-20	
11	3								3
12	4								4
13	5								5

RIG: Scout 1 **DRILLER:** Ground Test **LOGGED:** AMS **CASING:** Uncased

TYPE OF BORING: Hand Auger to 0.5m, Solid Flight Auger (TC-bit) to 2.5m

WATER OBSERVATIONS: Free groundwater observed at 2.4m

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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CONE PENETRATION TEST

CLIENT: CO-OP Studio Pty Ltd

PROJECT: Botany Aquatic Centre

LOCATION: 2 Myrtle Street, Botany

REDUCED LEVEL: 7.2

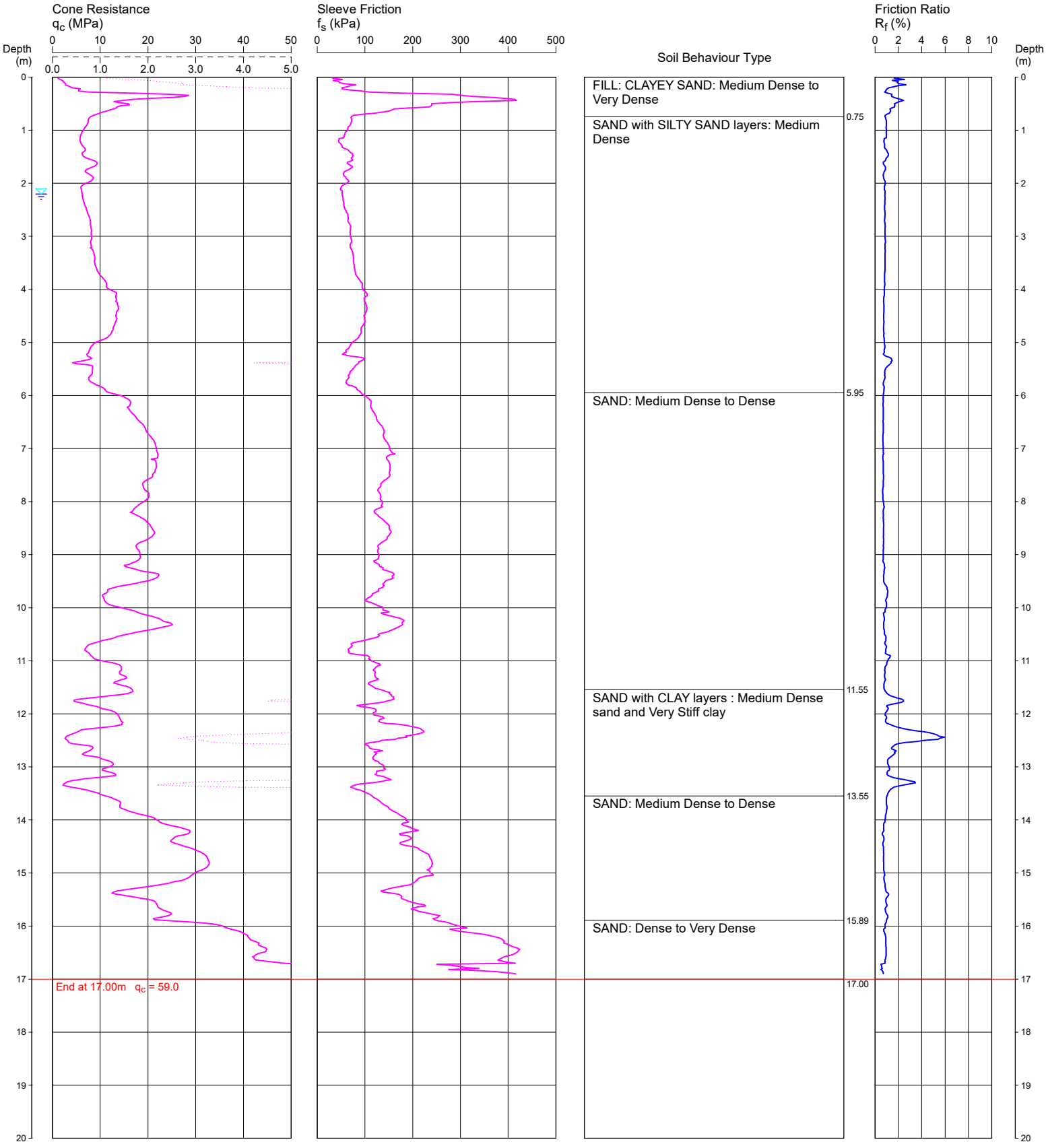
COORDINATES: 333823E 6243123N MGA

CPT1

Page 1 of 1

DATE 12/05/2020

PROJECT No: 99679.00



REMARKS: TEST TERMINATED DUE TO CONE TIP REFUSAL
GROUNDWATER MEASURED AT 2.20 m AFTER REMOVAL OF RODS

Water depth after test: 2.20m depth (measured)

File: \\DPSYDNAS01\Projects\99679.00 - BOTANY, corner Myrtle St and Jasmine St\4.0 Field Work\4.2 Testing\CPT 12.05.2020\interpreted\CPT1.CP5

Cone ID: 170707 **Type:** I-CFXY-10

ConePlot Version 5.9.2

Douglas Partners
Geotechnics | Environment | Groundwater

CONE PENETRATION TEST

CLIENT: CO-OP Studio Pty Ltd

PROJECT: Botany Aquatic Centre

LOCATION: 2 Myrtle Street, Botany

REDUCED LEVEL: 7.3

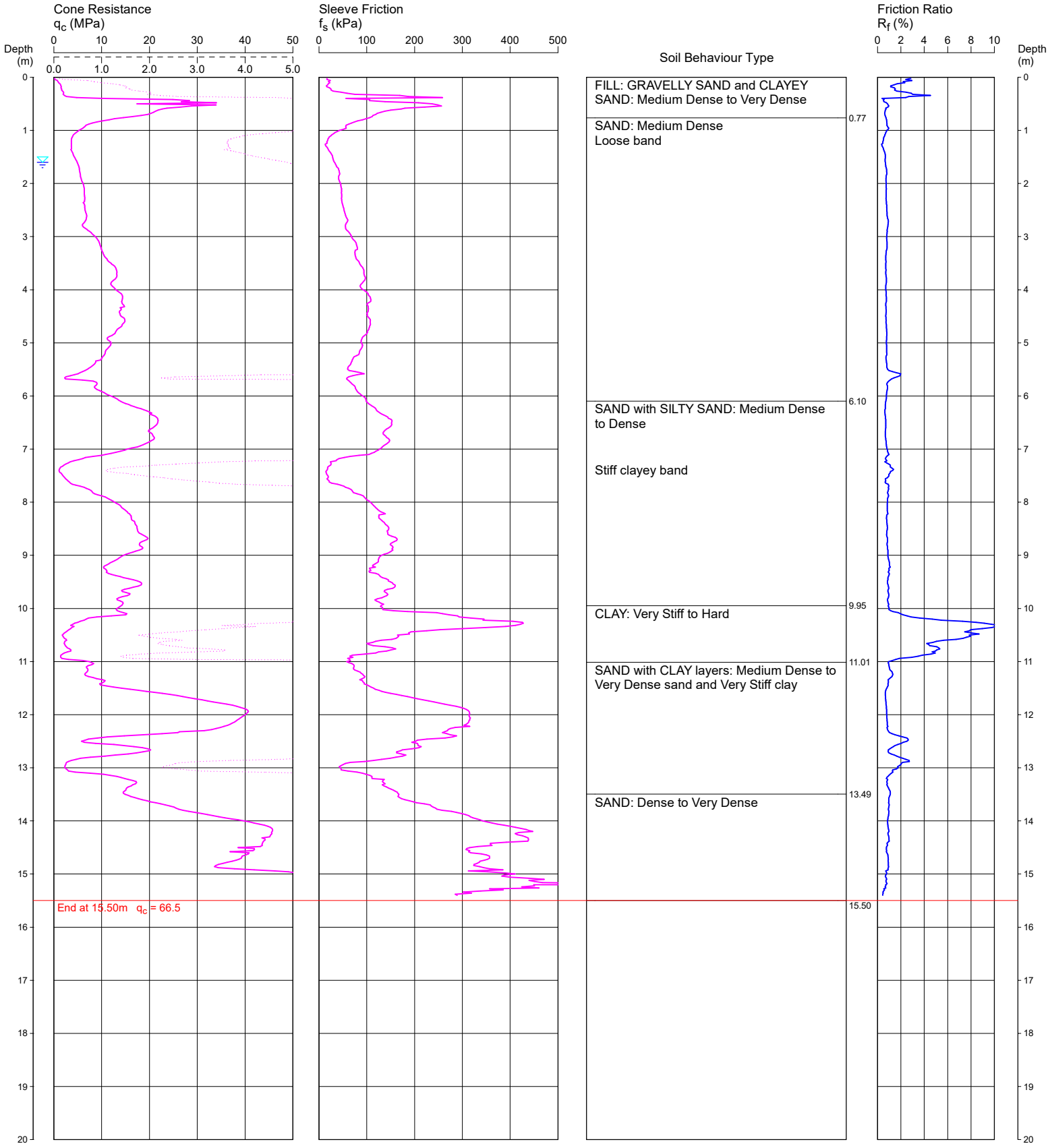
COORDINATES: 333930E 6243124N MGA

CPT2

Page 1 of 1

DATE 12/05/2020

PROJECT No: 99679.00



REMARKS: HOLE PRE-DRILLED TO 0.40 m
TEST TERMINATED DUE TO CONE TIP REFUSAL
GROUNDWATER MEASURED AT 1.60 m AFTER REMOVAL OF RODS

Water depth after test: 1.60m depth (measured)

File: \\DPSYDNAS01\Projects\99679.00 - BOTANY, corner Myrtle St and Jasmine St\4.0 Field Work\4.2 Testing\CPT 12.05.2020\interpreted\CPT2.CP5

Cone ID: 170707 **Type:** I-CFXY-10

ConePlot Version 5.9.2

Douglas Partners
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CONE PENETRATION TEST

CLIENT: CO-OP Studio Pty Ltd

PROJECT: Botany Aquatic Centre

LOCATION: 2 Myrtle Street, Botany

REDUCED LEVEL: 8.4

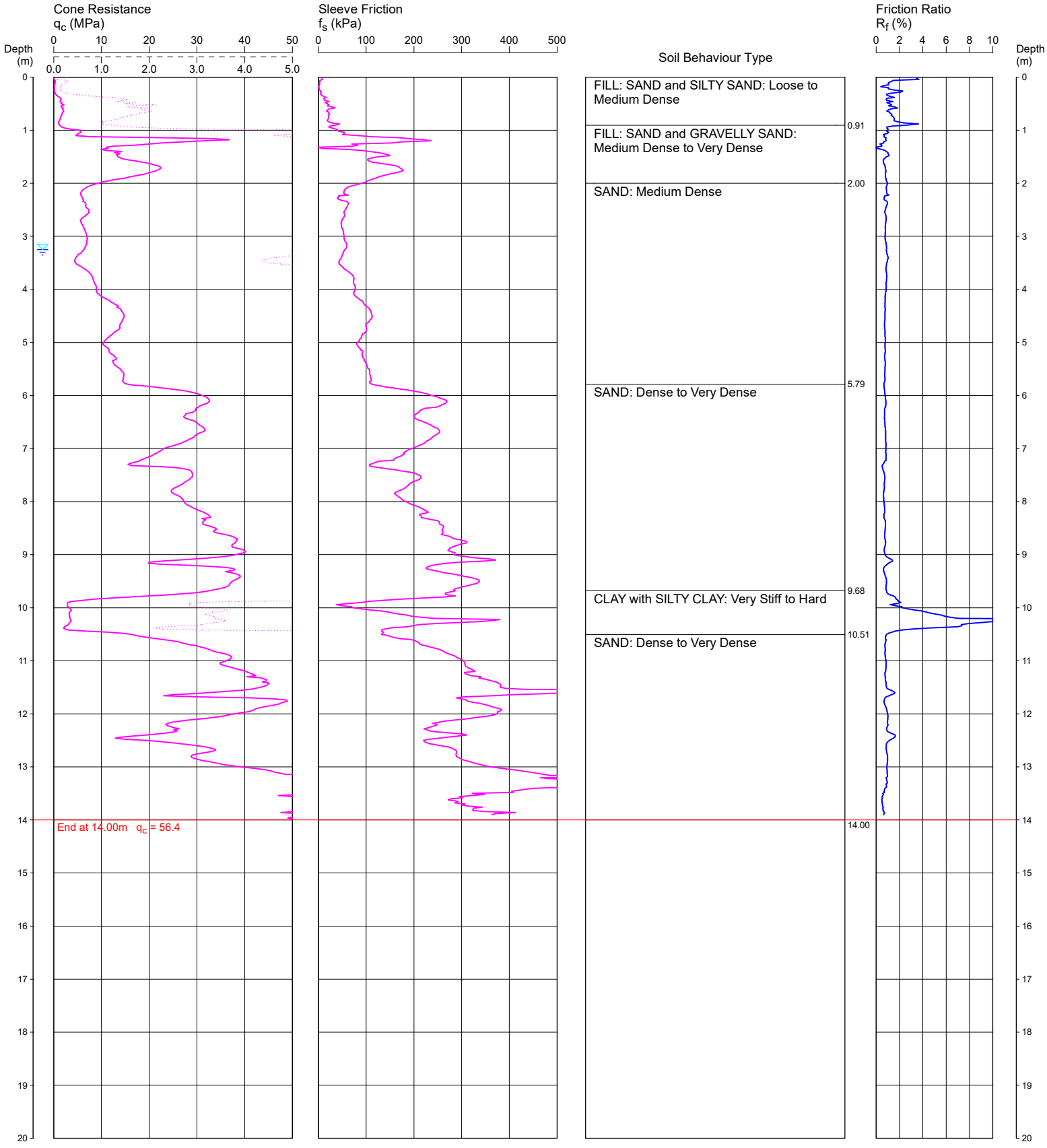
COORDINATES: 333874E 6243052N MGA

CPT3

Page 1 of 1

DATE 12/05/2020

PROJECT No: 99679.00



REMARKS: HOLE PRE-DRILLED TO 0.40 m
TEST TERMINATED DUE TO CONE TIP REFUSAL
GROUNDWATER MEASURED AT 3.25 m AFTER REMOVAL OF RODS

Water depth after test: 3.25m depth (measured)

File: \\DPSYDNAS01\Projects\99679.00 - BOTANY, corner Myrtle St and Jasmine St\4.0 Field Work\4.2 Testing\CPT 12.05.2020\interpreted\CPT3.CP5

Cone ID: 170707 **Type:** I-CFXY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: CO-OP Studio Pty Ltd

PROJECT: BBotany Aquatic Centre

LOCATION: 2 Myrtle Street, Botany

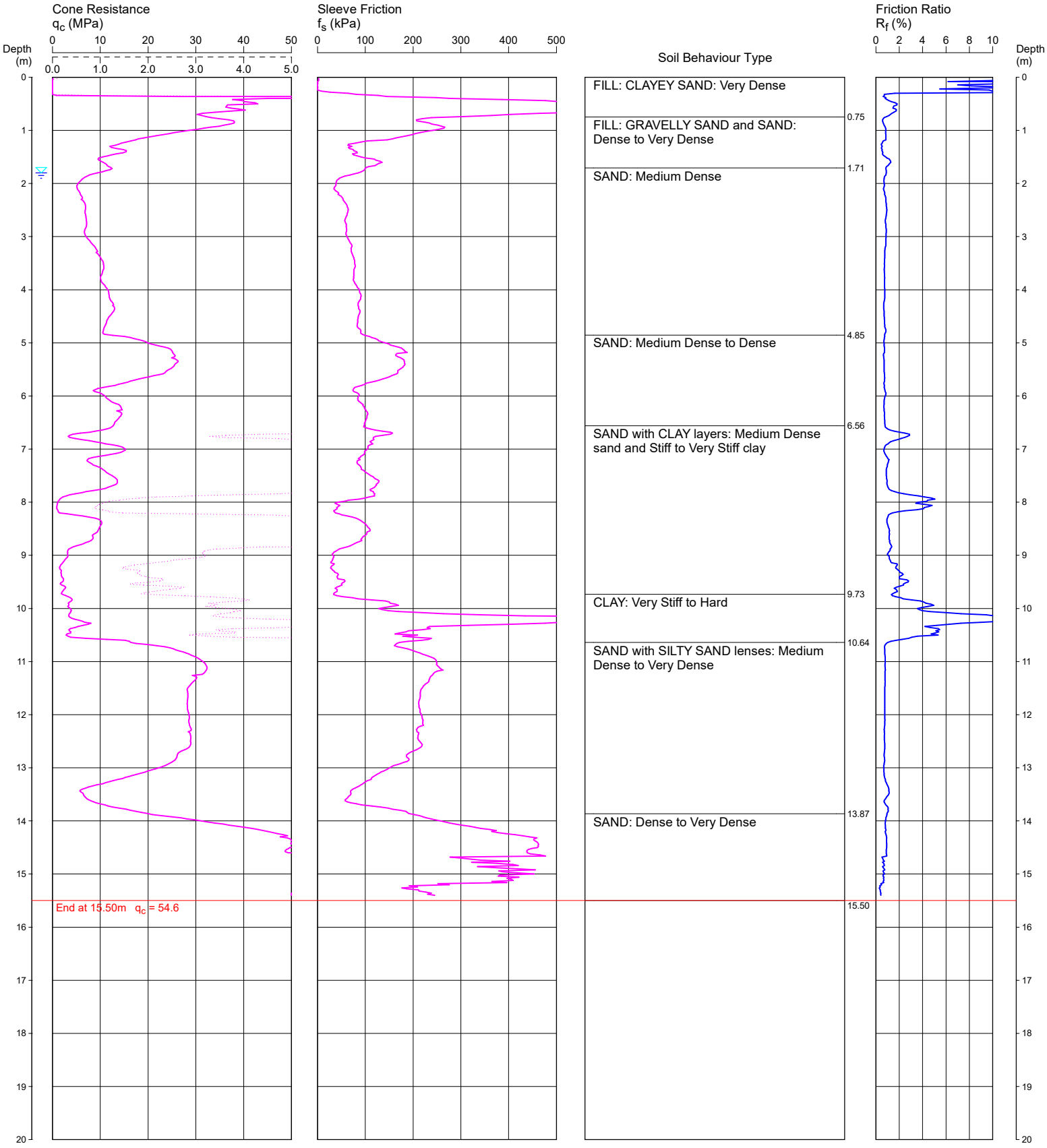
REDUCED LEVEL: 7.5

COORDINATES: 333936E 6243090N MGA

CPT4

DATE 12/05/2020

PROJECT No: 99679



REMARKS: HOLE PRE-DRILLED TO 0.30 m
TEST TERMINATED DUE TO CONE TIP REFUSAL
GROUNDWATER MEASURED AT 3.25 m AFTER REMOVAL OF RODS

Water depth after test: 1.80m depth (measured)

File: \\DPSYDNAS01\Projects\99679.00 - BOTANY, corner Myrtle St and Jasmine St\4.0 Field Work\4.2 Testing\CPT 12.05.2020\interpreted\CPT4.CP5

Cone ID: 170707 **Type:** I-CFXY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: CO-OP Studio Pty Ltd

PROJECT: Botany Aquatic Centre

LOCATION: 2 Myrtle Street, Botany

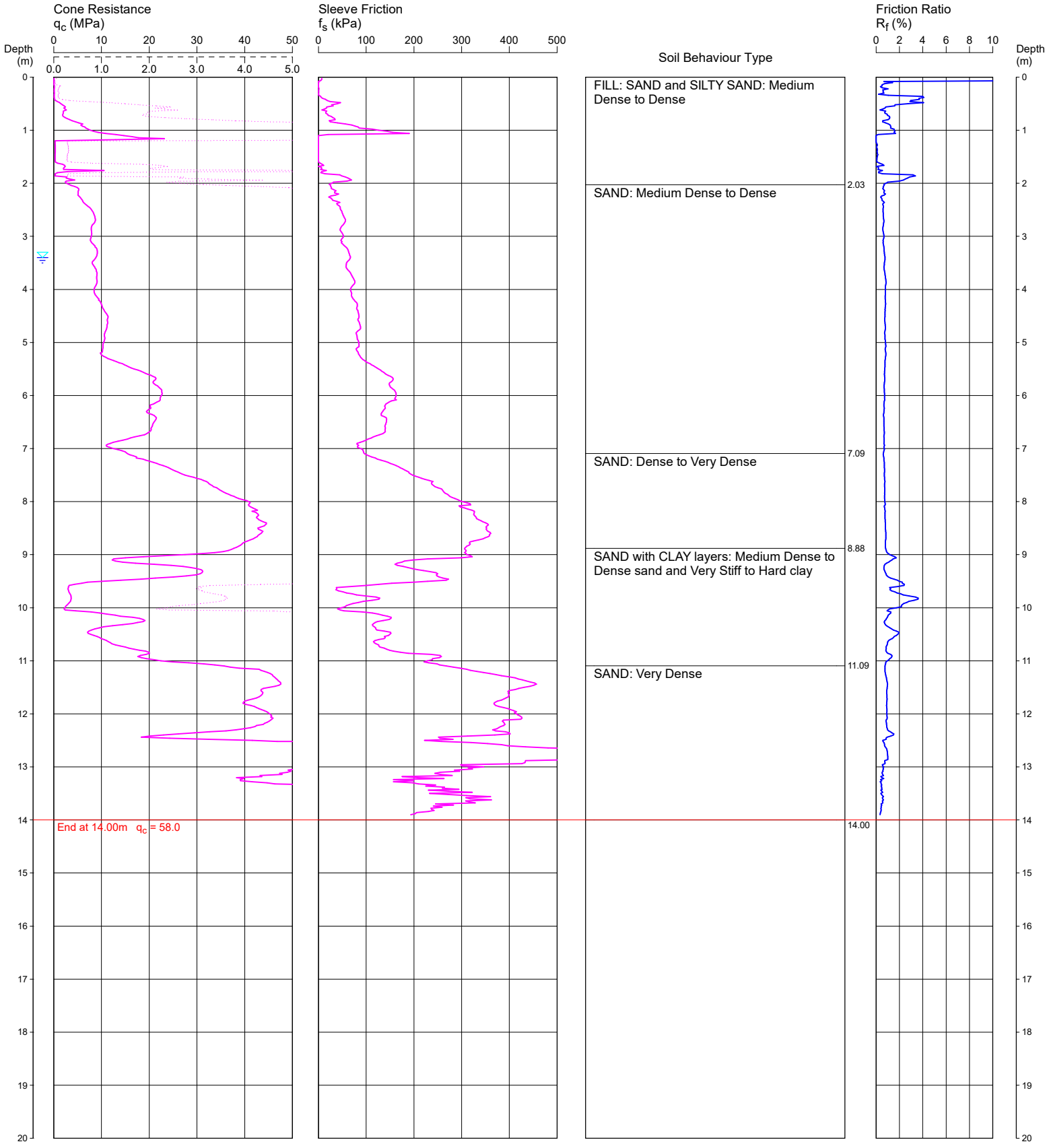
REDUCED LEVEL: 8.4

COORDINATES: 333883E 6243021N MGA

CPT5

DATE 12/05/2020

PROJECT No: 99679.00



REMARKS: HOLE PRE-DRILLED TO 0.50 m, DUMMY CONE USED FROM 1.16 m TO 1.80 m TO PENETRATE FILL
TEST TERMINATED DUE TO CONE TIP REFUSAL
GROUNDWATER MEASURED AT 3.40 m AFTER REMOVAL OF RODS

Water depth after test: 3.40m depth (assumed)

File: \\DPSYDNAS01\Projects\99679.00 - BOTANY, corner Myrtle St and Jasmine St\4.0 Field Work\4.2 Testing\CPT 12.05.2020\interpreted\CPT5.CP5

Cone ID: 170707 **Type:** I-CFXY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: CO-OP Studio Pty Ltd

PROJECT: Botany Aquatic Centre

LOCATION: 2 Myrtle Street, Botany

REDUCED LEVEL: 7.6

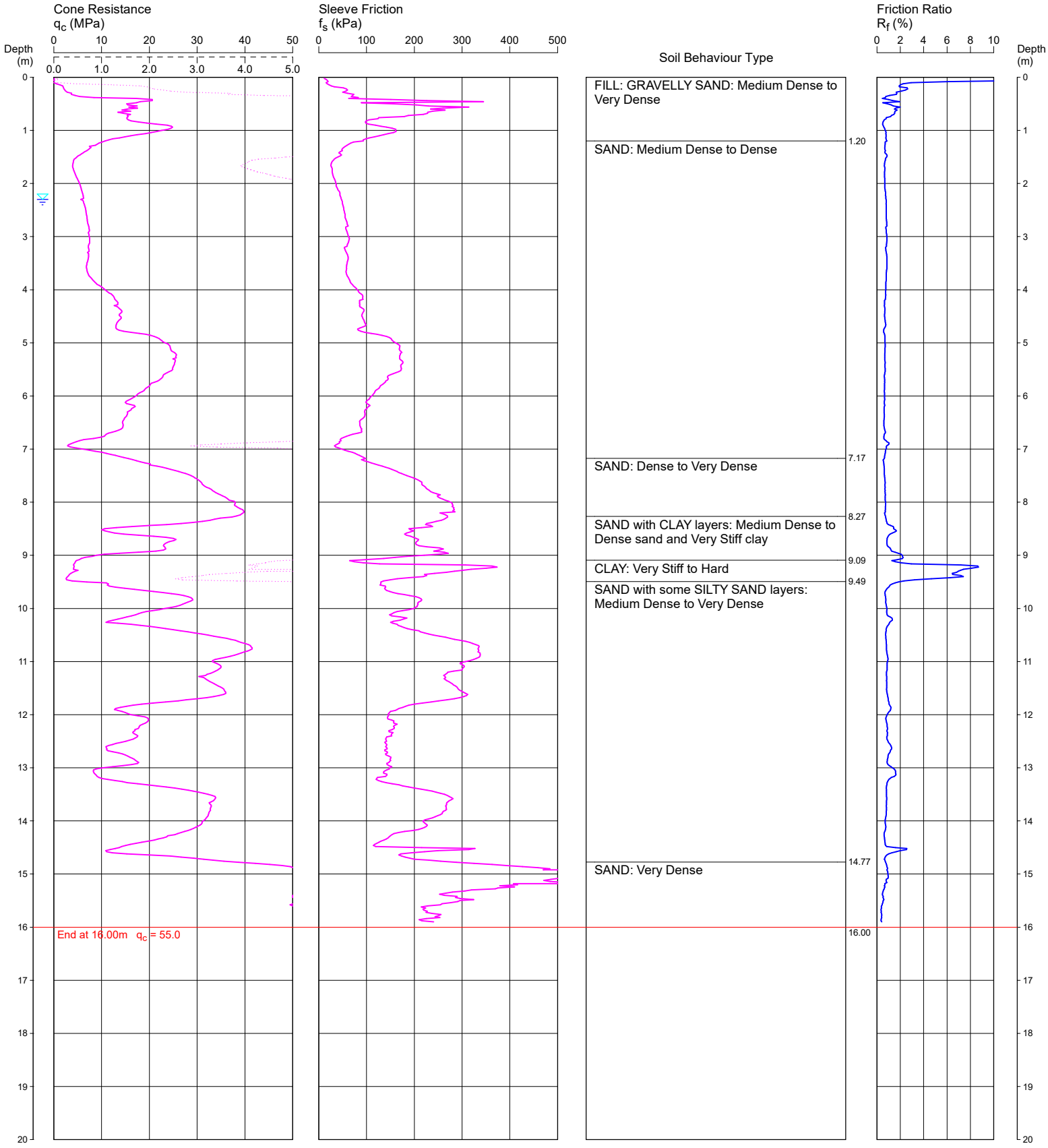
COORDINATES: 333946E 6243041N MGA

CPT6

Page 1 of 1

DATE 12/05/2020

PROJECT No: 99679.00



REMARKS: HOLE PRE-DRILLED TO 0.50 m
TEST TERMINATED DUE TO CONE TIP REFUSAL
GROUNDWATER MEASURED AT 2.30 m AFTER REMOVAL OF RODS

Water depth after test: 2.30m depth (measured)

File: \\DPSYDNAS01\Projects\99679.00 - BOTANY, corner Myrtle St and Jasmine St\4.0 Field Work\4.2 Testing\CPT 12.05.2020\interpreted\CPT6.CP5
Cone ID: 170707 **Type:** I-CFXY-10

ConePlot Version 5.9.2

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Appendix D

Laboratory Test Results

Material Test Report

Douglas Partners
Geotechnics / Environment / Groundwater
Douglas Partners Pty Ltd
Sydney Laboratory
96 Hermitage Road West Ryde NSW 2114
Phone: (02) 9809 0666
Fax: (02) 9809 0666
Email: andrew.hutchings@douglaspartners.com.au

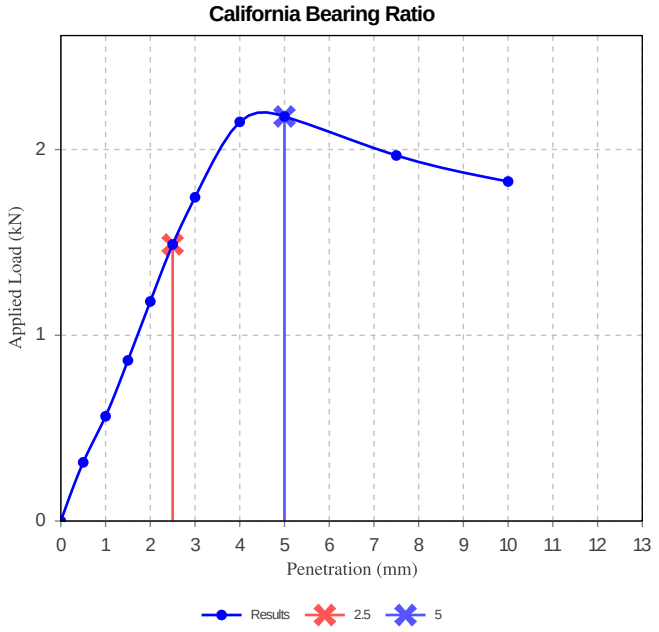
Accredited for compliance with ISO/IEC 17025 - Testing

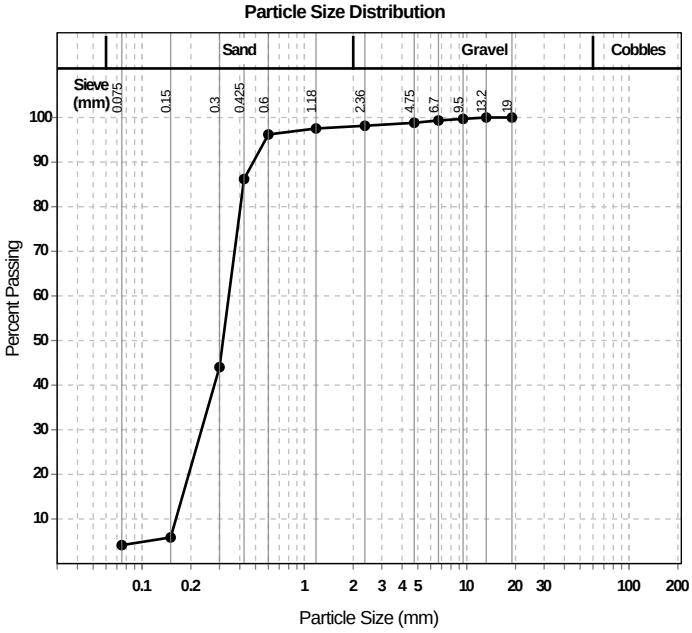
Approved Signatory: Andrew Hutchings
Laboratory Manager
NATA Accredited Laboratory Number: 828

Report Number: **99679.00-1**
Issue Number: 1
Date Issued: 28/05/2020
Client: CO-OP STUDIO PTY LTD
Level 7, 657 Pacific Highway, St Leonards NSW 2000
Contact: Steven Donaghey
Project Number: 99679.00
Project Name: Botany Aquatic Centre
Project Location: corner Myrtle St and Jasmine St, Botany
Work Request: 6100
Sample Number: SY-6100A
Date Sampled: 11/05/2020
Dates Tested: 14/05/2020 - 25/05/2020
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **BH9 (0.6-1.35m)**
Material: SAND(SP): fine to medium grained, pale grey, brown & dark brown ,with a trace of silt, moist, loose, alluvial

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**11**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.74		
Optimum Moisture Content (%)	13.5		
Laboratory Density Ratio (%)	99.5		
Laboratory Moisture Ratio (%)	100.5		
Dry Density after Soaking (t/m^3)	1.74		
Field Moisture Content (%)	13.5		
Moisture Content at Placement (%)	13.7		
Moisture Content Top 30mm (%)	17.9		
Moisture Content Rest of Sample (%)	17.7		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	2.4		
Swell (%)	-0.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**100**		
9.5 mm	**100**		
6.7 mm	**99**		
4.75 mm	**99**		
2.36 mm	**98**		
1.18 mm	**98**		
0.6 mm	**96**		
0.425 mm	**86**		
0.3 mm	**44**		
0.15 mm	**6**		
0.075 mm	**4**		





Material Test Report

Douglas Partners
Geotechnics / Environment / Groundwater
Douglas Partners Pty Ltd
Sydney Laboratory
96 Hermitage Road West Ryde NSW 2114
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Fax: (02) 9809 0666
Email: andrew.hutchings@douglaspartners.com.au

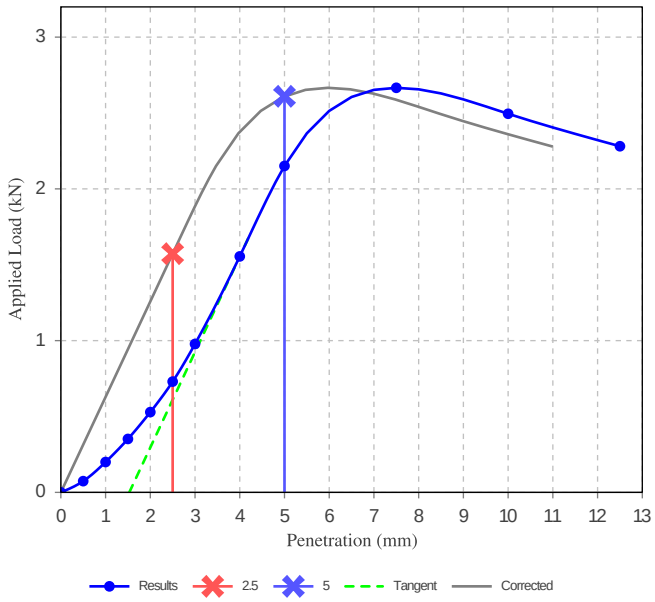
Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Andrew Hutchings
Laboratory Manager
NATA Accredited Laboratory Number: 828

Report Number: **99679.00-1**
Issue Number: 1
Date Issued: 28/05/2020
Client: CO-OP STUDIO PTY LTD
Level 7, 657 Pacific Highway, St Leonards NSW 2000
Contact: Steven Donaghey
Project Number: 99679.00
Project Name: Botany Aquatic Centre
Project Location: corner Myrtle St and Jasmine St, Botany
Work Request: 6100
Sample Number: SY-6100B
Date Sampled: 11/05/2020
Dates Tested: 14/05/2020 - 25/05/2020
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **BH11 (0.7-1.35m)**
Material: SAND(SP): fine to medium grained, pale grey and brown to dark brown, with a trace of silt, moist, medium dense, alluvial

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**13**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.75		
Optimum Moisture Content (%)	14.5		
Laboratory Density Ratio (%)	99.5		
Laboratory Moisture Ratio (%)	99.5		
Dry Density after Soaking (t/m^3)	1.75		
Field Moisture Content (%)	14.4		
Moisture Content at Placement (%)	14.6		
Moisture Content Top 30mm (%)	17.6		
Moisture Content Rest of Sample (%)	16.3		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	2		
Swell (%)	-1.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		

California Bearing Ratio



Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**100**		
9.5 mm	**100**		
6.7 mm	**99**		
4.75 mm	**99**		
2.36 mm	**99**		
1.18 mm	**99**		
0.6 mm	**98**		
0.425 mm	**87**		
0.3 mm	**47**		
0.15 mm	**7**		
0.075 mm	**4**		

Material Test Report

Douglas Partners
Geotechnics / Environment / Groundwater
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Email: andrew.hutchings@douglaspartners.com.au

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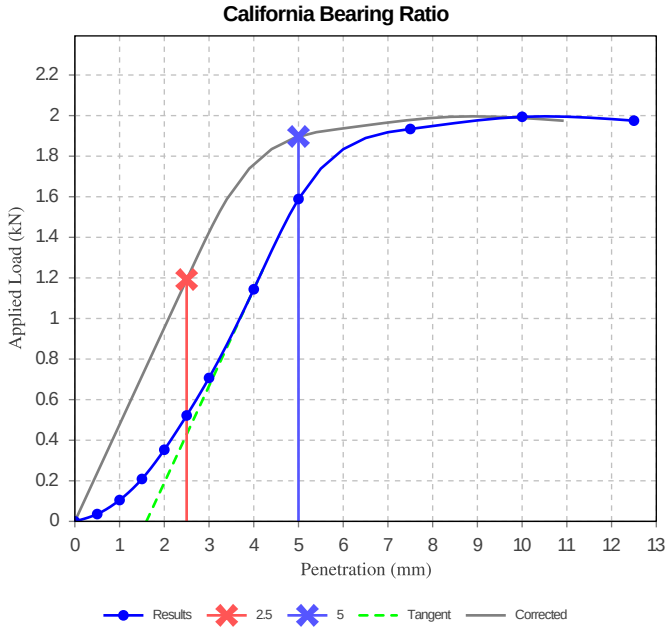
NATA
WORLD RECOGNISED ACCREDITATION

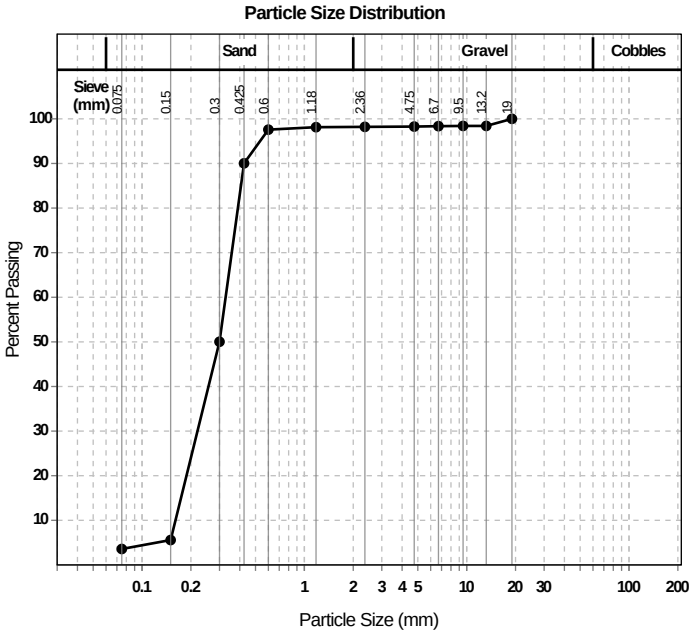
Approved Signatory: Andrew Hutchings
Laboratory Manager
NATA Accredited Laboratory Number: 828

Report Number: **99679.00-1**
Issue Number: 1
Date Issued: 28/05/2020
Client: CO-OP STUDIO PTY LTD
Level 7, 657 Pacific Highway, St Leonards NSW 2000
Contact: Steven Donaghey
Project Number: 99679.00
Project Name: Botany Aquatic Centre
Project Location: corner Myrtle St and Jasmine St, Botany
Work Request: 6100
Sample Number: SY-6100C
Date Sampled: 11/05/2020
Dates Tested: 14/05/2020 - 25/05/2020
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **BH12 (0.75-1.5m)**
Material: SAND(SP): fine to medium grained, pale grey and brown and dark brown, with trace silt, moist, loose to medium dense, alluvial

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**10**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.72		
Optimum Moisture Content (%)	11.5		
Laboratory Density Ratio (%)	99.5		
Laboratory Moisture Ratio (%)	101.0		
Dry Density after Soaking (t/m^3)	1.72		
Field Moisture Content (%)	7.4		
Moisture Content at Placement (%)	11.6		
Moisture Content Top 30mm (%)	18.9		
Moisture Content Rest of Sample (%)	19.3		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	2.8		
Swell (%)	-0.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		



Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**98**		
9.5 mm	**98**		
6.7 mm	**98**		
4.75 mm	**98**		
2.36 mm	**98**		
1.18 mm	**98**		
0.6 mm	**98**		
0.425 mm	**90**		
0.3 mm	**50**		
0.15 mm	**6**		
0.075 mm	**4**		



Material Test Report

Douglas Partners
Geotechnics / Environment / Groundwater
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96 Hermitage Road West Ryde NSW 2114
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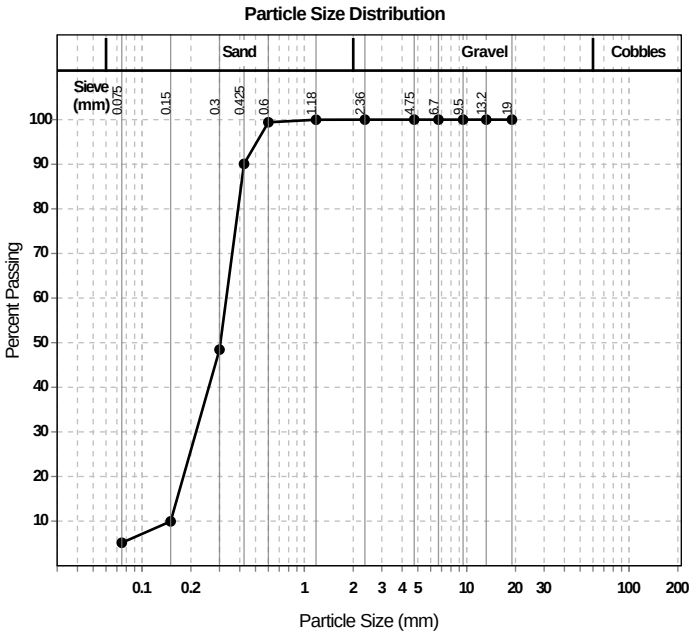
Email: andrew.hutchings@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Andrew Hutchings
Laboratory Manager
NATA Accredited Laboratory Number: 828

Report Number: **99679.00-1**
Issue Number: 1
Date Issued: 28/05/2020
Client: CO-OP STUDIO PTY LTD
Level 7, 657 Pacific Highway, St Leonards NSW 2000
Contact: Steven Donaghey
Project Number: 99679.00
Project Name: Botany Aquatic Centre
Project Location: corner Myrtle St and Jasmine St, Botany
Work Request: 6100
Sample Number: SY-6100D
Date Sampled: 11/05/2020
Dates Tested: 14/05/2020 - 14/05/2020
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **BH6 (1.9-2.0m)**
Material: SAND(SP): fine to medium grained, pale grey and brown, with a trace of silt, medium dense, moist, alluvial

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**100**		
9.5 mm	**100**		
6.7 mm	**100**		
4.75 mm	**100**		
2.36 mm	**100**		
1.18 mm	**100**		
0.6 mm	**99**		
0.425 mm	**90**		
0.3 mm	**48**		
0.15 mm	**10**		
0.075 mm	**5**		



Material Test Report

Douglas Partners
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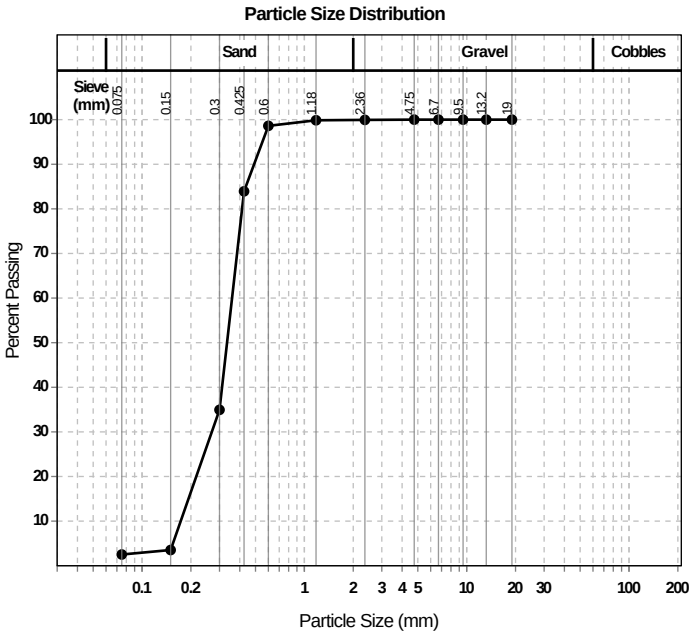
Report Number: **99679.00-1**
Issue Number: 1
Date Issued: 28/05/2020
Client: CO-OP STUDIO PTY LTD
Level 7, 657 Pacific Highway, St Leonards NSW 2000
Contact: Steven Donaghey
Project Number: 99679.00
Project Name: Botany Aquatic Centre
Project Location: corner Myrtle St and Jasmine St, Botany
Work Request: 6100
Sample Number: SY-6100E
Date Sampled: 11/05/2020
Dates Tested: 14/05/2020 - 14/05/2020
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **BH10 (0.9-1.0m)**
Material: SAND(SP): fine to medium grained, pale brown, with trace silt, moist, loose to medium dense, aeolian

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**100**		
9.5 mm	**100**		
6.7 mm	**100**		
4.75 mm	**100**		
2.36 mm	**100**		
1.18 mm	**100**		
0.6 mm	**99**		
0.425 mm	**84**		
0.3 mm	**35**		
0.15 mm	**4**		
0.075 mm	**3**		



Material Test Report

Douglas Partners
Geotechnics / Environment / Groundwater
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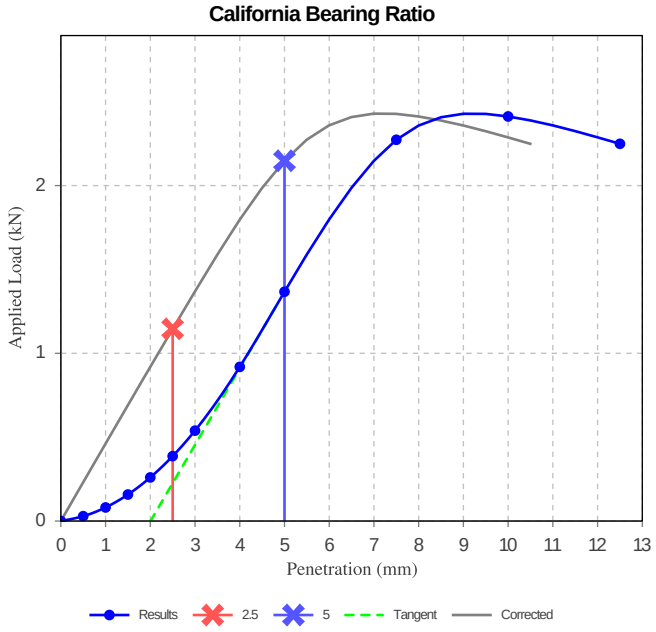
Accredited for compliance with ISO/IEC 17025 - Testing

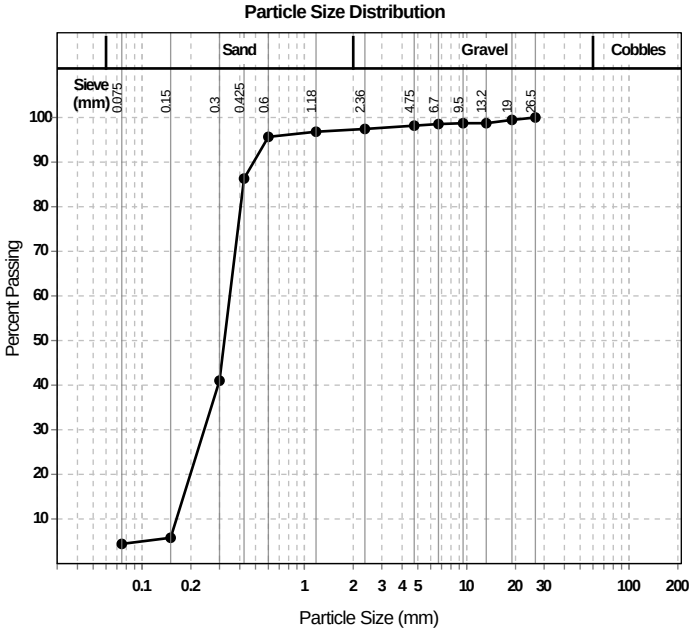
Approved Signatory: Andrew Hutchings
Laboratory Manager
NATA Accredited Laboratory Number: 828

Report Number: **99679.00-1**
Issue Number: 1
Date Issued: 28/05/2020
Client: CO-OP STUDIO PTY LTD
Level 7, 657 Pacific Highway, St Leonards NSW 2000
Contact: Steven Donaghey
Project Number: 99679.00
Project Name: Botany Aquatic Centre
Project Location: corner Myrtle St and Jasmine St, Botany
Work Request: 6100
Sample Number: SY-6100F
Date Sampled: 11/05/2020
Dates Tested: 14/05/2020 - 25/05/2020
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **BH3 (0.6-1.1m)**
Material: SAND(SP): fine to medium grained, pale brown, with trace gravel and silt

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**11**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.76		
Optimum Moisture Content (%)	13.5		
Laboratory Density Ratio (%)	99.5		
Laboratory Moisture Ratio (%)	102.0		
Dry Density after Soaking (t/m^3)	1.75		
Field Moisture Content (%)	3.0		
Moisture Content at Placement (%)	13.9		
Moisture Content Top 30mm (%)	16.3		
Moisture Content Rest of Sample (%)	16.9		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	20		
Swell (%)	0.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0.5		

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
26.5 mm	**100**		
19 mm	**99**		
13.2 mm	**99**		
9.5 mm	**99**		
6.7 mm	**99**		
4.75 mm	**98**		
2.36 mm	**97**		
1.18 mm	**97**		
0.6 mm	**96**		
0.425 mm	**86**		
0.3 mm	**41**		
0.15 mm	**6**		
0.075 mm	**4**		





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

CERTIFICATE OF ANALYSIS 242711

Client Details

Client	Douglas Partners Pty Ltd
Attention	Wen-Fei Yuan
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**99679.01, Botany**
Number of Samples	11 SOIL
Date samples received	12/05/2020
Date completed instructions received	12/05/2020

Analysis Details

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

Samples were analysed as received from the client. Results relate specifically to the samples as received.

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

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

Report Details

Date results requested by	19/05/2020
Date of Issue	18/05/2020

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vTRH(C6-C10)/BTEXN in Soil						
Our Reference		242711-1	242711-5	242711-6	242711-9	242711-12
Your Reference	UNITS	BH1/0.45-0.5	BH2/0.4-0.5	BH2/1.1-1.4	BH3/0.9-1.0	BH2/0.4-0.5 - [TRIPLICATE]
Depth		0.45-0.5	0.4-0.5	1.1-1.4	0.9-1.0	0.4-0.5
Date Sampled		08/05/2020	08/05/2020	08/05/2020	08/05/2020	08/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	13/05/2020	14/05/2020	13/05/2020	13/05/2020	14/05/2020
Date analysed	-	14/05/2020	15/05/2020	14/05/2020	14/05/2020	15/05/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	9	<1	<1	9
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	104	106	76	81	120

svTRH (C10-C40) in Soil					
Our Reference		242711-1	242711-5	242711-6	242711-9
Your Reference	UNITS	BH1/0.45-0.5	BH2/0.4-0.5	BH2/1.1-1.4	BH3/0.9-1.0
Depth		0.45-0.5	0.4-0.5	1.1-1.4	0.9-1.0
Date Sampled		08/05/2020	08/05/2020	08/05/2020	08/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL
Date extracted	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Date analysed	-	14/05/2020	14/05/2020	14/05/2020	14/05/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	900	1,700	<100	<100
TRH C_{29} - C_{36}	mg/kg	580	1,500	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	130	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	120	<50	<50
TRH >C_{16} -C_{34}	mg/kg	1,300	2,800	<100	<100
TRH >C_{34} -C_{40}	mg/kg	300	890	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	1,600	3,800	<50	<50
Surrogate o-Terphenyl	%	109	#	86	83

PAHs in Soil					
Our Reference		242711-1	242711-5	242711-6	242711-9
Your Reference	UNITS	BH1/0.45-0.5	BH2/0.4-0.5	BH2/1.1-1.4	BH3/0.9-1.0
Depth		0.45-0.5	0.4-0.5	1.1-1.4	0.9-1.0
Date Sampled		08/05/2020	08/05/2020	08/05/2020	08/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL
Date extracted	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Date analysed	-	14/05/2020	14/05/2020	14/05/2020	14/05/2020
Naphthalene	mg/kg	1.4	7.2	<0.1	<0.1
Acenaphthylene	mg/kg	2.3	2.6	<0.1	<0.1
Acenaphthene	mg/kg	0.6	6.0	<0.1	<0.1
Fluorene	mg/kg	1.4	12	<0.1	<0.1
Phenanthrene	mg/kg	71	200	<0.1	0.3
Anthracene	mg/kg	14	32	<0.1	<0.1
Fluoranthene	mg/kg	140	240	<0.1	0.7
Pyrene	mg/kg	140	220	<0.1	0.7
Benzo(a)anthracene	mg/kg	58	60	<0.1	0.5
Chrysene	mg/kg	47	56	<0.1	0.4
Benzo(b,j+k)fluoranthene	mg/kg	70	88	<0.2	0.7
Benzo(a)pyrene	mg/kg	48	64	<0.05	0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	25	30	<0.1	0.2
Dibenzo(a,h)anthracene	mg/kg	5.1	3.6	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	31	35	<0.1	0.2
Total +ve PAH's	mg/kg	660	1,100	<0.05	4.2
Benzo(a)pyrene TEQ calc (zero)	mg/kg	69	86	<0.5	0.6
Benzo(a)pyrene TEQ calc(half)	mg/kg	69	86	<0.5	0.7
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	69	86	<0.5	0.7
Surrogate p-Terphenyl-d14	%	96	102	100	105

Organochlorine Pesticides in soil		
Our Reference		242711-6
Your Reference	UNITS	BH2/1.1-1.4
Depth		1.1-1.4
Date Sampled		08/05/2020
Type of sample		SOIL
Date extracted	-	13/05/2020
Date analysed	-	14/05/2020
alpha-BHC	mg/kg	<0.1
HCB	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	89

Organophosphorus Pesticides in Soil		
Our Reference		242711-6
Your Reference	UNITS	BH2/1.1-1.4
Depth		1.1-1.4
Date Sampled		08/05/2020
Type of sample		SOIL
Date extracted	-	13/05/2020
Date analysed	-	14/05/2020
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Parathion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1
Surrogate TCMX	%	89

PCBs in Soil		
Our Reference		242711-6
Your Reference	UNITS	BH2/1.1-1.4
Depth		1.1-1.4
Date Sampled		08/05/2020
Type of sample		SOIL
Date extracted	-	13/05/2020
Date analysed	-	14/05/2020
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	89

Acid Extractable metals in soil					
Our Reference		242711-1	242711-5	242711-6	242711-9
Your Reference	UNITS	BH1/0.45-0.5	BH2/0.4-0.5	BH2/1.1-1.4	BH3/0.9-1.0
Depth		0.45-0.5	0.4-0.5	1.1-1.4	0.9-1.0
Date Sampled		08/05/2020	08/05/2020	08/05/2020	08/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL
Date prepared	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Date analysed	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Arsenic	mg/kg	8	4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	3	11	<1	<1
Copper	mg/kg	26	200	<1	5
Lead	mg/kg	44	54	<1	10
Mercury	mg/kg	0.1	0.2	<0.1	<0.1
Nickel	mg/kg	15	16	<1	1
Zinc	mg/kg	75	60	<1	12

Misc Soil - Inorg		
Our Reference		242711-6
Your Reference	UNITS	BH2/1.1-1.4
Depth		1.1-1.4
Date Sampled		08/05/2020
Type of sample		SOIL
Date prepared	-	13/05/2020
Date analysed	-	13/05/2020
Total Phenolics (as Phenol)	mg/kg	<5

Moisture					
Our Reference		242711-1	242711-5	242711-6	242711-9
Your Reference	UNITS	BH1/0.45-0.5	BH2/0.4-0.5	BH2/1.1-1.4	BH3/0.9-1.0
Depth		0.45-0.5	0.4-0.5	1.1-1.4	0.9-1.0
Date Sampled		08/05/2020	08/05/2020	08/05/2020	08/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL
Date prepared	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Date analysed	-	14/05/2020	14/05/2020	14/05/2020	14/05/2020
Moisture	%	18	9.6	4.8	3.8

Asbestos ID - soils					
Our Reference		242711-1	242711-5	242711-6	242711-9
Your Reference	UNITS	BH1/0.45-0.5	BH2/0.4-0.5	BH2/1.1-1.4	BH3/0.9-1.0
Depth		0.45-0.5	0.4-0.5	1.1-1.4	0.9-1.0
Date Sampled		08/05/2020	08/05/2020	08/05/2020	08/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL
Date analysed	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Sample mass tested	g	Approx. 55g	Approx. 45g	Approx. 30g	Approx. 40g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Beige sandy soil	Brown sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

sPOCAS field test						
Our Reference		242711-2	242711-3	242711-4	242711-7	242711-8
Your Reference	UNITS	BH1/0.9-1	BH1/1.9-2.0	BH1/2.5-2.95	BH2/1.6-1.7	BH2/2-2.95
Depth		0.9-1	1.9-2.0	2.5-2.95	1.6-1.7	2-2.95
Date Sampled		08/05/2020	08/05/2020	08/05/2020	08/05/2020	08/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Date analysed	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020	13/05/2020
pH_F (field pH test)*	pH Units	8.1	7.7	7.2	5.6	7.2
pH_{FOX} (field peroxide test)*	pH Units	5.9	5.8	5.7	4.4	5.9
Reaction Rate*	-	Medium reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test			
Our Reference		242711-10	242711-11
Your Reference	UNITS	BH3/1.9-2.0	BH3/2.5-2.95
Depth		1.9-2.0	2.5-2.95
Date Sampled		08/05/2020	08/05/2020
Type of sample		SOIL	SOIL
Date prepared	-	13/05/2020	13/05/2020
Date analysed	-	13/05/2020	13/05/2020
pH_F (field pH test)*	pH Units	4.6	6.8
pH_{FOX} (field peroxide test)*	pH Units	3.9	6.1
Reaction Rate*	-	Low reaction	Low reaction

Soil Aggressivity			
Our Reference		242711-4	242711-10
Your Reference	UNITS	BH1/2.5-2.95	BH3/1.9-2.0
Depth		2.5-2.95	1.9-2.0
Date Sampled		08/05/2020	08/05/2020
Type of sample		SOIL	SOIL
pH 1:5 soil:water	pH Units	7.2	4.9
Electrical Conductivity 1:5 soil:water	µS/cm	37	100
Chloride, Cl 1:5 soil:water	mg/kg	28	24
Sulphate, SO4 1:5 soil:water	mg/kg	30	90

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-063	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. Based on section H, Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			13/05/2020	5	14/05/2020	13/05/2020		13/05/2020	[NT]
Date analysed	-			14/05/2020	5	15/05/2020	14/05/2020		14/05/2020	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	5	<25	<25	0	84	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	5	<25	<25	0	84	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	5	<0.2	<0.2	0	83	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	5	<0.5	<0.5	0	78	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	5	<1	<1	0	79	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	5	<2	<2	0	91	[NT]
o-Xylene	mg/kg	1	Org-023	<1	5	<1	<1	0	87	[NT]
naphthalene	mg/kg	1	Org-023	<1	5	9	4	77	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	99	5	106	86	21	99	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Date analysed	-			14/05/2020	[NT]	[NT]	[NT]	[NT]	14/05/2020	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	110	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	96	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	129	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	110	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	96	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	129	[NT]
Surrogate o-Terphenyl	%		Org-020	74	[NT]	[NT]	[NT]	[NT]	124	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Date analysed	-			14/05/2020	[NT]	[NT]	[NT]	[NT]	14/05/2020	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	96	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	108	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Date analysed	-			14/05/2020	[NT]	[NT]	[NT]	[NT]	14/05/2020	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	72	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	93	[NT]	[NT]	[NT]	[NT]	86	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Date analysed	-			14/05/2020	[NT]	[NT]	[NT]	[NT]	14/05/2020	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Malathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	93	[NT]	[NT]	[NT]	[NT]	86	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Date analysed	-			14/05/2020	[NT]	[NT]	[NT]	[NT]	14/05/2020	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	93	[NT]	[NT]	[NT]	[NT]	86	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Date analysed	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	100	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	95	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: Misc Soil - Inorg					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Date analysed	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: Soil Aggressivity						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	4	7.2	7.2	0	101	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	4	37	39	5	102	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	4	28	20	33	98	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	4	30	27	11	103	[NT]

Result Definitions

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

Quality Control Definitions

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

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

TRH Soil C10-C40 NEPM - # Percent recovery for the surrogate is not possible to report as the high concentration of analytes in sample 242711-5 have caused interference.

vTRH & BTEXN in Soil NEPM - The laboratory RPD acceptance criteria has been exceeded for 242711-5. Therefore a triplicate result has been issued as laboratory sample number 242711-12

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples 242711-1, 5, 6, 9 were sub-sampled from bags provided by the client.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99679.01	**Suburb:**	Botany	**To:**	Envirolab Services
Project Name:	Botany, DSI	**Order Number**	152412		
Project Manager:	WFY	**Sampler:**	WFY	**Attn:**	Aileen Hie
Emails:	wenfei.yuan@douglaspartners.com.au and ayla.sorensen@douglaspartners.com.au			**Phone:**	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	

Prior Storage: ☐ Esky ☐ Fridge/Freezer ☐ Shelved Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Combo8A	Combo3A	ASS Screening	Soil Aggressivity (pH, sulphate, chloride and EC)					
BH1/0.45-0.5	1	08/05/20	S	G/P		X							
BH1/0.9-1	2	08/05/20	S	P			X						
BH1/1.9-2.0	3	08/05/20	S	P			X						
BH1/2.5-2.95	4	08/05/20	S	P			X	x					
BH2/0.4-0.5	5	08/05/20	S	G/P		X							
BH2/1.1-1.4	6	08/05/20	S	G/P	X								
BH2/1.6-1.7	7	08/05/20	S	P			X						
BH2/2-2.95	8	08/05/20	S	P			X						
BH3/0.9-1.0	9	08/05/20	S	G/P		X							
BH3/1.9-2.0	10	08/05/20	S	G/P			X	x					
BH3/2.5-2.95	11	08/05/20	S	G/P			X						
PQL (S) mg/kg													

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

Job No: 242711
~~Date Received:~~ 12-5-20
Time Received: 13:43
Received By: Helen
~~Temp: Cool/Ambient~~
Cooling: Ice/Icepack
Security: Intact/Broken/None

ANZECC PQLs req'd for all water analytes ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Lab Report/Reference No:

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: **Relinquished by:** WFY **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** 96 Hermitage Road, West Ryde **Phone:** 9809 0999

Signed: **Received by:** Helen **Date & Time:** 12-5-20 13:43

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

CERTIFICATE OF ANALYSIS 242857

Client Details

Client	Douglas Partners Pty Ltd
Attention	Ayla Sorensen, Wen-Fei Yuan
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**99679.01, Botany**
Number of Samples	27 Soil
Date samples received	13/05/2020
Date completed instructions received	13/05/2020

Analysis Details

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

Samples were analysed as received from the client. Results relate specifically to the samples as received.

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

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

Report Details

Date results requested by	20/05/2020
Date of Issue	20/05/2020

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Hannah Nguyen, Senior Chemist
Josh Williams, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		242857-1	242857-3	242857-6	242857-10	242857-11
Your Reference	UNITS	BH4/0.9-1	BH5/0.5-0.6	BH7/0.9-1	BD2/110520	BH8/0.9-1.0
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	17	1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	122	113	125	112	121

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		242857-14	242857-15	242857-19	242857-20	242857-22
Your Reference	UNITS	BH10/0.4-0.5	BD1/110520	BH11/0.9-1.0 (light colour)	BH11/1-1.3	TS
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	[NA]
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	108%
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	110%
Ethylbenzene	mg/kg	<1	<1	<1	<1	109%
m+p-xylene	mg/kg	<2	<2	<2	<2	108%
o-Xylene	mg/kg	<1	<1	<1	<1	106%
naphthalene	mg/kg	<1	2	<1	<1	[NA]
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	[NA]
Surrogate aaa-Trifluorotoluene	%	118	105	122	122	109

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		242857-23
Your Reference	UNITS	TB
Date Sampled		11/05/2020
Type of sample		Soil
Date extracted	-	18/05/2020
Date analysed	-	18/05/2020
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<3
Surrogate aaa-Trifluorotoluene	%	134

svTRH (C10-C40) in Soil						
Our Reference		242857-1	242857-3	242857-6	242857-10	242857-11
Your Reference	UNITS	BH4/0.9-1	BH5/0.5-0.6	BH7/0.9-1	BD2/110520	BH8/0.9-1.0
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	18/05/2020	19/05/2020	18/05/2020	19/05/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	120	<100	1,500	<100	290
TRH C_{29} - C_{36}	mg/kg	170	<100	1,100	<100	460
TRH >C_{10} -C_{16}	mg/kg	<50	<50	120	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	100	<50	<50
TRH >C_{16} -C_{34}	mg/kg	240	<100	2,300	<100	610
TRH >C_{34} -C_{40}	mg/kg	160	<100	680	<100	360
Total +ve TRH (>C10-C40)	mg/kg	400	<50	3,100	<50	970
Surrogate o-Terphenyl	%	103	91	126	88	94

svTRH (C10-C40) in Soil					
Our Reference		242857-14	242857-15	242857-19	242857-20
Your Reference	UNITS	BH10/0.4-0.5	BD1/110520	BH11/0.9-1.0 (light colour)	BH11/1-1.3
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	130	480	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	280	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	55	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	53	<50	<50
TRH >C_{16} -C_{34}	mg/kg	200	680	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	190	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	200	920	<50	<50
Surrogate o-Terphenyl	%	89	105	102	86

PAHs in Soil						
Our Reference		242857-1	242857-3	242857-6	242857-10	242857-11
Your Reference	UNITS	BH4/0.9-1	BH5/0.5-0.6	BH7/0.9-1	BD2/110520	BH8/0.9-1.0
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Naphthalene	mg/kg	<0.1	<0.1	16	<0.1	1.2
Acenaphthylene	mg/kg	0.1	<0.1	7.1	<0.1	0.2
Acenaphthene	mg/kg	<0.1	<0.1	5.4	<0.1	0.6
Fluorene	mg/kg	<0.1	<0.1	25	<0.1	0.6
Phenanthrene	mg/kg	1.1	0.2	210	0.4	9.1
Anthracene	mg/kg	0.3	<0.1	39	0.1	2.3
Fluoranthene	mg/kg	3.4	0.4	220	0.8	11
Pyrene	mg/kg	3.7	0.4	200	0.8	9.9
Benzo(a)anthracene	mg/kg	2.6	0.3	78	0.5	5.7
Chrysene	mg/kg	2.5	0.3	70	0.4	5.2
Benzo(b,j+k)fluoranthene	mg/kg	4.4	0.5	110	0.9	9.8
Benzo(a)pyrene	mg/kg	2.9	0.3	77	0.55	7.0
Indeno(1,2,3-c,d)pyrene	mg/kg	1.6	0.2	44	0.4	4.8
Dibenzo(a,h)anthracene	mg/kg	0.4	<0.1	7.6	<0.1	1.4
Benzo(g,h,i)perylene	mg/kg	1.9	0.2	56	0.4	6.2
Total +ve PAH's	mg/kg	25	2.7	1,200	5.3	75
Benzo(a)pyrene TEQ calc (zero)	mg/kg	4.2	<0.5	110	0.7	11
Benzo(a)pyrene TEQ calc(half)	mg/kg	4.2	<0.5	110	0.8	11
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	4.2	<0.5	110	0.8	11
Surrogate p-Terphenyl-d14	%	104	98	130	99	99

PAHs in Soil					
Our Reference		242857-14	242857-15	242857-19	242857-20
Your Reference	UNITS	BH10/0.4-0.5	BD1/110520	BH11/0.9-1.0 (light colour)	BH11/1-1.3
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Naphthalene	mg/kg	1.3	15	0.4	<0.1
Acenaphthylene	mg/kg	0.2	0.5	<0.1	<0.1
Acenaphthene	mg/kg	0.8	3.9	<0.1	<0.1
Fluorene	mg/kg	1.5	8.9	0.3	<0.1
Phenanthrene	mg/kg	21	42	1.7	<0.1
Anthracene	mg/kg	3.5	13	0.3	<0.1
Fluoranthene	mg/kg	26	41	1.4	<0.1
Pyrene	mg/kg	24	39	1.3	<0.1
Benzo(a)anthracene	mg/kg	9.8	24	0.5	<0.1
Chrysene	mg/kg	8.8	21	0.5	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	14	31	0.7	<0.2
Benzo(a)pyrene	mg/kg	9.8	22	0.54	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	5.9	14	0.3	<0.1
Dibenzo(a,h)anthracene	mg/kg	1.4	3.3	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	7.5	18	0.4	<0.1
Total +ve PAH's	mg/kg	130	300	8.3	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	14	33	0.7	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	14	33	0.7	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	14	33	0.8	<0.5
Surrogate p-Terphenyl-d14	%	98	96	99	97

Organochlorine Pesticides in soil					
Our Reference		242857-1	242857-6	242857-11	242857-19
Your Reference	UNITS	BH4/0.9-1	BH7/0.9-1	BH8/0.9-1.0	BH11/0.9-1.0 (light colour)
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	0.2	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	110	93	96

Organophosphorus Pesticides in Soil					
Our Reference		242857-1	242857-6	242857-11	242857-19
Your Reference	UNITS	BH4/0.9-1	BH7/0.9-1	BH8/0.9-1.0	BH11/0.9-1.0 (light colour)
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	110	93	96

PCBs in Soil					
Our Reference		242857-1	242857-6	242857-11	242857-19
Your Reference	UNITS	BH4/0.9-1	BH7/0.9-1	BH8/0.9-1.0	BH11/0.9-1.0 (light colour)
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	110	93	96

Acid Extractable metals in soil						
Our Reference		242857-1	242857-3	242857-6	242857-10	242857-11
Your Reference	UNITS	BH4/0.9-1	BH5/0.5-0.6	BH7/0.9-1	BD2/110520	BH8/0.9-1.0
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	0.6	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	2	7	7	14
Copper	mg/kg	37	29	73	14	48
Lead	mg/kg	170	25	110	42	92
Mercury	mg/kg	0.1	<0.1	0.3	<0.1	<0.1
Nickel	mg/kg	6	3	13	4	7
Zinc	mg/kg	380	19	82	50	920

Acid Extractable metals in soil						
Our Reference		242857-14	242857-15	242857-19	242857-20	242857-28
Your Reference	UNITS	BH10/0.4-0.5	BD1/110520	BH11/0.9-1.0 (light colour)	BH11/1-1.3	BH4/0.9-1 - [TRIPLICATE]
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	0.5
Chromium	mg/kg	5	6	<1	5	8
Copper	mg/kg	9	14	1	<1	46
Lead	mg/kg	30	37	<1	2	240
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Nickel	mg/kg	8	10	<1	1	7
Zinc	mg/kg	61	73	1	<1	320

Misc Soil - Inorg					
Our Reference		242857-1	242857-6	242857-11	242857-19
Your Reference	UNITS	BH4/0.9-1	BH7/0.9-1	BH8/0.9-1.0	BH11/0.9-1.0 (light colour)
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5

Moisture						
Our Reference		242857-1	242857-3	242857-6	242857-10	242857-11
Your Reference	UNITS	BH4/0.9-1	BH5/0.5-0.6	BH7/0.9-1	BD2/110520	BH8/0.9-1.0
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Moisture	%	10	7.4	11	15	13

Moisture					
Our Reference		242857-14	242857-15	242857-19	242857-20
Your Reference	UNITS	BH10/0.4-0.5	BD1/110520	BH11/0.9-1.0 (light colour)	BH11/1-1.3
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Moisture	%	9.5	13	3.1	9.5

Asbestos ID - soils						
Our Reference		242857-1	242857-3	242857-6	242857-11	242857-13
Your Reference	UNITS	BH4/0.9-1	BH5/0.5-0.6	BH7/0.9-1	BH8/0.9-1.0	BH10/0.05-0.1
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	20/05/2020	20/05/2020	20/05/2020	20/05/2020	20/05/2020
Sample mass tested	g	Approx. 35g	Approx. 35g	Approx. 45g	Approx. 30g	Approx. 30g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils			
Our Reference		242857-19	242857-20
Your Reference	UNITS	BH11/0.9-1.0 (light colour)	BH11/1-1.3
Date Sampled		11/05/2020	11/05/2020
Type of sample		Soil	Soil
Date analysed	-	20/05/2020	20/05/2020
Sample mass tested	g	Approx. 35g	Approx. 30g
Sample Description	-	Grey sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected

sPOCAS field test						
Our Reference		242857-2	242857-4	242857-5	242857-7	242857-8
Your Reference	UNITS	BH4/2.5-2.95	BH5/1-1.3	BH5/2.5-2.95	BH7/1.9-2	BH7/2.5-2.95
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
pH_F (field pH test)*	pH Units	7.4	8.1	7.5	8.8	7.3
pH_{FOX} (field peroxide test)*	pH Units	5.5	5.7	5.7	6.3	5.9
Reaction Rate*	-	Low reaction	Volcanic reaction	Low reaction	Medium reaction	Low reaction

sPOCAS field test						
Our Reference		242857-9	242857-12	242857-16	242857-17	242857-18
Your Reference	UNITS	BH8/0.05-0.15	BH8/2.5-2.95	BH10/0.9-1.0	BH10/1-1.45	BH10/2.5-2.95
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
pH_F (field pH test)*	pH Units	6.6	7.4	7.0	6.9	6.7
pH_{FOX} (field peroxide test)*	pH Units	4.2	5.5	4.6	5.1	4.9
Reaction Rate*	-	Medium reaction	Low reaction	Low reaction	Medium reaction	Medium reaction

sPOCAS field test			
Our Reference		242857-20	242857-21
Your Reference	UNITS	BH11/1-1.3	BH11/4-4.45
Date Sampled		11/05/2020	11/05/2020
Type of sample		Soil	Soil
Date prepared	-	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020
pH_F (field pH test)*	pH Units	6.2	6.6
pH_{FOX} (field peroxide test)*	pH Units	4.7	5.7
Reaction Rate*	-	Low reaction	Low reaction

Soil Aggressivity						
Our Reference		242857-1	242857-6	242857-8	242857-12	242857-16
Your Reference	UNITS	BH4/0.9-1	BH7/0.9-1	BH7/2.5-2.95	BH8/2.5-2.95	BH10/0.9-1.0
Date Sampled		11/05/2020	11/05/2020	11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
pH 1:5 soil:water	pH Units	6.6	9.3	7.2	7.6	6.8
Electrical Conductivity 1:5 soil:water	µS/cm	[NA]	[NA]	16	35	11
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	[NA]	<10	<10	<10
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	[NA]	<10	<10	<10

Soil Aggressivity		
Our Reference		242857-17
Your Reference	UNITS	BH10/1-1.45
Date Sampled		11/05/2020
Type of sample		Soil
pH 1:5 soil:water	pH Units	6.7

CEC				
Our Reference		242857-1	242857-6	242857-17
Your Reference	UNITS	BH4/0.9-1	BH7/0.9-1	BH10/1-1.45
Date Sampled		11/05/2020	11/05/2020	11/05/2020
Type of sample		Soil	Soil	Soil
Date prepared	-	20/05/2020	20/05/2020	20/05/2020
Date analysed	-	20/05/2020	20/05/2020	20/05/2020
Exchangeable Ca	meq/100g	2.1	19	0.6
Exchangeable K	meq/100g	<0.1	0.1	<0.1
Exchangeable Mg	meq/100g	0.58	0.58	0.23
Exchangeable Na	meq/100g	<0.1	<0.1	<0.1
Cation Exchange Capacity	meq/100g	2.8	20	<1

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-063	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. Based on section H, Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	242857-6
Date extracted	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	18/05/2020
Date analysed	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	18/05/2020
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	112	111
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	112	111
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	106	104
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	116	114
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	118	117
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	110	110
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	119	118
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	137	1	122	118	3	125	117

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	19	18/05/2020	18/05/2020		[NT]	[NT]
Date analysed	-			[NT]	19	18/05/2020	18/05/2020		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	19	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	19	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	19	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	19	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	19	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	19	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	19	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	19	<1	3	100	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	19	122	132	8	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	242857-6
Date extracted	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	18/05/2020
Date analysed	-			18/05/2020	1	19/05/2020	19/05/2020		18/05/2020	19/05/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	111	127
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	120	210	55	112	79
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	170	260	42	92	#
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	111	127
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	240	400	50	112	79
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	160	170	6	92	#
Surrogate o-Terphenyl	%		Org-020	93	1	103	94	9	109	#

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	19	18/05/2020	18/05/2020		[NT]	[NT]
Date analysed	-			[NT]	19	18/05/2020	18/05/2020		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	19	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	19	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	19	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	19	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	19	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	19	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	19	102	101	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	242857-6
Date extracted	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	18/05/2020
Date analysed	-			19/05/2020	1	19/05/2020	19/05/2020		19/05/2020	19/05/2020
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.1	0	100	#
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.2	67	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.2	67	102	#
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	1.1	2.3	71	106	#
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.7	80	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	3.4	6.7	65	104	#
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	3.7	7.8	71	106	#
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	2.6	4.8	59	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	2.5	4.8	63	90	#
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	4.4	8.2	60	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	2.9	5.6	64	106	#
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	1.6	2.9	58	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.4	0.9	77	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	1.9	3.5	59	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	97	1	104	99	5	98	95

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	19	18/05/2020	18/05/2020		[NT]	[NT]
Date analysed	-			[NT]	19	19/05/2020	19/05/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	19	0.4	1.2	100	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	0.2	67	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	19	0.3	0.4	29	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	19	1.7	2.7	45	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	19	0.3	0.6	67	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	19	1.4	2.2	44	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	19	1.3	2.0	42	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	19	0.5	0.9	57	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	19	0.5	0.8	46	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	19	0.7	1	35	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	19	0.54	0.84	43	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	19	0.3	0.5	50	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	19	0.4	0.6	40	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	19	99	98	1	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	242857-6
Date extracted	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	18/05/2020
Date analysed	-			19/05/2020	1	19/05/2020	19/05/2020		19/05/2020	19/05/2020
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	114	112
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	100
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	104
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	108
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	122	108
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.4	120	118	112
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	126	124
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	122
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	124	120
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.7	150	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	114	122
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	93	1	97	91	6	89	88

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	19	18/05/2020	18/05/2020		[NT]	[NT]
Date analysed	-			[NT]	19	19/05/2020	19/05/2020		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	19	96	94	2	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	242857-6
Date extracted	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	18/05/2020
Date analysed	-			19/05/2020	1	19/05/2020	19/05/2020		19/05/2020	19/05/2020
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	95
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	120	118
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	124
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	120
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	114	122
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	126
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	114	118
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	93	1	97	91	6	89	88

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	19	18/05/2020	18/05/2020		[NT]	[NT]
Date analysed	-			[NT]	19	19/05/2020	19/05/2020		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	19	96	94	2	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	242857-6
Date extracted	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	18/05/2020
Date analysed	-			19/05/2020	1	19/05/2020	19/05/2020		19/05/2020	19/05/2020
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	114	102
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	93	1	97	91	6	89	88

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	19	18/05/2020	18/05/2020		[NT]	[NT]
Date analysed	-			[NT]	19	19/05/2020	19/05/2020		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	19	96	94	2	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	242857-6
Date prepared	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	18/05/2020
Date analysed	-			19/05/2020	1	19/05/2020	19/05/2020		19/05/2020	19/05/2020
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	106	107
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	0.6	<0.4	40	104	93
Chromium	mg/kg	1	Metals-020	<1	1	7	7	0	103	100
Copper	mg/kg	1	Metals-020	<1	1	37	40	8	106	90
Lead	mg/kg	1	Metals-020	<1	1	170	250	38	103	95
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.1	0.1	0	102	103
Nickel	mg/kg	1	Metals-020	<1	1	6	6	0	104	93
Zinc	mg/kg	1	Metals-020	<1	1	380	200	62	109	78

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	19	18/05/2020	18/05/2020		[NT]	[NT]
Date analysed	-			[NT]	19	19/05/2020	19/05/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	19	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	19	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	19	<1	<1	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	19	1	1	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	19	<1	<1	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	19	<1	<1	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	19	1	1	0	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	242857-6
Date prepared	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	18/05/2020
Date analysed	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	18/05/2020
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	101	102

QUALITY CONTROL: Soil Aggressivity						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	97	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			20/05/2020	1	20/05/2020	20/05/2020		20/05/2020	[NT]
Date analysed	-			20/05/2020	1	20/05/2020	20/05/2020		20/05/2020	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	1	2.1	1.7	21	100	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	1	<0.1	0.1	0	98	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	1	0.58	0.60	3	97	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	1	<0.1	<0.1	0	92	[NT]

Result Definitions

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

Quality Control Definitions

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

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Incorrect Container for BH11/1-1.3 - no jar received, only bag

PAHs in Soil - # Percent recovery for the matrix spike is not possible to report as the high concentration of analytes in sample242857-6ms have caused interference.

TRH Soil C10-C40 NEPM - # Percent recovery for the surrogate and matrix spike is not possible to report as the high concentration of analytes in sample 242857-6 have caused interference.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 242857-1 for Zn. Therefore a triplicate result has been issued as laboratory sample number 242857-28.

PAH_S The RPD for duplicate results is accepted due to the non homogenous nature of sample/s 242857-1,1d and 243857-19,19d.

1315 3:18pm

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99679.01	**Suburb:**	Botany	**To:**	Envirolab Services
Project Name:	Botany, DSI	**Order Number**	152412		
Project Manager:	WFY	**Sampler:**	WFY	**Attn:**	Aileen Hie
Emails:	wenfei.yuan@douglaspartners.com.au and ayla.sorensen@douglaspartners.com.au			**Phone:**	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☐ Esky ☐ Fridge/Freezer ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type: S - soil, W - water	Container Type: G - glass, P - plastic	Analytes: Combo8A	Combo3A	ASS Screening	pH, CEC	Combo3	Asbestos	Soil Aggressivity (pH, sulphate, chloride and EC)		Notes
BH4/0.9-1	1	11/05/20	S	G/P	x			x					
BH4/2.5-2.95	2	11/05/20	S	P			X						
BH5/0.5-0.6	3	11/05/20	S	P		X							
BD4/110520	—	11/05/20	S	G					X				Please send the inter-lab replicate to Eurofins
BH5/1-1.3	4	11/05/20	S	P			X						
BH5/2.5-2.95	5	11/05/20	S	P			X						
BH7/0.9-1	6	11/05/20	S	G/P	X			X					
BH7/1.9-2	7	11/05/20	S	P			X						
BH7/2.5-2.95	8	11/05/20	S	P			X				x		
BH8/0.05-0.15	9	11/05/20	S	G/P			X						
BD2/110520	10	11/05/20	S	G/P					X				
BH8/0.9-1.0	11	11/05/20	S	G/P	X								
BH8/2.5-2.95	12	11/05/20	S	P			X				x		
BH10/0.05-0.1	13	11/05/20								X			
BH10/0.4-0.5	14	11/05/20	S	G/P		Combo3							
BD1/110520	15	11/05/20	S	G/P					X				
BH10/0.9-1.0	16	11/05/20	S	P			X				x		
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: **Relinquished by:** WFY **Transported to laboratory by:**

Lab Report/Reference No: 242857

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

Job No: 242857
Date Received: 13/05/2020
Time Received: 13:45
Received By: LM
Temp: Cool/Ambient
Cooling: Ice/Icepack 14.3
Security: Intact/Broken/None

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99679.01	**Suburb:**	Botany	**To:**	Envirolab Services
Project Name:	Botany, DSI	**Order Number**	152412		
Project Manager:	WFY	**Sampler:**	WFY	**Attn:**	Aileen Hie
Emails:	wenfei.yuan@douglaspartners.com.au and ayla.sorensen@douglaspartners.com.au			**Phone:**	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☐ Esky ☐ Fridge/Freezer ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo8A	Combo3A	ASS Screening	pH, CEC	Combo3	TRH/BTEX			
BH10/1-1.45	17	11/05/20	S	P			X	X					
BH10/2.5-2.95	18	11/05/20	S	P			X						
BH11/0.9-1	19	11/05/20	S	G/P	X								
BH11/1-1.3	20	11/05/20	S	G/P		X	X						
BH11/4-4.45	21	11/05/20	S	P			X						
TS	22									BTEX			
TB	23									TRH/BTEX			
Extra. BH11/0.4-0.5	24												
BH11/1.3-1.4	25												
BH11/2.5-2.95	26												
BH11/0.9-1.0 (dark)	27												
PQL (S) mg/kg										**ANZECC PQLs req'd for all water analytes** ☐			

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 242857

Total number of samples in container: | **Relinquished by:** WFY | **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd | **Address:** 96 Hermitage Road, West Ryde | **Phone:** 9809 0999

Signed: | **Received by:** Ming Yan To | **Date & Time:** 13/05/2020 13:48

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

24285 14.34.

Project No:	99679.01	**Suburb:**	Botany	**To:**	Envirolab Services
Project Name:	Botany, DSI	**Order Number**	152412		
Project Manager:	WFY	**Sampler:**	WFY	**Attn:**	Aileen Hie
Emails:	wenfei.yuan@douglaspartners.com.au and ayla.sorensen@douglaspartners.com.au			**Phone:**	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☐ Esky ☐ Fridge/Freezer ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	
Send Results to:	Douglas Partners Pty Ltd	**Address:**	96 Hermitage Road, West Ryde	**Phone:**	9809 0999
Signed:		**Received by:**	Ming Yan Zo.	**Date & Time:**	13/05/2020 13:48

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

CERTIFICATE OF ANALYSIS 242991

Client Details

Client	Douglas Partners Pty Ltd
Attention	Wen-Fei Yuan
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**99679.01, Botany**
Number of Samples	13 Soil
Date samples received	14/05/2020
Date completed instructions received	15/05/2020

Analysis Details

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

Samples were analysed as received from the client. Results relate specifically to the samples as received.

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

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

Report Details

Date results requested by	22/05/2020
Date of Issue	22/05/2020

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Hannah Nguyen, Senior Chemist
Josh Williams, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		242991-1	242991-5	242991-8	242991-11
Your Reference	UNITS	BH6	BH9	BH12	BH30
Depth		0.5-0.6	0.5-0.6	0.5-0.6	0.3-0.5
Date Sampled		12/05/2020	12/05/2020	12/05/2020	13/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
naphthalene	mg/kg	3	<1	5	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	123	120	115	118

svTRH (C10-C40) in Soil					
Our Reference		242991-1	242991-5	242991-8	242991-11
Your Reference	UNITS	BH6	BH9	BH12	BH30
Depth		0.5-0.6	0.5-0.6	0.5-0.6	0.3-0.5
Date Sampled		12/05/2020	12/05/2020	12/05/2020	13/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020
TRH C_{10} - C_{14}	mg/kg	57	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	970	880	2,200	510
TRH C_{29} - C_{36}	mg/kg	630	750	2,000	470
TRH >C_{10} -C_{16}	mg/kg	120	<50	74	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	120	<50	69	<50
TRH >C_{16} -C_{34}	mg/kg	140	1,400	3,700	850
TRH >C_{34} -C_{40}	mg/kg	480	430	1,100	300
Total +ve TRH (>C10-C40)	mg/kg	740	1,900	4,900	1,200
Surrogate o-Terphenyl	%	115	103	#	119

PAHs in Soil					
Our Reference		242991-1	242991-5	242991-8	242991-11
Your Reference	UNITS	BH6	BH9	BH12	BH30
Depth		0.5-0.6	0.5-0.6	0.5-0.6	0.3-0.5
Date Sampled		12/05/2020	12/05/2020	12/05/2020	13/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Naphthalene	mg/kg	14	1.8	2.4	<1
Acenaphthylene	mg/kg	<1	2.1	2.0	2.6
Acenaphthene	mg/kg	5.8	3.0	3.9	<1
Fluorene	mg/kg	4.2	3.0	5.4	<1
Phenanthrene	mg/kg	65	46	48	3.8
Anthracene	mg/kg	18	13	17	1.6
Fluoranthene	mg/kg	47	67	89	9.7
Pyrene	mg/kg	46	65	98	15
Benzo(a)anthracene	mg/kg	25	38	59	6.3
Chrysene	mg/kg	23	36	51	7.5
Benzo(b,j+k)fluoranthene	mg/kg	26	49	100	13
Benzo(a)pyrene	mg/kg	18	33	68	9.7
Indeno(1,2,3-c,d)pyrene	mg/kg	7.3	16	40	5.7
Dibenzo(a,h)anthracene	mg/kg	2.7	4.6	12	2.0
Benzo(g,h,i)perylene	mg/kg	8.6	20	47	7.9
Total +ve PAH's	mg/kg	310	400	640	86
Benzo(a)pyrene TEQ calc (zero)	mg/kg	26	49	100	14
Benzo(a)pyrene TEQ calc(half)	mg/kg	26	49	100	14
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	26	49	100	14
Surrogate p-Terphenyl-d14	%	130	120	130	120

Organochlorine Pesticides in soil			
Our Reference		242991-1	242991-8
Your Reference	UNITS	BH6	BH12
Depth		0.5-0.6	0.5-0.6
Date Sampled		12/05/2020	12/05/2020
Type of sample		Soil	Soil
Date extracted	-	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020
alpha-BHC	mg/kg	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	120	110

Organophosphorus Pesticides in Soil			
Our Reference		242991-1	242991-8
Your Reference	UNITS	BH6	BH12
Depth		0.5-0.6	0.5-0.6
Date Sampled		12/05/2020	12/05/2020
Type of sample		Soil	Soil
Date extracted	-	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	120	110

PCBs in Soil			
Our Reference		242991-1	242991-8
Your Reference	UNITS	BH6	BH12
Depth		0.5-0.6	0.5-0.6
Date Sampled		12/05/2020	12/05/2020
Type of sample		Soil	Soil
Date extracted	-	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020
Aroclor 1016	mg/kg	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	120	110

Acid Extractable metals in soil					
Our Reference		242991-1	242991-5	242991-8	242991-11
Your Reference	UNITS	BH6	BH9	BH12	BH30
Depth		0.5-0.6	0.5-0.6	0.5-0.6	0.3-0.5
Date Sampled		12/05/2020	12/05/2020	12/05/2020	13/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Arsenic	mg/kg	<4	7	<4	<4
Cadmium	mg/kg	0.4	<0.4	0.9	<0.4
Chromium	mg/kg	4	11	19	8
Copper	mg/kg	57	130	46	16
Lead	mg/kg	91	63	54	19
Mercury	mg/kg	<0.1	0.2	0.3	<0.1
Nickel	mg/kg	7	10	21	160
Zinc	mg/kg	610	46	280	34

Misc Soil - Inorg			
Our Reference		242991-1	242991-8
Your Reference	UNITS	BH6	BH12
Depth		0.5-0.6	0.5-0.6
Date Sampled		12/05/2020	12/05/2020
Type of sample		Soil	Soil
Date prepared	-	18/05/2020	18/05/2020
Date analysed	-	18/05/2020	18/05/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5

Moisture					
Our Reference		242991-1	242991-5	242991-8	242991-11
Your Reference	UNITS	BH6	BH9	BH12	BH30
Depth		0.5-0.6	0.5-0.6	0.5-0.6	0.3-0.5
Date Sampled		12/05/2020	12/05/2020	12/05/2020	13/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Moisture	%	15	7.0	9.1	7.6

Asbestos ID - soils					
Our Reference		242991-1	242991-5	242991-8	242991-11
Your Reference	UNITS	BH6	BH9	BH12	BH30
Depth		0.5-0.6	0.5-0.6	0.5-0.6	0.3-0.5
Date Sampled		12/05/2020	12/05/2020	12/05/2020	13/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	20/05/2020	20/05/2020	20/05/2020	20/05/2020
Sample mass tested	g	Approx. 55g	Approx. 30g	Approx. 30g	Approx. 45g
Sample Description	-	Brown fine-grained soil & mica	Brown fine-grained soil & mica	Brown fine-grained soil & mica	Brown fine-grained soil & mica
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

sPOCAS field test						
Our Reference		242991-2	242991-3	242991-4	242991-6	242991-7
Your Reference	UNITS	BH6	BH6	BH6	BH9	BH9
Depth		1-1.45	2.5-2.95	5.5-5.95	1-1.45	5.5-5.95
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
pH_F (field pH test)*	pH Units	5.3	5.9	6.5	8.7	7.6
pH_{FOX} (field peroxide test)*	pH Units	2.5	5.0	5.3	6.1	5.6
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test					
Our Reference		242991-9	242991-10	242991-12	242991-13
Your Reference	UNITS	BH12	BH12	BH30	BH30
Depth		1.0-1.45	3.5-3.95	3.5-3.95	5.5-5.95
Date Sampled		12/05/2020	12/05/2020	13/05/2020	13/05/2020
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	18/05/2020	19/05/2020	18/05/2020	18/05/2020
Date analysed	-	18/05/2020	19/05/2020	18/05/2020	18/05/2020
pH_F (field pH test)*	pH Units	7.9	6.5	6.1	6.6
pH_{FOX} (field peroxide test)*	pH Units	6.4	4.5	4.9	5.8
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction

Soil Aggressivity		
Our Reference		242991-10
Your Reference	UNITS	BH12
Depth		3.5-3.95
Date Sampled		12/05/2020
Type of sample		Soil
pH 1:5 soil:water	pH Units	6.7
Electrical Conductivity 1:5 soil:water	µS/cm	10
Chloride, Cl 1:5 soil:water	mg/kg	<10
Sulphate, SO4 1:5 soil:water	mg/kg	<10

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-063	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. Based on section H, Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	[NT]
Date analysed	-			18/05/2020	1	18/05/2020	18/05/2020		18/05/2020	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	112	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	112	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	106	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	116	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	118	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	110	[NT]
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	119	[NT]
naphthalene	mg/kg	1	Org-023	<1	1	3	3	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	137	1	123	91	30	125	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			18/05/2020	[NT]	[NT]	[NT]	[NT]	18/05/2020	[NT]
Date analysed	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	123	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	123	[NT]
Surrogate o-Terphenyl	%		Org-020	103	[NT]	[NT]	[NT]	[NT]	124	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			18/05/2020	[NT]	[NT]	[NT]	[NT]	18/05/2020	[NT]
Date analysed	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	106	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	97	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			18/05/2020	[NT]	[NT]	[NT]	[NT]	18/05/2020	[NT]
Date analysed	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	122	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	126	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	124	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	93	[NT]	[NT]	[NT]	[NT]	89	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			18/05/2020	[NT]	[NT]	[NT]	[NT]	18/05/2020	[NT]
Date analysed	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	120	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Malathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	93	[NT]	[NT]	[NT]	[NT]	89	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			18/05/2020	[NT]	[NT]	[NT]	[NT]	18/05/2020	[NT]
Date analysed	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	93	[NT]	[NT]	[NT]	[NT]	89	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			18/05/2020	[NT]	[NT]	[NT]	[NT]	18/05/2020	[NT]
Date analysed	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	106	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	104	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			18/05/2020	[NT]	[NT]	[NT]	[NT]	18/05/2020	[NT]
Date analysed	-			18/05/2020	[NT]	[NT]	[NT]	[NT]	18/05/2020	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: Soil Aggressivity						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	10	6.7	6.6	2	101	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	10	10	10	0	101	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	10	<10	<10	0	113	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	10	<10	<10	0	120	[NT]

Result Definitions

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

Quality Control Definitions

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

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

PAHs in Soil - The PQL for samples 242991-1 and 11 has been raised due to the high concentration of analytes in the samples, resulting in the samples requiring a dilution.
TRH Soil C10-C40 NEPM - # Percent recovery for the surrogate is not possible to report as the high concentration of analytes in sample 242991-8 have caused interference.

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples were sub-sampled from bags provided by the client.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99679.01	**Suburb:** Botany	**To:** Envirolab Services
Project Name:	Botany, DSI	**Order Number** 152412	
Project Manager:	WFY	**Sampler:** WFY	**Attn:** Aileen Hie
Emails:	wenfei.yuan@douglaspartners.com.au and ayla.sorensen@douglaspartners.com.au		**Phone:**
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐		**Email:**
Prior Storage:	☐ Esky ☐ Fridge/Freezer ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo8	Combo3	ASS Screening	Soil Aggressivity (pH, sulphate, chloride)						
BH6/0.5-0.6	1	12-13/05/2020	S	G/P	X									
BH6/1-1.45	2	12-13/05/2020	S	P			X							
BH6/2.5-2.95	3	12-13/05/2020	S	P			X							
BH6/5.5-5.95	4	12-13/05/2020	S	P			X							
BH9/0.5-0.6	5	12-13/05/2020	S	G/P		X								
BH9/1-1.45	6	12-13/05/2020	S	P			X							
BH9/5.5-5.95	7	12-13/05/2020	S	P			X							
BH12/0.5-0.6	8	12-13/05/2020	S	P	X									
BH12/1.0-1.45	9	12-13/05/2020	S	P			X							
BH12/3.5-3.95	10	12-13/05/2020	S	P			X	x						
BH30/0.3-0.5	11	13/05/20	S	G/P		X								
BH30/3.5-3.95	12	13/05/20	S	P			X							
BH30/5.5-5.95	13	13/05/20	S	P			X							
PQL (S) mg/kg														

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: **Relinquished by:** WFY **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** 96 Hermitage Road, West Ryde **Phone:** 9809 0999

Signed: **Received by:** Michael Opie ECS **Date & Time:**

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

Job No: 242991
Date Received: 15.5.20
Time Received: 1230
Received by: MO
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

ANZECC PQLs req'd for all water analytes ☐

Lab Report/Reference No: 242991