Appendix G

Preliminary Waste Classification

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Project 86059.00
4 October 2017
R.002.WasteClass
JMP:jlb

Attention: Mr Mark Sabry

Email: msabry@portauthoritynsw.com.au

Dear Sirs

Preliminary Waste Classification
Proposed Multi-User Facility
James Craig Road, Glebe Island, NSW

1. Executive Summary

This report describes the methodology and results of a preliminary waste classification undertaken by Douglas Partners Pty Ltd (DP) on *in situ* material located at James Craig Road, Glebe Island (refer to Section 2 for further details). The results are summarised in the following Table 1.

Table 1: Summary of Waste Classification

Material Identification	*in situ* filling described as grey brown yellow brown, red brown and black sandy gravel, sand and crushed sandstone filling
Approximate Area	11,500 m^2 as shown by the outline on attached Drawing 1
Approximate Depth	waste classification applies to a depth of 2.6 m below existing ground level (bgl)
Preliminary Classification	General Solid Waste (non-putrescible)
References	NSW EPA *Waste Classification Guidelines* (2014) *Protection of the Environment Operations Act 1997* (POEO Act)

Note: The waste classification provided is preliminary only and is subject to confirmation prior to or during excavation, through visual and analytical (if required) processes.

Reference should be made to the following sections of the report for information on the materials subject to the classification, the methodology, guidelines used, analytical results, conditions and limitations associated with this preliminary waste classification.

2. Introduction

This preliminary waste classification was commissioned by Mr Mark Sabry of Port Authority of NSW and was undertaken with reference to the DP Proposal SYD170758 dated 10 July 2017.

It is understood that Glebe Island Berths 1 and 2 are being redeveloped to allow for the unloading and storage of soil and gravel materials in six 40 m by 65 m bays.

Excavation for services and deeper pile excavations are expected. It is noted that this waste classification report applies to the shallow filling only (to a maximum depth of 2.6 m below current surface level) within a footprint of about 150 m by 60 m as shown on the attached Drawing 1 (referred to herein as the "investigation area"). Further the investigation area was moved to the south-west of the original location nominated by the client, after completion of the field work and laboratory testing and therefore only two of the five boreholes (located within the original investigation area) are located within the current investigation area.

The shallow filling will be surplus to the development and requires disposal off site.

The preliminary waste classification was conducted with reference to the NSW Environmental Protection Authority (EPA) *Waste Classification Guidelines, Part 1: Classifying Waste*, November 2014 (EPA, 2014).

3. Scope of Works

The scope of works was as follows:

- Brief review of historical aerial photos to assess the potential for historical sources of contamination;
- Brief site walkover to assess the potential for contamination;
- Photographing of the site for recording purposes;
- Drilling of five boreholes to depths of between 9.65 m and 31.8 m using a Scout 4 Drill Rig which used augers and rotary drilling through soil. The bores were drilled primarily for geotechnical investigation purposes;
- Logging of the sub-surface profile encountered in the boreholes;
- Collection of samples from each borehole;
- Dispatch of 10 primary samples and one replicate sample to a NATA accredited laboratory (Envirolab Services Pty Ltd) for quantitative analysis for the identified contaminants of concern; and
- Preparation of this preliminary *in situ* waste classification report.

4. Site Information and Potential for Contamination

The site of the proposed multi-user facility (referred to herein as "the site") is located on the north-eastern side of Glebe Island adjacent to Berths 1 and 2. It covers an area of about 2.5 Hectares.

At the time of the investigation (9 to 19 August 2017) the site was vacant and mostly covered with concrete pavements and some concrete block pavements. Some patched areas were observed. The existing pavement surface falls gradually to the north from about RL2.9 m to RL2.4 m relative to Australian Height Datum (AHD).

A review of historical aerial photographs dated 1943 to present indicates that the site been used for industrial purposes since at least 1943.

It is understood that the Glebe Island berths were constructed by the Sydney Harbour Trust in the early 1900s by dredging of the soft seabed sediments and filling using soil and rock excavated from high ground on the original Glebe Island location. On the basis of the information obtained from various geotechnical investigations it is apparent that the depth to bedrock is deeper under the northern part of the berths and that the dredging process in some areas did not remove all the softer sediments overlying the bedrock.

Reference to the Sydney 1:250,000 geological series sheet indicates that the site is underlain by Hawkesbury sandstone beneath the filling used for reclamation. The sandstone is comprised of medium to coarse-grained quartz sandstone with minor shale and laminite lenses.

Reference to the Acid Sulfate Soil (ASS) Risk Map published by the Department of Land and Water Conservation indicates that the site is in an area of disturbed terrain, described as an area where soil investigations are required to assess the area for ASS. ASS testing of deeper soils was completed as part of the geotechnical investigation for the site and will be reported under separate cover.

On the basis of the above information it is considered that the potential sources of contamination of site soils are as follows:

- Imported fill;
- Previous and current industrial land uses;
- Previous buildings (potential hazardous materials such as asbestos); and
- Use as a ship docking area.

The primary contaminants of concern are considered to comprise the following:

- Eight priority metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc;
- Total recoverable hydrocarbons (TRH);
- Benzene, toluene, ethylbenzene and xylenes (BTEX);
- Polycyclic aromatic hydrocarbons (PAH);
- Organochlorine pesticides (OCP);
- Organophosphorus pesticides (OPP);

- Total phenols;
- Polychlorinated biphenyls (PCB); and
- Asbestos.

It should be noted that whilst there is a potential for soils close to the freshore to be impacted with tributyltin (an anti-fouling agent used in boat and ship paints) at and around the water line, there is no criteria for such a contaminant in NSW EPA (2014) and therefore no analyses for these compounds was undertaken.

5. Field Work Rationale and Methodology

The investigation area subject to the preliminary waste classification is approximately 11,500 m^2 to a maximum depth of 2.6 m bgl as shown on the outline on attached Drawing 1. As noted above, the site area was relocated and therefore only two of the boreholes are located within the investigation area.

Given the preliminary nature of the assessment, samples were recovered from a total of five boreholes as shown on attached Drawing 1.

The inspection and environmental sampling was performed by an Environmental Scientist from DP, with reference to standard operating procedures outlined in the DP *Field Procedures Manual*. All sampling data was recorded on DP chain-of-custody sheets, and the general sampling procedure comprised:

- Collection of representative soil samples directly from the solid flight auger or SPT sampling device;
- The use of disposable gloves for each sampling event;
- Collection of a replicate sample for QA / QC purposes;
- Transfer of samples into laboratory-prepared glass jars, capping immediately, minimising the headspace within the sample jar;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placing the glass jars into a cooled, insulated and sealed container for transport to the laboratory; and
- Use of chain of custody documentation ensuring that sample tracking and custody could be cross-checked at any point in the transfer of samples from the field to the laboratory. Copies of completed chain of custody forms are attached.

6. Field Work Observations

The borehole logs are attached. In summary, the subsurface profile encountered in the boreholes comprised concrete or asphaltic concrete pavement to depths of between 0.07 m and 0.13 m, grey brown, yellow brown, red brown and black sandy gravel, sand and crushed sandstone filling to depths of between 4.1 m and 12.7 m, overlying natural grey brown, brown, orange brown and red brown

clayey and sandy soils to depths of between 17.6 m and 26.0 m (all except BH1), then light grey and red brown sandstone bedrock to depths of between 9.65 m and 31.8 m.

There were no obvious indications of gross contamination (e.g. staining or odours) or anthropogenic materials within the boreholes.

7. Waste Classification Criteria

NSW EPA (2014) contains a six step procedure for determining the type of waste and the waste classification. Part of the procedure, for materials not classified as special waste or pre-classified waste, is a comparison of analytical data initially against contaminant threshold (CT) values specific to a waste category. Alternatively, the data can be assessed against specific contaminant concentration (SCC) thresholds when used in conjunction with toxicity characteristic leaching procedure (TCLP) thresholds.

The CT, SCC, and TCLP values relevant to this preliminary waste classification are shown on the attached Table A.

8. Waste Classification

The following Table 2 presents the results of the six step procedure outlined in NSW EPA (2014) for determining the type of waste and the waste classification. This process applies to the filling (including surface soils) at the site, which do not meet the definition of virgin excavated natural material (VENM).

Table 2: Six Step Classification Procedure

Step	Comments	Rationale
1. Is the waste special waste?	No	No asbestos containing materials (ACM), clinical or related waste, or waste tyres were observed in the test boreholes; Asbestos was not detected by the analytical laboratory.
2. Is the waste liquid waste?	No	The fill comprised a soil matrix.
3. Is the waste “pre-classified”?	No	The filling material is not pre-classified with reference to NSW EPA (2014).
4. Does the waste possess hazardous waste characteristics?	No	The waste was not observed to contain or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances, corrosive substances, coal tar, batteries, lead paint or dangerous goods containers.
5. Determining a wastes classification using chemical assessment	Conducted	Refer to Table A (attached).

Step	Comments	Rationale
6. Is the waste putrescible or non-putrescible?	No	The fill does not contain materials considered to be putrescible [a].

Note: a wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forest and crop materials, and natural fibrous organic and vegetative materials (EPA, 2014).

All sample analysis was conducted by Envirolab Services Pty Ltd in accordance with the chain-of-custody prepared by DP. Based on a comparison of the test results for the field replicate sample with its original sample, and a review of the laboratory reported QC results, it is considered that the laboratory test data obtained are reliable and useable for this assessment. The laboratory test results certificate is attached.

As shown on the attached Table A, all contaminant concentrations for the analysed fill samples were within the contaminant thresholds (CT1s) for General Solid Waste (GSW).

Based on the observations at the time of sampling and the reported analytical results, the filling (including surface soils) described as grey brown yellow brown, red brown and black sandy gravel, sand and crushed sandstone filling, within the investigation area subject to classification as shown on Drawing 1, are preliminarily classified as **General Solid Waste (non-putrescible)**, as defined in EPA (2014).

This waste classification does not include an assessment of the natural soils and bedrock at the site. This classification is limited to the shallow filling at the investigation area (to a maximum depth of 2.6 m bgl).

Given the preliminary nature of the assigned waste classification, which was based on limited sampling, it is recommended that the waste classification be confirmed by a qualified environmental consultant prior to or during bulk excavation.

Division 4, Section 45, of *The Protection of the Environment Operations (Waste) Regulation 2014* states that it is an offence for waste to be transported to a place that cannot lawfully be used as a facility to accept that waste. It is the duty of the owner and transporter of the waste to ensure that the waste is disposed of appropriately. DP does not accept liability for the unlawful disposal of waste materials from any site. DP accepts no responsibility for the material tracking, loading, management, transport or disposal of waste from the site. Before disposal of the material to a licensed landfill is undertaken, the waste producer will be required to obtain prior consent from the landfill.

Both the receiving site and the site disposing of the material should satisfy the requirements of the licence before disposal of the material is undertaken. Note that appropriate prior arrangement with the receiving site/relevant authorities should be obtained prior to the disposal of any material off site. The receiving site should check to ensure that the material received matches the description provided in this report and contains no cross contamination.

The results provided in the report are indicative of the sub-surface conditions only at the specific sampling locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change as a result of human influences, and such changes may occur after DP's field testing has been completed. Furthermore, fill is by its nature heterogeneous and therefore some parts of the fill may not be represented by the visual and analytical results reported

herein. Note that the fill did not contain building rubble or other anthropogenic materials, which can be an indication of potential for asbestos containing materials (ACM). However, should suspected ACM or other unexpected conditions arise during the excavation and loading of the fill for off-site disposal, DP should be consulted for advice.

9. Limitations

Douglas Partners (DP) has prepared this waste classification report for this project at Glebe Island in accordance with DP's proposal SYD170758 dated 10 July 2017 and acceptance received from Port Authority of NSW. The work was carried out under the amended Port Authority of NSW Works/Services Agreement dated July 2017. This report is provided for the exclusive use of Port Authority of NSW 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. Subsurface 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 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 environmental

components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Please contact the undersigned if you have any questions on this matter.

Yours faithfully
Douglas Partners Pty Ltd

pp: J. Beamon

Jessica Paulsen
Geo-environmental Scientist

Reviewed by

Paul Gorman
Principal

Attachments:
About this Report
Drawing 1
Descriptive Notes
Borehole Logs
Table A
Laboratory Reports

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

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

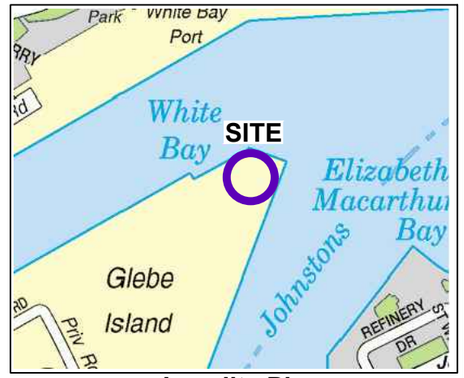
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later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



Locality Plan

LEGEND

- Bores by Maritime Services Board (1964)
- Bores by J+K (1998)
- Bores + CPTs by DP (2000)
- Bores by J+K (2013)
- Current boreholes by DP (August 2017)
- Survey lines by others
- Geotechnical Cross Section A-A'

Refer to Dwg 2 for Geotechical Cross Section

NOTE:
1: Base image from Nearmap.com (Dated Aug.2017)
2: Test locations are approximate only and are shown with reference to existing features.

0 10 20 30 40 60 80 100 150 200m

1:2000 @ A3

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Port Authority of NSW		TITLE: **Locations of Tests** **Proposed Multi-User Facility** **James Craig Road, GLEBE ISLAND**
OFFICE: Sydney	DRAWN BY: PSCH	
SCALE: 1:2000 @ A3	DATE: 3.10.2017	

N

PROJECT No:	86059.00
DRAWING No:	1
REVISION:	0

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.

Soil Descriptions

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Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. 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	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

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

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

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	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

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;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Rock Strength

Rock strength is defined by the Point Load Strength Index ($Is_{(50)}$) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 2007. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index $Is_{(50)}$ MPa	Approximate Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	M	0.3 - 1.0	6 - 20
High	H	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EH	>10	>200

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
Moderately weathered	MW	Staining and discolouration of rock substance has taken place
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects
Fresh	Fr	No signs of decomposition or staining

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and longer sections
Unbroken	Core lengths mostly > 1000 mm

Rock Descriptions

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Douglas Partners

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

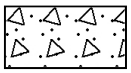
Symbols & Abbreviations

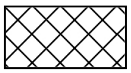
Graphic Symbols for Soil and Rock

General

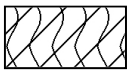
Asphalt

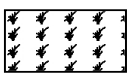
Road base

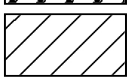

Concrete


Filling

Soils


Topsoil

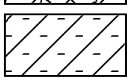

Peat


Clay

Silty clay

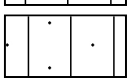
Sandy clay

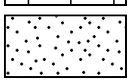
Gravelly clay

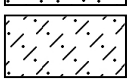

Shaly clay

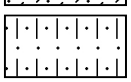
Silt

Clayey silt


Sandy silt

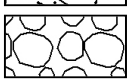

Sand


Clayey sand


Silty sand

Gravel

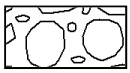
Sandy gravel


Cobbles, boulders

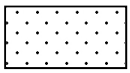
Talus

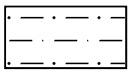
Sedimentary Rocks

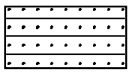
Boulder conglomerate

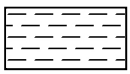

Conglomerate

Conglomeratic sandstone

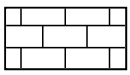

Sandstone


Siltstone

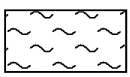

Laminite

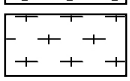

Mudstone, claystone, shale

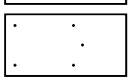
Coal


Limestone

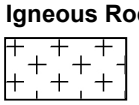
Metamorphic Rocks

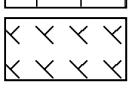

Slate, phyllite, schist

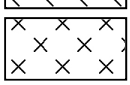

Gneiss

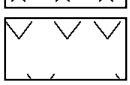

Quartzite

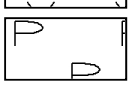
Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: Port Authority of NSW
PROJECT: Proposed Multi-User Facility
LOCATION: James Craig Road, Glebe Island

SURFACE LEVEL: 2.89 AHD
EASTING: 332143.88
NORTHING: 6251260.08
DIP/AZIMUTH: 90°/--

BORE No: 1
PROJECT No: 86059.00
DATE: 9/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Water	Fracture Spacing (m)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
	0.07	CONCRETE SLAB										
	0.35	FILLING - grey sandy gravel filling, moist (roadbase)										
		FILLING - yellow crushed sandstone filling, moist							E*			
									E			
		2.9m: becomes wet				▼			S			4,5,4 N = 9
	4.1	SANDSTONE - very low strength, light grey, medium to coarse grained sandstone						Note: Unless otherwise stated, rock is fractured along rough planar bedding dipping 0°- 10°	S/E			25/140mm refusal
	5.1	SANDSTONE - low strength, fresh, slightly fractured, light grey, medium to coarse grained sandstone with some laminations						5.98m: Cs, 20mm				PL(A) = 0.23
	6.2	SANDSTONE - medium strength, fresh then slightly weathered, slightly fractured and unbroken, light grey and orange, medium grained sandstone with high strength iron-cemented bands							C	100	99	PL(A) = 0.3
												PL(A) = 1.49
								8.2m: B0°- 10°, un, ro, fe stn				PL(A) = 0.69
								8.77m: B10°, pl, ro, cly, >>3mm 9.2-9.4m: J70°, pl, ro, fe stn	C	100	100	
	9.65	Bore discontinued at 9.65m - target depth reached										PL(A) = 0.57

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** JN **CASING:** HW to 4.0m; HQ to 5.0m

TYPE OF BORING: 150mm diameter Diatube to 0.07m; Solid flight auger (TC-bit) to 2.5m; Rotary (water) to 5.0m; NMLC-Coring to 9.65m

WATER OBSERVATIONS: Free groundwater observed at 2.9m

REMARKS: *BD2/0170801 taken at 1.4m to 1.5m

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: Port Authority of NSW
PROJECT: Proposed Multi-User Facility
LOCATION: James Craig Road, Glebe Island

SURFACE LEVEL: 2.81 AHD
EASTING: 332170.79
NORTHING: 6251323.87
DIP/AZIMUTH: 90°/--

BORE No: 2
PROJECT No: 86059.00
DATE: 15 - 16/8/2017
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
	0.08	CONCRETE SLAB										
	0.3	FILLING - grey sandy gravel filling (roadbase)										
		FILLING - yellow crushed sandstone filling, moist							S/E			13,30/130mm refusal
	2.0	FILLING - light grey-brown, coarse sand and crushed sandstone gravel filling, moist to wet				▼			S/E			6,3,3 N = 6
		2.6m: becoming wet										
	4.0	FILLING - light grey-brown, crushed sandstone and sand filling							S/E			4,11,13 N = 24
		5.6m: some carbonaceous material/possible decomposed organic matter							S/E			11,6,4 N = 10
	7.0	FILLING - grey-brown clayey sand filling with crushed sandstone							S/E			3,1,6 N = 7
									S/E			12,16,9 N = 25
	9.5	CLAYEY SAND - see next page										

RIG: Scout **DRILLER:** RKE **LOGGED:** SI **CASING:** HW to 8.0m; HQ to 18.5m

TYPE OF BORING: 150mm diameter diatube to 0.08m; NDD to 1.20m; Solid flight auger to 4.0m; Rotary to 18.5m; NMLC-Coring to 23.0m

WATER OBSERVATIONS: Free groundwater observed at 2.6m whilst augering

REMARKS:

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: Port Authority of NSW
PROJECT: Proposed Multi-User Facility
LOCATION: James Craig Road, Glebe Island

SURFACE LEVEL: 2.81 AHD
EASTING: 332170.79
NORTHING: 6251323.87
DIP/AZIMUTH: 90°/--

BORE No: 2
PROJECT No: 86059.00
DATE: 15 - 16/8/2017
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Water	Fracture Spacing (m)	Discontinuities	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
			EW HW MW SW FS FR		Ex Low / Very Low / Low / Medium / High / Very High / Ex High		0.01 / 0.05 / 0.10 / 0.50 / 1.00	B - Bedding J - Joint S - Shear F - Fault				
-8	11	CLAYEY SAND - very loose to loose, grey, fine to medium grained clayey sand with some seashell fragments *(continued)* 10.3m: becoming loose							S/E			2,1,5 N = 6
	11.2	CLAYEY SAND/SANDY CLAY - loose/firm, brown, fine to medium clayey sand/sandy clay										
-9	12								S/E			3,2,3 N = 5
-10	13	13.0 CLAYEY SAND - medium dense, mottled brown-light grey, fine to medium clayey sand							S/E			5,7,17 N = 24
-11	14	14.0 SAND - medium dense, brown, fine to medium grained sand, saturated										
-12	15								S/E			8,10,6 N = 16
-13	16											
	16.2	CLAY - hard, mottled brown-light grey clay (extremely weathered sandstone)							S/E			12,16,22 N = 38
-14	17											
	17.6	SANDSTONE - very low strength, brown, medium grained sandstone						Note: Unless otherwise stated, rock is fractured along rough planar bedding dipping 0°- 10°	S/E			31/130mm refusal
-15	18											
	18.53	SANDSTONE - high strength, slightly weathered then fresh, slightly fractured and unbroken, light grey-brown then light grey, medium grained sandstone						18.54, 18.97m: B's 5°, fe 19.27, 19.78m: B (x7) 5°, cly vn, ti	C	100	98	PL(A) = 1.24 PL(A) = 1.21
-16	19											
-17												

RIG: Scout **DRILLER:** RKE **LOGGED:** SI **CASING:** HW to 8.0m; HQ to 18.5m

TYPE OF BORING: 150mm diameter diatube to 0.08m; NDD to 1.20m; Solid flight auger to 4.0m; Rotary to 18.5m; NMLC-Coring to 23.0m

WATER OBSERVATIONS: Free groundwater observed at 2.6m whilst augering

REMARKS:

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: Port Authority of NSW
PROJECT: Proposed Multi-User Facility
LOCATION: James Craig Road, Glebe Island

SURFACE LEVEL: 2.81 AHD
EASTING: 332170.79
NORTHING: 6251323.87
DIP/AZIMUTH: 90°/--

BORE No: 2
PROJECT No: 86059.00
DATE: 15 - 16/8/2017
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
-18	21	SANDSTONE - high strength, slightly weathered then fresh, slightly fractured and unbroken, light grey-brown then light grey, medium grained sandstone *(continued)*						20.8, 21.02m: B (x2) cly, 2mm	C	100	98	PL(A) = 1.62
												PL(A) = 1.84
-19	22							22.02-22.07m: fg	C	100	96	PL(A) = 1.5
-20	23											PL(A) = 2.17
	23.5	Bore discontinued at 23.5m										
-21	24											
-22	25											
-23	26											
-24	27											
-25	28											
-26	29											
-27												

RIG: Scout **DRILLER:** RKE **LOGGED:** SI **CASING:** HW to 8.0m; HQ to 18.5m

TYPE OF BORING: 150mm diameter diatube to 0.08m; NDD to 1.20m; Solid flight auger to 4.0m; Rotary to 18.5m; NMLC-Coring to 23.0m

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REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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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: Port Authority of NSW
PROJECT: Proposed Multi-User Facility
LOCATION: James Craig Road, Glebe Island

SURFACE LEVEL: 2.40 AHD
EASTING: 334295.53
NORTHING: 6251275.46
DIP/AZIMUTH: 90°/--

BORE No: 3
PROJECT No: 86059.00
DATE: 9 - 11/8/2017
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
2.39	0.01	ASPHALTIC CONCRETE										
2.32	0.08	PAVERS										
2.27	0.13	CONCRETE SLAB										
2.00	0.4	FILLING - grey sandy gravel filling, moist (roadbase)										
1.40	1	FILLING - yellow crushed sandstone filling, moist							S/E			18,25/120mm refusal
0.70	1.7	FILLING - red-brown medium to coarse grained sand filling with some sandstone gravel and a trace of clay, moist 2.0m: becoming wet				▼			A/E			
-0.80	3.2	FILLING - medium dense, black, medium grained peaty sand filling with organic clay and some timber pieces and seashell fragments, wet							S/E			4,11,7 N = 18
-2.80	5								S/E			8,6,6 N = 12
-4.80	7	7.0m: strong sulphur dioxide odour							S/E			10/100mm refusal bouncing
-5.00	7.3	FILLING - light grey-brown, medium to high strength sandstone boulder filling						7.7m: CORE LOSS: 170mm 8m: CORE LOSS: 260mm 8.67m: CORE LOSS: 200mm 9m: CORE LOSS: 200mm				
-5.47	7.87											
-5.73	8.13											
-5.86	8.26											
-6.47	8.87											
-6.73	9.13											
-6.80	9.2											
-6.93	9.33	SANDY CLAY - firm to stiff, grey and orange fine sandy clay, wet							S/E			15,8,2 N = 10

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** JN **CASING:** HW to 7.5m; HQ to 12.0m

TYPE OF BORING: Diatube to 0.13m; NDD to1.0m; Solid flight auger to 4.0m; Rotary (water) to 7.6m; NMLC-Coring to 9.3m; Rotary (mud) to19.1m; NMLC-Coring to 24.10m

WATER OBSERVATIONS: Free groundwater observed at 2.0m

REMARKS:

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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BORE No: 3
PROJECT No: 86059.00
DATE: 9 - 11/8/2017
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
-8		SANDY CLAY - firm to stiff, grey and orange fine sandy clay, wet *(continued)*										
	11											
-9									S/E			1,1,4 N = 5
	12								U_{50}			
-10												
	13											
	13.2	SAND - medium dense, grey, medium to coarse grained sand with some clay, wet							S/E			8,5,6 N = 11
-11												
	14											
-12	14.4	SAND - medium dense, orange, medium to coarse grained sand with a trace of clay, wet							S/E			7,11,13 N = 24
	15											
-13												
	16	16.0 CLAYEY SAND - medium dense, orange mottled red clayey sand, wet							S/E			10,7,8 N = 15
-14		16.3 SANDY CLAY - stiff, grey sandy clay, moist										
	17											
-15	17.5	SAND - medium dense, grey, medium to coarse grained sand with some clay, wet										
		17.8 SANDY CLAY - hard, orange-brown sandy clay, moist						Note: Unless otherwise stated, rock is fractured along rough planar bedding dipping 0°- 10°				
-16	18											
	18.7	SANDSTONE - very low strength, light grey, fine to medium grained sandstone							S/E			10,18,19 N = 37 14/50mm refusal
	19	19.1 SANDSTONE - low strength, highly weathered, slightly fractured, light grey and red, fine to medium grained sandstone with medium strength iron-cemented bands							S/E			bouncing
-17									C	100	90	PL(A) = 0.12 PL(A) = 0.39

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** JN **CASING:** HW to 7.5m; HQ to 12.0m

TYPE OF BORING: Diatube to 0.13m; NDD to1.0m; Solid flight auger to 4.0m; Rotary (water) to 7.6m; NMLC-Coring to 9.3m; Rotary (mud) to19.1m; NMLC-Coring to 24.10m

WATER OBSERVATIONS: Free groundwater observed at 2.0m

REMARKS:

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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-18	20.15	SANDSTONE - high strength, slightly weathered, fractured and slightly fractured, light grey and brown, medium grained sandstone						20.15m: B0°, pl, ro, cly, 5mm 20.20-20.45m: J70°, pl, fe stn, he 20.4-20.55m: J (x6) 0°-45°, cu, fe stn, fe	C	100	90	PL(A) = 0.22
	20.6	SANDSTONE - high strength, fresh stained then fresh, slightly fractured then unbroken, light grey medium grained sandstone with occasional clay bands						20.5m: B10°, pl, ro, fe stn, cly, 2mm 20.67m: J45°, pl, ro, fe stn 20.78-20.90m: B0°- 10°, un, ro, fe stn 21.4m: Cs, 10mm 21.6-21.65m: J (x4) 10°-60°, pl, ro, cln 21.65m: Cs, 10mm 21.93m: J30°, un, ro, cln				PL(A) = 1.48
-19	21											
-20	22								C	100	98	PL(A) = 1.64
-21	23											
	24							23.87m: J45°, pl, ro, cly, 5mm				PL(A) = 1.66
-22	24.1	Bore discontinued at 24.1m - target depth reached										
	25											
-23	26											
-24	27											
-25	28											
-26	29											
-27												

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** JN **CASING:** HW to 7.5m; HQ to 12.0m

TYPE OF BORING: Diatube to 0.13m; NDD to1.0m; Solid flight auger to 4.0m; Rotary (water) to 7.6m; NMLC-Coring to 9.3m; Rotary (mud) to19.1m; NMLC-Coring to 24.10m

WATER OBSERVATIONS: Free groundwater observed at 2.0m

REMARKS:

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

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LOCATION: James Craig Road, Glebe Island

SURFACE LEVEL: 2.47 AHD
EASTING: 332216.58
NORTHING: 6251346.82
DIP/AZIMUTH: 90°/--

BORE No: 4
PROJECT No: 86059.00
DATE: 17/8/2017
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
	0.08	CONCRETE SLAB										
	0.3	FILLING - grey sandy gravel filling, moist (roadbase)										
		FILLING - yellow crushed sandstone filling, moist										
	1.0	FILLING - light grey and brown, medium to coarse sand and crushed sandstone gravel filling, moist							S/E			14,8,10 N = 18
									A/E			
	2.1	FILLING - light grey crushed sandstone filling with sand and occasional sandstone boulders, wet				▼			S/E			4,4,7 N = 11
									A/E			
									A/E			
									S/E			4,10,4 N = 14
									S/E			8,11,15 N = 26
									S/E			14,22,30/120mm refusal
									S/E			8,16,11 N = 27

RIG: Scout **DRILLER:** RKE **LOGGED:** SI **CASING:** HW to 4.0m; HQ to 20.5m

TYPE OF BORING: Diatube to 0.08m; NDD to 1.0m; Solid flight auger to 4.0m; Rotary to 22.5m; NMLC-Coring to 27.6m

WATER OBSERVATIONS: Free groundwater observed at 2.1m whilst augering

REMARKS:

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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BORE No: 4
PROJECT No: 86059.00
DATE: 17/8/2017
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
-8	11	FILLING - light grey crushed sandstone filling with sand and occasional sandstone boulders, wet *(continued)*							S/E			9,22,18 N = 40
-9	12								S/E			6,7,16 N = 23
-10	12.7	CLAYEY SAND - loose, olive grey, fine grained clayey sand with some seashell fragments										
-11	13								S/E			3,4,4 N = 8
-12	14	13.8-14.3m: becoming sandy clay with a trace of shell fragments										
	14.6	CLAY - stiff, light grey fine clay with trace of sand							S/E			10,6,4 N = 10
-13	15								U_{50}			pp = 110
-14	16	16.0 CLAYEY SAND - medium dense, light grey-brown, fine to medium clayey sand, wet										
-15	17											
	17.5	CLAY - very stiff, grey clay							S/E			5,11,18 N = 29
-16	18											
-17	19	19.0m: becoming hard mottled red-brown with ironstone gravel							S/E			7,13,17 N = 30

RIG: Scout **DRILLER:** RKE **LOGGED:** SI **CASING:** HW to 4.0m; HQ to 20.5m

TYPE OF BORING: Diatube to 0.08m; NDD to 1.0m; Solid flight auger to 4.0m; Rotary to 22.5m; NMLC-Coring to 27.6m

WATER OBSERVATIONS: Free groundwater observed at 2.1m whilst augering

REMARKS:

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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SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
	20.2	CLAY - very stiff, grey clay *(continued)*										
		CLAYEY SAND - dense, light grey, fine grained clayey sand							S/E			5,12,20 N = 32
	21.8	SANDSTONE - very low strength, light grey, medium grained sandstone						Note: Unless otherwise stated, rock is fractured along rough planar bedding dipping 0°- 10°	S/E			30/150mm refusal
	22.5	SANDSTONE - medium to high then high strength, moderately to slightly weathered then fresh, slightly fractured, brown then light grey, medium grained sandstone						22.65m: B10°, cly, 10mm 23.03m: B10°, fe 23.1m: B0°, cly co 23.35m: B0°, fe, cly, 2mm 23.62, 24.25m: B (x2) 5°, cly vn, ti	C	100	96	PL(A) = 1.01 PL(A) = 1.22
		25.83-25.91m: some siltstone clasts						24.7m: B10°, cbs co, 1mm 25.45m: J45°, pl, sm, siltstone clast 25.56m: B5°, cly, 10mm 25.76-25.91m: sz, fg 25.83-25.91m: siltstone clasts 25.91m: B20°, cly vn, ti 26.5m: B5°, cly co, 2mm 27.16m: B5°, cbs co, 1mm	C	100	95	PL(A) = 1.55 PL(A) = 1.11 PL(A) = 1.71 PL(A) = 1.68
	27.6	Bore discontinued at 27.6m										

RIG: Scout **DRILLER:** RKE **LOGGED:** SI **CASING:** HW to 4.0m; HQ to 20.5m

TYPE OF BORING: Diatube to 0.08m; NDD to 1.0m; Solid flight auger to 4.0m; Rotary to 22.5m; NMLC-Coring to 27.6m

WATER OBSERVATIONS: Free groundwater observed at 2.1m whilst augering

REMARKS:

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

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SURFACE LEVEL: 2.41 AHD
EASTING: 332234.35
NORTHING: 6251380.77
DIP/AZIMUTH: 90°/--

BORE No: 5
PROJECT No: 86059.00
DATE: 18 - 19/8/2017
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
	0.09	CONCRETE SLAB										
	0.4	FILLING - grey sandy gravel filling, moist (roadbase)										
		FILLING - yellow crushed sandstone filling										
	1.1	FILLING - crushed sandstone filling with some medium to coarse sand, moist 1.7m: becoming wet				▼			A/E* S/E			1,16/50mm refusal
									A/E			
									S/E			16,20/50mm refusal
									S/E			10,30/150mm refusal
	5.0	FILLING - light grey-brown, medium to coarse sand and crushed sandstone gravel filling							S/E			8,14,14 N = 28
									S/E			9,7,5 N = 12
	8.0	FILLING - light grey-brown, crushed sandstone gravel filling with some sand							S/E			23,19,18 N = 37

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** SI **CASING:** HW to 2.5m; HQ to 26.5m

TYPE OF BORING: Diatube to 0.09m; NDD to 1.10m; Solid flight auger to 2.5m; Rotary to 26.5m; NMLC-Coring to 31.8m

WATER OBSERVATIONS: Free groundwater observed at 1.7m whilst augering

REMARKS: *BD1/18082017 taken at 1.1-1.2m

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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RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
-8		FILLING - light grey-brown, crushed sandstone gravel filling with some sand *(continued)*							S/E			8,10,27 N = 37
-9	11											
	11.8	FILLING - soft, olive-grey clay with some crushed sandstone gravel							S/E			3,12,26 N = 38
-10	12 12.0	CLAYEY SAND - loose, olive-grey, fine to medium grained clayey sand, saturated										
-11	13								S/E			3,4,4 N = 8
-12	14 14.0	CLAY - stiff, grey clay with a trace of fine sand, wet							S/E			6,7,8 N = 15 (no recovery)
-13	15								U_{50}			pp = 110
-14	16 16.0	CLAY - very stiff, mottled brown, slightly silty, light grey clay							S/E			10,12,16 N = 28
-15	17	- becoming grey at 17.5m							S/E			7,10,11 N = 21
-16	18											
-17	19 19.0	CLAY - hard, mottled brown and grey clay, moist,							S/E			8,17,22 N = 39

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** SI **CASING:** HW to 2.5m; HQ to 26.5m

TYPE OF BORING: Diatube to 0.09m; NDD to 1.10m; Solid flight auger to 2.5m; Rotary to 26.5m; NMLC-Coring to 31.8m

WATER OBSERVATIONS: Free groundwater observed at 1.7m whilst augering

REMARKS: *BD1/18082017 taken at 1.1-1.2m

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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PROJECT No: 86059.00
DATE: 18 - 19/8/2017
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Water	Fracture Spacing (m)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
-18	20.5	CLAY - hard, mottled brown and grey clay, moist, *(continued)*										
		CLAY - very stiff, mottled yellow-grey clay, moist							S			6,8,10 N = 18
-19	21											
	22.0	CLAY - firm to stiff, grey clay, wet							S			0,0,4 N = 4
-20	23	23.0m: becoming stiff										
-21									S			1,4,6 N = 10 (no recovery)
	24	24.0m: becoming slightly sandy							S			0,0,7 N = 7
-22	25.0	CLAYEY SAND - medium dense, light grey to grey, fine to medium grained clayey sand										
-23	26.0	SANDSTONE - extremely low strength, light grey-brown, fine to medium grained sandstone						Note: Unless otherwise stated, rock is fractured along rough planar bedding dipping 0°- 10°	S			8,7,13 N = 20
-24	26.5	SANDSTONE - low to medium then medium strength, moderately weathered, slightly fractured, brown, medium grained sandstone						27.15m: J70°, un, ro, fe 27.33-27.43m: Ds				PL(A) = 0.36
-25	27											
	28							27.8m: B10°, fe	C	100	89	PL(A) = 0.67
-26	28.35	SANDSTONE - high strength, moderately weathered then fresh, slightly fractured, light grey-brown, medium grained sandstone										PL(A) = 1.53
	29							28.75-28.78m: Cs 28.95-29.0m Ds 29.05m: J (partially) 45°,un, ro, he				
-27								29.5m: J20°, pl, sm, cbs cly	C	100	100	PL(A) = 1.12

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** SI **CASING:** HW to 2.5m; HQ to 26.5m

TYPE OF BORING: Diatube to 0.09m; NDD to 1.10m; Solid flight auger to 2.5m; Rotary to 26.5m; NMLC-Coring to 31.8m

WATER OBSERVATIONS: Free groundwater observed at 1.7m whilst augering

REMARKS: *BD1/18082017 taken at 1.1-1.2m

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)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Port Authority of NSW
PROJECT: Proposed Multi-User Facility
LOCATION: James Craig Road, Glebe Island

SURFACE LEVEL: 2.41 AHD
EASTING: 332234.35
NORTHING: 6251380.77
DIP/AZIMUTH: 90°/--

BORE No: 5
PROJECT No: 86059.00
DATE: 18 - 19/8/2017
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
-28		SANDSTONE - high strength, moderately weathered then fresh, slightly fractured, light grey-brown, medium grained sandstone *(continued)*						30.3m: B5°, cly co, 2mm				
	31								C	100	100	PL(A) = 1.5
-29								31.25-31.45m: B (x2) 5°, cly vn, ti				
	31.8	Bore discontinued at 31.8m										PL(A) = 1.6
-30	32											
	33											
-31												
	34											
-32												
	35											
-33												
	36											
-34												
	37											
-35												
	38											
-36												
	39											
-37												

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** SI **CASING:** HW to 2.5m; HQ to 26.5m

TYPE OF BORING: Diatube to 0.09m; NDD to 1.10m; Solid flight auger to 2.5m; Rotary to 26.5m; NMLC-Coring to 31.8m

WATER OBSERVATIONS: Free groundwater observed at 1.7m whilst augering

REMARKS: *BD1/18082017 taken at 1.1-1.2m

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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Table A - Summary of Results

					Inorganics			Metals								TPH										BTEX						Halogenated Benzenes
				Asbestos ID	Chloride	Moisture	Sulphate	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	C10-C16	C16-C34	C34-C40	F2-NAPHTHALENE	C6 - C9	C10 - C14	C15 - C28	C29-C36	C10 - C40 (Sum of total)	C6-C10 less BTEX (F1)	C6-C10	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	Hexachlorobenzene
				g/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.1	10	0.1	10	4	0.4	1	1	1	0.1	1	1	50	100	100	50	25	50	100	100	50	25	25	0.2	1	0.5	2	1	1	0.1
NSW EPA 2014 - GSW CT1 (No TCLP)								100	20			100	4	40													10	600	288			1000	
NSW EPA 2014 - GSW SCC1 (using TCLP)								500	100			1500	50	1050						650							18	1080	518			1800	
NSW EPA 2014 - RSW CT2 (No TCLP)								400	80			400	16	160													40	2400	1152			4000	
NSW EPA 2014 - RSW SCC2 (using TCLP)								2000	400			6000	200	4200						2600							72	4320	2073			7200	
National Background Levels								1-53	0.016-0.7	2.5-673	0.4-412	2-81		1-517	1-263												0.05-1		0.1-1				
ASSMAC Action Criteria (<1000T medium texture sandy loams to light clays 5-40% clay content disturbed)																																
Field_ID	**Sample_Depth_Range**	**Filling (F) / Natural (N)**	**Matrix_Type**																													
BD1	Field Replicate of BH5/1.1-1.2	F	SOIL	No asbestos detected	-	11	-	<4	<0.4	6	7	34	<0.1	1	19	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH1	1.4-1.5	F	SOIL	No asbestos detected	-	9.6	-	<4	<0.4	8	2	6	<0.1	<1	9	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH1	2.4-2.5	F	SOIL	No asbestos detected	83	8.5	48	<4	<0.4	11	2	5	<0.1	<1	13	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH1 - [TRIPLICATE]	1.4-1.5	F	SOIL	-	-	-	-	<4	<0.4	11	4	5	<0.1	<1	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	1.2-1.3	F	SOIL	No asbestos detected	-	6.6	-	<4	<0.4	8	6	15	<0.1	3	25	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH2	2.5-2.6	F	SOIL	No asbestos detected	-	9.3	-	<4	<0.4	11	6	14	0.1	2	19	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH2	4-4.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	7-7.45	F	SOIL	-	1600	-	380	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	8.5-8.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	10-10.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	11.5-11.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	14.5-14.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	16-16.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	1-1.27	F	SOIL	No asbestos detected	-	8.1	-	<4	<0.4	8	3	17	<0.1	3	24	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH3	2.4-2.5	F	SOIL	No asbestos detected	-	14	-	<4	<0.4	12	10	45	0.2	2	24	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH3	4-4.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	5.5-5.95	F	SOIL	-	940	-	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	11.5-11.95	N	SOIL	-	3300	-	370	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	14.5-14.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	16-16.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	17.5-17.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	1-1.45	F	SOIL	No asbestos detected	-	11	-	<4	<0.4	8	110	34	<0.1	3	92	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH4	2-2.1	F	SOIL	No asbestos detected	-	9	-	12	<0.4	13	150	44	<0.1	10	84	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH4	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	7-7.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	8.5-8.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	10-10.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	11.5-11.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	13-13.45	N	SOIL	-	2300	-	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	14.5-14.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	17.5-17.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	19-19.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	20.5-20.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	22-22.15	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	1.1-1.2	F	SOIL	No asbestos detected	-	9.8	-	<4	<0.4	7	9	17	<0.1	1	10	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH5	2-2.1	F	SOIL	No asbestos detected	-	13	-	<4	<0.4	9	8	15	<0.1	2	53	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<0.1
BH5	2.5-2.7	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	4-4.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	7-7.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	8.5-8.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	10-10.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	11.5-11.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	16-16.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A - Summary of Results

				PAH/Phenols														Polychlorinated Biphenyls								Organochlorine Pesticides													
				Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Phenolics Total	Pyrene	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	4,4-DDE	a-BHC	Aldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NSW EPA 2014 - GSW CT1 (No TCLP)								0.8																															
NSW EPA 2014 - GSW SCC1 (using TCLP)								10																	49.999														
NSW EPA 2014 - RSW CT2 (No TCLP)								3.2																															
NSW EPA 2014 - RSW SCC2 (using TCLP)								23																	49.999														
National Background Levels																	0.03-0.5																						
ASSMAC Action Criteria (<1000T medium texture sandy loams to light clays 5-40% clay content distu																																							
Field_ID	**Sample_Depth_Range**	**Filling (F) / Natural (N)**	**Matrix_Type**																																				
BD1	Field Replicate of BH5/1.1-1.2	F	SOIL	<0.1	<0.1	<0.1	0.1	0.1	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<5	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH1	1.4-1.5	F	SOIL	<0.1	<0.1	<0.1	0.1	0.3	0.3	0.1	<0.1	0.1	<0.1	0.3	<0.1	<0.1	<5	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH1	2.4-2.5	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH1 - [TRIPLICATE]	1.4-1.5	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	1.2-1.3	F	SOIL	<0.1	<0.1	<0.1	0.1	0.2	0.1	0.2	<0.1	0.2	<0.1	0.1	<0.1	<0.1	<5	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH2	2.5-2.6	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH2	4-4.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	7-7.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	8.5-8.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	10-10.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	11.5-11.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	14.5-14.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	16-16.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	1-1.27	F	SOIL	<0.1	<0.1	<0.1	<0.1	0.08	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1	<5	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH3	2.4-2.5	F	SOIL	<0.1	<0.1	<0.1	0.2	0.3	0.2	0.2	<0.1	0.5	<0.1	0.2	<0.1	0.2	<5	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH3	4-4.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	11.5-11.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	14.5-14.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	16-16.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	17.5-17.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	1-1.45	F	SOIL	<0.1	0.1	0.1	0.5	0.63	0.3	0.5	<0.1	0.9	<0.1	0.4	<0.1	0.4	<5	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH4	2-2.1	F	SOIL	<0.1	<0.1	<0.1	0.1	0.08	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<5	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH4	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	7-7.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	8.5-8.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	10-10.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	11.5-11.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	14.5-14.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	17.5-17.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	19-19.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	20.5-20.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	22-22.15	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	1.1-1.2	F	SOIL	<0.1	<0.1	<0.1	0.2	0.2	0.1	0.2	<0.1	0.3	<0.1	0.1	<0.1	0.2	<5	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH5	2-2.1	F	SOIL	<0.1	<0.1	<0.1	0.1	0.2	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<5	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH5	2.5-2.7	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	4-4.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	7-7.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	8.5-8.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	10-10.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	11.5-11.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	16-16.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A - Summary of Results

				Organophosphorus Pesticides																		Pesticides	ASS Screening				Chromium Reducible Sulfur Suite		
				Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Ronnel	Parathion	pH (Field)	pH-H2O2	Change	Reaction Rate	TPA/TAA	Soxidisable	Net Acidity
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH_Units	pH_Units	pH_Units		mol H^+/tonne	%	mol H+/tonne
EQL				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1				
NSW EPA 2014 - GSW CT1 (No TCLP)													4																
NSW EPA 2014 - GSW SCC1 (using TCLP)													7.5																
NSW EPA 2014 - RSW CT2 (No TCLP)													16																
NSW EPA 2014 - RSW SCC2 (using TCLP)													30																
National Background Levels																													
ASSMAC Action Criteria (<1000T medium texture sandy loams to light clays 5-40% clay content distur																						<4	<3.5	>1		36	0.06		
Field_ID	**Sample_Depth_Range**	**Filling (F) / Natural (N)**	**Matrix_Type**																											
BD1	Field Replicate of BH5/1.1-1.2	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH1	1.4-1.5	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH1	2.4-2.5	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH1 - [TRIPLICATE]	1.4-1.5	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	1.2-1.3	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH2	2.5-2.6	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH2	4-4.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.6	6.3	1.3	Slight	-	-	-
BH2	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.3	3.1	4.2	Slight	<5	0.05	32
BH2	7-7.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.1	6.1	2	Slight	-	-	-
BH2	8.5-8.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2	6.3	1.9	Slight	-	-	-
BH2	10-10.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2	6.4	1.8	Moderate	-	-	-
BH2	11.5-11.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2	6.8	1.4	Slight	-	-	-
BH2	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.5	7	0.5	Moderate	-	-	-
BH2	14.5-14.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	6.4	1.3	Slight	-	-	-
BH2	16-16.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.1	4.2	0.9	Slight	-	-	-
BH3	1-1.27	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH3	2.4-2.5	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH3	4-4.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	3.8	3.9	Moderate	<5	<0.005	<5
BH3	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	6.5	2.5	Moderate	-	-	-
BH3	11.5-11.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.5	6.2	1.3	Slight	-	-	-
BH3	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.6	4.6	2	Slight	-	-	-
BH3	14.5-14.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.2	4.2	1	Slight	-	-	-
BH3	16-16.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3	5.2	0.1	Moderate	-	-	-
BH3	17.5-17.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	3.8	1	Moderate	-	-	-
BH4	1-1.45	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH4	2-2.1	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH4	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.5	6.3	1.2	Slight	<5	<0.005	<5
BH4	7-7.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	8.1	-0.4	Vigorous	-	-	-
BH4	8.5-8.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.6	7.9	-0.3	Vigorous	-	-	-
BH4	10-10.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.9	7.9	0	Moderate	-	-	-
BH4	11.5-11.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	8.2	-0.4	Vigorous	-	-	-
BH4	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2	7.8	0.4	Moderate	-	-	-
BH4	14.5-14.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.3	7.2	0.1	Slight	-	-	-
BH4	17.5-17.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3	4.8	0.5	Slight	-	-	-
BH4	19-19.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.2	3.9	1.3	Slight	16	<0.005	16
BH4	20.5-20.95	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.9	5.8	0.1	Slight	-	-	-
BH4	22-22.15	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.4	6.5	-1.1	Moderate	-	-	-
BH5	1.1-1.2	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH5	2-2.1	F	SOIL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH5	2.5-2.7	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.5	8.5	1	Vigorous	-	-	-
BH5	4-4.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	8.4	2.6	Slight	-	-	-
BH5	5.5-5.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.7	8.9	-0.2	Vigorous	-	-	-
BH5	7-7.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.8	4.2	2.6	Moderate	<5	0.02	<5
BH5	8.5-8.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.3	6.9	0.4	Slight	-	-	-
BH5	10-10.45	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.4	7.9	-0.5	Vigorous	-	-	-
BH5	11.5-11.95	F	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.9	7.8	0.1	Moderate	-	-	-
BH5	13-13.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	7.6	0.4	Moderate	-	-	-
BH5	16-16.45	N	SOIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.8	7	-0.2	Slight	-	-	-

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CERTIFICATE OF ANALYSIS 174177

Client Details

Client	Douglas Partners Pty Ltd
Attention	Scott Easton
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86059.00, Glebe Island Multi User Facility**
Number of Samples	47 soils
Date samples received	24/08/2017
Date completed instructions received	24/08/2017

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.

Report Details

Date results requested by	31/08/2017
Date of Issue	31/08/2017

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Report Comments

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 174177-1 for Zn. Therefore a triplicate result has been issued as laboratory sample number 174177-48.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples requested for asbestos testing were sub-sampled from jars provided by the client.

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Paul Ching
Authorised by Asbestos Approved Signatory: Paul Ching

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Jeremy Faircloth, Organics Supervisor
Long Pham, Team Leader, Metals
Paul Ching, Senior Analyst
Priya Samarawickrama, Senior Chemist

Authorised By

David Springer, General Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		174177-1	174177-2	174177-3	174177-4	174177-14
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		1.4-1.5	2.4-2.5	1.2-1.3	2.5-2.6	1.0-1.27
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
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
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	105	92	99	98	97

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		174177-15	174177-23	174177-24	174177-36	174177-37
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.4-2.5	1-1.45	2.0-2.1	1.1-1.2	2-2.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
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
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	93	99	96	99	96

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		174177-47
Your Reference	UNITS	BD1
Depth		-
Type of sample		soil
Date extracted	-	25/08/2017
Date analysed	-	28/08/2017
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
Total +ve Xylenes	mg/kg	<1
naphthalene	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	99

svTRH (C10-C40) in Soil						
Our Reference		174177-1	174177-2	174177-3	174177-4	174177-14
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		1.4-1.5	2.4-2.5	1.2-1.3	2.5-2.6	1.0-1.27
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	77	76	89	83	92

svTRH (C10-C40) in Soil						
Our Reference		174177-15	174177-23	174177-24	174177-36	174177-37
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.4-2.5	1-1.45	2.0-2.1	1.1-1.2	2-2.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	26/08/2017	26/08/2017	26/08/2017	26/08/2017	26/08/2017
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	94	83	82	89	82

svTRH (C10-C40) in Soil		
Our Reference		174177-47
Your Reference	UNITS	BD1
Depth		-
Type of sample		soil
Date extracted	-	25/08/2017
Date analysed	-	26/08/2017
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	89

PAHs in Soil						
Our Reference		174177-1	174177-2	174177-3	174177-4	174177-14
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		1.4-1.5	2.4-2.5	1.2-1.3	2.5-2.6	1.0-1.27
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	0.2	<0.1	0.1
Pyrene	mg/kg	0.2	<0.1	0.3	<0.1	0.2
Benzo(a)anthracene	mg/kg	0.1	<0.1	0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	0.2	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.4	<0.2	0.4	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.3	<0.05	0.2	<0.05	0.08
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	<0.1	0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.3	<0.1	0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.6	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.6	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.6	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	3.0	<0.05	1.6	<0.05	0.5
Surrogate p-Terphenyl-d14	%	105	96	95	94	92

PAHs in Soil						
Our Reference		174177-15	174177-23	174177-24	174177-36	174177-37
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.4-2.5	1-1.45	2.0-2.1	1.1-1.2	2-2.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	28/08/2017	25/08/2017	25/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	0.4	<0.1	0.2	<0.1
Anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.5	0.9	0.2	0.3	0.2
Pyrene	mg/kg	0.5	0.9	0.2	0.3	0.2
Benzo(a)anthracene	mg/kg	0.2	0.5	0.1	0.2	0.1
Chrysene	mg/kg	0.2	0.5	0.1	0.2	0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.5	1	<0.2	0.4	0.3
Benzo(a)pyrene	mg/kg	0.3	0.63	0.08	0.2	0.2
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	0.4	<0.1	0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	0.3	<0.1	0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	0.8	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	0.8	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	0.8	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	2.8	5.9	0.3	2.0	1.0
Surrogate p-Terphenyl-d14	%	92	91	95	92	89

PAHs in Soil		
Our Reference		174177-47
Your Reference	UNITS	BD1
Depth		-
Type of sample		soil
Date extracted	-	25/08/2017
Date analysed	-	28/08/2017
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.2
Pyrene	mg/kg	0.2
Benzo(a)anthracene	mg/kg	0.1
Chrysene	mg/kg	0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.2
Benzo(a)pyrene	mg/kg	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total +ve PAH's	mg/kg	1.0
Surrogate p-Terphenyl-d14	%	91

Organochlorine Pesticides in soil						
Our Reference		174177-1	174177-2	174177-3	174177-4	174177-14
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		1.4-1.5	2.4-2.5	1.2-1.3	2.5-2.6	1.0-1.27
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	90	88	90	89	92

Organochlorine Pesticides in soil						
Our Reference		174177-15	174177-23	174177-24	174177-36	174177-37
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.4-2.5	1-1.45	2.0-2.1	1.1-1.2	2-2.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	87	88	88	87

Organochlorine Pesticides in soil		
Our Reference		174177-47
Your Reference	UNITS	BD1
Depth		-
Type of sample		soil
Date extracted	-	25/08/2017
Date analysed	-	25/08/2017
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-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
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	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	%	88

Organophosphorus Pesticides						
Our Reference		174177-1	174177-2	174177-3	174177-4	174177-14
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		1.4-1.5	2.4-2.5	1.2-1.3	2.5-2.6	1.0-1.27
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	90	88	90	89	92

Organophosphorus Pesticides						
Our Reference		174177-15	174177-23	174177-24	174177-36	174177-37
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.4-2.5	1-1.45	2.0-2.1	1.1-1.2	2-2.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	87	88	88	87

Organophosphorus Pesticides		
Our Reference		174177-47
Your Reference	UNITS	BD1
Depth		-
Type of sample		soil
Date extracted	-	25/08/2017
Date analysed	-	25/08/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate TCMX	%	88

PCBs in Soil						
Our Reference		174177-1	174177-2	174177-3	174177-4	174177-14
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		1.4-1.5	2.4-2.5	1.2-1.3	2.5-2.6	1.0-1.27
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	90	88	90	89	92

PCBs in Soil						
Our Reference		174177-15	174177-23	174177-24	174177-36	174177-37
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.4-2.5	1-1.45	2.0-2.1	1.1-1.2	2-2.1
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	89	87	88	88	87

PCBs in Soil		
Our Reference		174177-47
Your Reference	UNITS	BD1
Depth		-
Type of sample		soil
Date extracted	-	25/08/2017
Date analysed	-	25/08/2017
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 TCLMX	%	88

Acid Extractable metals in soil						
Our Reference		174177-1	174177-2	174177-3	174177-4	174177-14
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		1.4-1.5	2.4-2.5	1.2-1.3	2.5-2.6	1.0-1.27
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	11	8	11	8
Copper	mg/kg	2	2	6	6	3
Lead	mg/kg	6	5	15	14	17
Mercury	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Nickel	mg/kg	<1	<1	3	2	3
Zinc	mg/kg	9	13	25	19	24

Acid Extractable metals in soil						
Our Reference		174177-15	174177-23	174177-24	174177-36	174177-37
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.4-2.5	1-1.45	2.0-2.1	1.1-1.2	2-2.1
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Arsenic	mg/kg	<4	<4	12	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	8	13	7	9
Copper	mg/kg	10	110	150	9	8
Lead	mg/kg	45	34	44	17	15
Mercury	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	3	10	1	2
Zinc	mg/kg	24	92	84	10	53

Acid Extractable metals in soil			
Our Reference		174177-47	174177-48
Your Reference	UNITS	BD1	BH1 - [TRIPLICATE]
Depth		-	1.4-1.5
Type of sample		soil	soil
Date prepared	-	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	6	11
Copper	mg/kg	7	4
Lead	mg/kg	34	5
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	1	<1
Zinc	mg/kg	19	19

Misc Soil - Inorg						
Our Reference		174177-1	174177-2	174177-3	174177-4	174177-14
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		1.4-1.5	2.4-2.5	1.2-1.3	2.5-2.6	1.0-1.27
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		174177-15	174177-23	174177-24	174177-36	174177-37
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.4-2.5	1-1.45	2.0-2.1	1.1-1.2	2-2.1
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg		
Our Reference		174177-47
Your Reference	UNITS	BD1
Depth		-
Type of sample		soil
Date prepared	-	25/08/2017
Date analysed	-	25/08/2017
Total Phenolics (as Phenol)	mg/kg	<5

Moisture						
Our Reference		174177-1	174177-2	174177-3	174177-4	174177-14
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		1.4-1.5	2.4-2.5	1.2-1.3	2.5-2.6	1.0-1.27
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Moisture	%	9.6	8.5	6.6	9.3	8.1

Moisture						
Our Reference		174177-15	174177-23	174177-24	174177-36	174177-37
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.4-2.5	1-1.45	2.0-2.1	1.1-1.2	2-2.1
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	25/08/2017	25/08/2017	25/08/2017	25/08/2017	25/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Moisture	%	14	11	9.0	9.8	13

Moisture		
Our Reference		174177-47
Your Reference	UNITS	BD1
Depth		-
Type of sample		soil
Date prepared	-	25/08/2017
Date analysed	-	28/08/2017
Moisture	%	11

Asbestos ID - soils						
Our Reference		174177-1	174177-2	174177-3	174177-4	174177-14
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		1.4-1.5	2.4-2.5	1.2-1.3	2.5-2.6	1.0-1.27
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	29/08/2017	29/08/2017	29/08/2017	29/08/2017	29/08/2017
Sample mass tested	g	Approx. 35g	Approx. 40g	Approx. 40g	Approx. 35g	Approx. 35g
Sample Description	-	Brown quartzy soil & rocks	Brown quartzy soil & rocks	Brown quartzy soil & rocks	Brown quartzy soil & rocks	Brown quartzy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		174177-15	174177-23	174177-24	174177-36	174177-37
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.4-2.5	1-1.45	2.0-2.1	1.1-1.2	2-2.1
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	29/08/2017	29/08/2017	29/08/2017	29/08/2017	29/08/2017
Sample mass tested	g	Approx. 35g	Approx. 40g	Approx. 45g	Approx. 35g	Approx. 45g
Sample Description	-	Brown quartzy soil & rocks	Brown quartzy soil & rocks	Brown quartzy soil & rocks	Brown quartzy soil & rocks	Brown quartzy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils		
Our Reference		174177-47
Your Reference	UNITS	BD1
Depth		-
Type of sample		soil
Date analysed	-	29/08/2017
Sample mass tested	g	Approx. 35g
Sample Description	-	Brown quartzy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected
Trace Analysis	-	No asbestos detected

Soil Aggressivity						
Our Reference		174177-2	174177-7	174177-17	174177-18	174177-30
Your Reference	UNITS	BH1	BH2	BH3	BH3	BH4
Depth		2.4-2.5	7-7.45	5.5-5.95	11.5-11.95	13-13.45
Type of sample		soil	soil	soil	soil	soil
pH 1:5 soil:water	pH Units	7.5	8.8	8.7	7.5	8.8
Electrical Conductivity 1:5 soil:water	µS/cm	90	1,300	840	2,300	1,600
Resistivity by calculation	ohm m	110	8.0	12	4.0	6.0
Chloride, Cl 1:5 soil:water	mg/kg	83	1,600	940	3,300	2,300
Sulphate, SO4 1:5 soil:water	mg/kg	48	380	110	370	360

sPOCAS field test						
Our Reference		174177-5	174177-6	174177-7	174177-8	174177-9
Your Reference	UNITS	BH2	BH2	BH2	BH2	BH2
Depth		4-4.45	5.5-5.95	7-7.45	8.5-8.95	10-10.45
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
pH_F (field pH test)*	pH Units	7.6	7.3	8.1	8.2	8.2
pH_{FOX} (field peroxide test)*	pH Units	6.3	3.1	6.1	6.3	6.4
Reaction Rate*	-	Slight	Slight	Slight	Slight	Moderate

sPOCAS field test						
Our Reference		174177-10	174177-11	174177-12	174177-13	174177-16
Your Reference	UNITS	BH2	BH2	BH2	BH2	BH3
Depth		11.5-11.95	13-13.45	14.5-14.95	16-16.45	4-4.45
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
pH_F (field pH test)*	pH Units	8.2	7.5	7.7	5.1	7.7
pH_{FOX} (field peroxide test)*	pH Units	6.8	7.0	6.4	4.2	3.8
Reaction Rate*	-	Slight	Moderate	Slight	Slight	Moderate

sPOCAS field test						
Our Reference		174177-17	174177-18	174177-19	174177-20	174177-21
Your Reference	UNITS	BH3	BH3	BH3	BH3	BH3
Depth		5.5-5.95	11.5-11.95	13-13.45	14.5-14.95	16-16.45
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
pH_F (field pH test)*	pH Units	9.0	7.5	6.6	5.2	5.3
pH_{FOX} (field peroxide test)*	pH Units	6.5	6.2	4.6	4.2	5.2
Reaction Rate*	-	Moderate	Slight	Slight	Slight	Moderate

sPOCAS field test						
Our Reference		174177-22	174177-25	174177-26	174177-27	174177-28
Your Reference	UNITS	BH3	BH4	BH4	BH4	BH4
Depth		17.5-17.95	5.5-5.95	7-7.45	8.5-8.95	10-10.45
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
pH_F (field pH test)*	pH Units	4.8	7.5	7.7	7.6	7.9
pH_{FOX} (field peroxide test)*	pH Units	3.8	6.3	8.1	7.9	7.9
Reaction Rate*	-	Moderate	Slight	Vigorous	Vigorous	Moderate

sPOCAS field test						
Our Reference		174177-29	174177-30	174177-31	174177-32	174177-33
Your Reference	UNITS	BH4	BH4	BH4	BH4	BH4
Depth		11.5-11.95	13-13.45	14.5-14.95	17.5-17.95	19-19.45
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
pH_F (field pH test)*	pH Units	7.8	8.2	7.3	5.3	5.2
pH_{FOX} (field peroxide test)*	pH Units	8.2	7.8	7.2	4.8	3.9
Reaction Rate*	-	Vigorous	Moderate	Slight	Slight	Slight

sPOCAS field test						
Our Reference		174177-34	174177-35	174177-38	174177-39	174177-40
Your Reference	UNITS	BH4	BH4	BH5	BH5	BH5
Depth		20.5-20.95	22-22.15	2.5-2.7	4-4.45	5.5-5.95
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
pH_F (field pH test)*	pH Units	5.9	5.4	9.5	11.0	8.7
pH_{FOX} (field peroxide test)*	pH Units	5.8	6.5	8.5	8.4	8.9
Reaction Rate*	-	Slight	Moderate	Vigorous	Slight	Vigorous

sPOCAS field test						
Our Reference		174177-41	174177-42	174177-43	174177-44	174177-45
Your Reference	UNITS	BH5	BH5	BH5	BH5	BH5
Depth		7-7.45	8.5-8.95	10-10.45	11.5-11.95	13-13.45
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
Date analysed	-	28/08/2017	28/08/2017	28/08/2017	28/08/2017	28/08/2017
pH_F (field pH test)*	pH Units	6.8	7.3	7.4	7.9	8.0
pH_{FOX} (field peroxide test)*	pH Units	4.2	6.9	7.9	7.8	7.6
Reaction Rate*	-	Moderate	Slight	Vigorous	Moderate	Moderate

sPOCAS field test		
Our Reference		174177-46
Your Reference	UNITS	BH5
Depth		16-16.45
Type of sample		soil
Date prepared	-	28/08/2017
Date analysed	-	28/08/2017
pH_F (field pH test)*	pH Units	6.8
pH_{FOX} (field peroxide test)*	pH Units	7.0
Reaction Rate*	-	Slight

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-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA 22nd ED 2510 and Rayment & Lyons. Resistivity is calculated from Conductivity.
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. Alternatively determined by colourimetry/turbidity using Discrete Analyer.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	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-003	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-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. 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-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	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-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-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-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	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.

Method ID	Methodology Summary
Org-016	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-5	174177-2
Date extracted	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Date analysed	-			28/08/2017	1	28/08/2017	28/08/2017		28/08/2017	28/08/2017
TRH C_6 - C_9	mg/kg	25	Org-016	<25	1	<25	<25	0	101	87
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	1	<25	<25	0	101	87
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	91	75
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	96	82
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	104	90
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	106	93
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	105	94
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	109	1	105	100	5	115	99

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]	14	25/08/2017	25/08/2017		[NT]	[NT]
Date analysed	-			[NT]	14	28/08/2017	28/08/2017		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	[NT]	14	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	[NT]	14	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	14	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	14	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	14	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	14	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	14	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	14	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	14	97	98	1	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	174177-2
Date extracted	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Date analysed	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	1	<50	<50	0	99	88
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	1	<100	<100	0	106	98
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	1	<100	<100	0	114	96
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	1	<50	<50	0	99	88
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	1	<100	<100	0	106	98
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	1	<100	<100	0	114	96
Surrogate o-Terphenyl	%		Org-003	85	1	77	74	4	92	76

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
Date analysed	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	[NT]	14	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	[NT]	14	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	[NT]	14	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	[NT]	14	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	[NT]	14	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	[NT]	14	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	14	92	83	10	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	174177-2
Date extracted	-			28/08/2017	1	28/08/2017	25/08/2017		25/08/2017	25/08/2017
Date analysed	-			28/08/2017	1	28/08/2017	28/08/2017		28/08/2017	28/08/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	111	98
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	116	102
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	112	99
Anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	0.1	0.1	0	108	93
Pyrene	mg/kg	0.1	Org-012	<0.1	1	0.2	0.1	67	111	95
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	0.1	0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	0.1	0.1	0	120	106
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	0.4	0.4	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	0.3	0.2	40	121	119
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	0.3	0.2	40	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	0.3	0.3	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	92	1	105	96	9	102	90

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
Date analysed	-			[NT]	14	28/08/2017	28/08/2017		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	14	0.1	0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	14	0.1	0.2	67	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	14	0.2	0.2	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	14	<0.1	0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	14	<0.2	0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	14	0.08	0.1	22	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	14	92	92	0	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	174177-2
Date extracted	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Date analysed	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
HCB	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	89	83
gamma-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	105	94
Heptachlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	97	89
delta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	107	99
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	99	91
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	109	100
Dieldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	109	99
Endrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	86	73
pp-DDD	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	103	91
Endosulfan II	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	78	64
Methoxychlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	90	1	90	90	0	115	109

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
Date analysed	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	14	92	90	2	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	174177-2
Date extracted	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Date analysed	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	107	101
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	94	109
Dimethoate	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	106	108
Fenitrothion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	102	86
Malathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	74	67
Parathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	108	94
Ronnel	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	118	109
Surrogate TCMX	%		Org-008	90	1	90	90	0	90	87

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
Date analysed	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-008	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-008	[NT]	14	92	90	2	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	174177-2
Date extracted	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Date analysed	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	109	108
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	90	1	90	90	0	90	87

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
Date analysed	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	[NT]	14	92	90	2	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	174177-2
Date prepared	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Date analysed	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	108	102
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	100	104
Chromium	mg/kg	1	Metals-020	<1	1	8	10	22	104	103
Copper	mg/kg	1	Metals-020	<1	1	2	2	0	104	108
Lead	mg/kg	1	Metals-020	<1	1	6	5	18	105	103
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	103	102
Nickel	mg/kg	1	Metals-020	<1	1	<1	<1	0	99	101
Zinc	mg/kg	1	Metals-020	<1	1	9	22	84	103	98

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
Date analysed	-			[NT]	14	25/08/2017	25/08/2017		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	14	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	14	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	14	8	8	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	14	3	2	40	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	14	17	17	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	14	3	3	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	14	24	23	4	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	174177-2
Date prepared	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Date analysed	-			25/08/2017	1	25/08/2017	25/08/2017		25/08/2017	25/08/2017
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	100	102

QUALITY CONTROL: Soil Aggressivity					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Resistivity by calculation	ohm m	0.1	Inorg-002	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	107	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	117	[NT]

QUALITY CONTROL: sPOCAS field test						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	[NT]
Date prepared	-			[NT]	[NT]	[NT]	[NT]	[NT]	28/08/2017	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	28/08/2017	[NT]
pH_F (field pH test)*	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
pH_{FOX} (field peroxide test)*	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: sPOCAS field test						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			[NT]	[NT]	[NT]	[NT]	[NT]	28/08/2017	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	28/08/2017	[NT]
pH_F (field pH test)*	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
pH_{FOX} (field peroxide test)*	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	100	[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.

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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-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.

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86059.00	**Suburb:**	Glebe	**To:**	Envirolab Services
Project Name:	Glebe Island Multi User Facility	**Order Number**			
Project Manager:	STE	**Sampler:**	SI/JN	**Attn:**	Aileen Hie
Emails:	scott.easton@douglaspartners.com.au			**Phone:**	02 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☒ Fridge ☐ 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, E - enviro)	Container Type (B - bulk, J - jar)	Analytes: combo 8a		aggressivity		ass screening					Notes/preservation
BH1 1.4-1.5	BH1	J 1	E	J	1									
BH1 2.4-2.5	BH1	J 2	E	J	1		1							
BH1 2.5-2.95	BH1	NR NL	E	J										
BH1 4-4.14	BH1	NR NL	E	J										
BH2 1.2-1.3	BH2	J 3	E	J	1									
BH2 2.5-2.6	BH2	J 4	E	J	1									
BH2 4-4.45	BH2	B 5	S	D					1					
BH2 5.5-5.95	BH2	B 6	S	D					1					
BH2 7-7.45	BH2	B 7	S	D			1		1					
BH2 8.5-8.95	BH2	B 8	S	D					1					
BH2 10-10.45	BH2	B 9	S	D					1					
BH2 11.5-11.95	BH2	B 10	S	D					1					
BH2 13-13.45	BH2	B 11	S	D					1					
BH2 14.5-14.95	BH2	B 12	S	D					1					
BH2 16-16.45	BH2	B 13	S	D					1					
PQL (S) mg/kg														

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

Job No: 174177
Date Received: 24/8/2017
Time Received: 17:20
Received by: PR
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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

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

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** PRay **Date & Time:** 24/8/2017 17:20

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86059.00	**Suburb:**	Glebe	**To:**	Envirolab Services
Project Name:	Glebe Island Multi User Facility	**Order Number**			
Project Manager:	STE	**Sampler:**	SI/JN	**Attn:**	Aileen Hie
Emails:	scott.easton@douglaspartners.com.au			**Phone:**	02 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐	No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, E - enviro)	Container Type (B - bulk, J - jar)	Analytes: combo 8a		aggressivity		ass screening					Notes/preservation
BH2 17.5-17.63	BH2	NR NR	E	J										
BH3 1.00-1.27	BH3	J 14	E	J	1									
BH3 2.4-2.5	BH3	J 15	E	J	1									
BH3 4-4.45	BH3	J 16	E	J					1					
BH3 5.5-5.95	BH3	J 17	E	J			1		1					
BH3 7-7.1	BH3	NR NR	E	J										
BH3 9.5-9.95	BH3	NR NR	E	J										
BH3 11.5-11.95	BH3	J 18	E	J			1		1					
BH3 12-12.35	BH3	NR NR	E	J										
BH3 13-13.45	BH3	J 19	E	J					1					
BH3 14.5-14.95	BH3	J 20	E	J					1					
BH3 16-16.45	BH3	J 21	E	J					1					
BH3 17.5-17.95	BH3	J/B 22	E	J					1					
BH3 19-19.05	BH3	NR NR	E	J										
BH4 1-1.45	BH4	J 23	E	J	1									
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:

Total number of samples in container:	**Relinquished by:**	**Transported to laboratory by:**	
Send Results to: Douglas Partners Pty Ltd	**Address:**	**Phone:**	**Fax:**
Signed:	**Received by:** Ray	**Date & Time:** 24/8/17 1720	

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86059.00	**Suburb:**	Glebe	**To:**	Envirolab Services
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Project Manager:	STE	**Sampler:**	SI/JN	**Attn:**	Aileen Hie
Emails:	scott.easton@douglaspartners.com.au			**Phone:**	02 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, E - enviro)	Container Type (B - bulk, J - jar)	Analytes: combo 8a		aggressivity		ass screening					Notes/preservation
BH4 2.0-2.1	BH4	J 24	E	J	1									
BH4 4-4.45	BH4	NR NR	S	D										
BH4 5.5-5.95	BH4	B 25	S	D					1					
BH4 7-7.45	BH4	B 26	S	D					1					
BH4 8.5-8.95	BH4	B 27	S	D					1					
BH4 10-10.45	BH4	B 28	S	D					1					
BH4 11.5-11.95	BH4	B 29	S	D					1					
BH4 13-13.45	BH4	B 30	S	D			1		1					
BH4 14.5-14.95	BH4	B 31	S	D					1					
BH4 15-15.4	BH4	NR NR	U50	D										
BH4 17.5-17.95	BH4	B 32	S	D					1					
BH4 19-19.45	BH4	B 33	S	D					1					
BH4 20.5-20.95	BH4	B 34	S	D					1					
BH4 22-22.15	BH4	B 35	S	D					1					
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:

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

Send Results to: Douglas Partners Pty Ltd | **Address:** | **Phone:** | **Fax:**

Signed: | **Received by:** Play | **Date & Time:** 24/8/2017 1720

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86059.00	**Suburb:**	Glebe	**To:**	Envirolab Services
Project Name:	Glebe Island Multi User Facility	**Order Number**			
Project Manager:	STE	**Sampler:**	SI/JN	**Attn:**	Aileen Hie
Emails:	scott.easton@douglaspartners.com.au			**Phone:**	02 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐	No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, E - enviro)	Container Type (B - bulk, J - jar)	Analytes: combo 8a		aggressivity		ass screening					Notes/preservation
BH5 1.1-1.2 ✓	BH5	J 36	E	J	1									
BH5 1.2-1.4	BH5	NR NR	E	J										
BH5 2-2.1 ✓	BH5	J 37	E	J	1									
BH5 2.5-2.7 ✓	BH5	B 38							1					
BH5 4-4.45 ✓	BH5	B 39	S	D					1					
BH5 5.5-5.95 ✓	BH5	B 40	S	D					1					
BH5 7-7.45 ✓	BH5	B 41	S	D					1					
BH5 8.5-8.95 ✓	BH5	B 42	S	D					1					
BH5 10-10.45 ✓	BH5	B 43	S	D					1					
BH5 11.5-11.95 ✓	BH5	B 44	S	D					1					
BH5 13-13.45 ✓	BH5	B 45	S	D					1					
BH5 14.5-14.95	BH5	NR NR	S	D										
BH5 15-15.4	BH5	NR NR	U50											
BH5 16.16.45 ✓	BH5	B 46	S	D					1					
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:

Total number of samples in container:	**Relinquished by:**	**Transported to laboratory by:**	
Send Results to: Douglas Partners Pty Ltd	**Address:**	**Phone:**	**Fax:**
Signed:	**Received by:** Raj	**Date & Time:** 24/8/2017 17.20	

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 174177-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Jessica Paulsen
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86059.00, Glebe Island Multi User Facility**
Number of Samples	Additional Testing on 5 Soils
Date samples received	24/08/2017
Date completed instructions received	01/09/2017

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.

Report Details

Date results requested by	08/09/2017
Date of Issue	08/09/2017

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Paul Ching
Authorised by Asbestos Approved Signatory: Paul Ching
Results Approved By
Nick Sarlamis, Inorganics Supervisor

Authorised By

David Springer, General Manager

Chromium Suite						
Our Reference		174177-A-6	174177-A-16	174177-A-25	174177-A-33	174177-A-41
Your Reference	UNITS	BH2	BH3	BH4	BH4	BH5
Depth		5.5-5.95	4-4.45	5.5-5.95	19-19.45	7-7.45
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	08/09/2017	08/09/2017	08/09/2017	08/09/2017	08/09/2017
Date analysed	-	08/09/2017	08/09/2017	08/09/2017	08/09/2017	08/09/2017
pH $_{kcl}$	pH units	6.8	7.8	7.0	4.8	6.8
s-TAA pH 6.5	%w/w S	<0.01	<0.01	<0.01	0.03	<0.01
TAA pH 6.5	moles H^+ /t	<5	<5	<5	16	<5
Chromium Reducible Sulfur	%w/w	0.05	0.04	<0.005	<0.005	0.02
a-Chromium Reducible Sulfur	moles H^+ /t	32	27	<3	<3	13
S_{HCl}	%w/w S	<0.005	<0.005	<0.005	<0.005	<0.005
S_{KCl}	%w/w S	0.021	0.021	0.011	0.037	0.019
S_{NAS}	%w/w S	<0.005	<0.005	<0.005	<0.005	<0.005
ANC_{BT}	% $CaCO_3$	<0.05	0.18	0.05	<0.05	0.18
s-ANC_{BT}	%w/w S	<0.05	0.06	<0.05	<0.05	0.06
s-Net Acidity	%w/w S	0.052	0.0050	<0.005	0.026	<0.005
a-Net Acidity	moles H^+ /t	32	<5	<5	16	<5
Liming rate	kg $CaCO_3$ /t	2.4	<0.75	<0.75	1.2	<0.75
a-Net Acidity without ANCE	moles H^+ /t	32	27	<5	16	13
Liming rate without ANCE	kg $CaCO_3$ /t	2.4	2.0	<0.75	1.2	1.0
s-Net Acidity without ANCE	%w/w S	0.052	0.043	<0.005	0.026	0.021

Method ID	Methodology Summary
Inorg-068	Chromium Reducible Sulfur - Hydrogen Sulfide is quantified by iodometric titration after distillation to determine potential acidity. Based on Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004.

QUALITY CONTROL: Chromium Suite						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			08/09/2017	6	08/09/2017	08/09/2017		08/09/2017	[NT]
Date analysed	-			08/09/2017	6	08/09/2017	08/09/2017		08/09/2017	[NT]
pH $_{kcl}$	pH units		Inorg-068	[NT]	6	6.8	6.8	0	98	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-068	<0.01	6	<0.01	<0.01	0	[NT]	[NT]
TAA pH 6.5	moles H^+ /t	5	Inorg-068	<5	6	<5	<5	0	115	[NT]
Chromium Reducible Sulfur	%w/w	0.005	Inorg-068	<0.005	6	0.05	0.06	18	103	[NT]
a-Chromium Reducible Sulfur	moles H^+ /t	3	Inorg-068	<3	6	32	40	22	[NT]	[NT]
S_{HCl}	%w/w S	0.005	Inorg-068	<0.005	6	<0.005	<0.005	0	[NT]	[NT]
S_{KCl}	%w/w S	0.005	Inorg-068	<0.005	6	0.021	0.019	10	[NT]	[NT]
S_{NAS}	%w/w S	0.005	Inorg-068	<0.005	6	<0.005	<0.005	0	[NT]	[NT]
ANC_{BT}	% $CaCO_3$	0.05	Inorg-068	<0.05	6	<0.05	<0.05	0	[NT]	[NT]
s-ANC_{BT}	%w/w S	0.05	Inorg-068	<0.05	6	<0.05	<0.05	0	[NT]	[NT]
s-Net Acidity	%w/w S	0.005	Inorg-068	<0.005	6	0.052	0.064	21	[NT]	[NT]
a-Net Acidity	moles H^+ /t	5	Inorg-068	<5	6	32	40	22	[NT]	[NT]
Liming rate	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	6	2.4	3.0	22	[NT]	[NT]
a-Net Acidity without ANCE	moles H^+ /t	5	Inorg-068	<5	6	32	40	22	[NT]	[NT]
Liming rate without ANCE	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	6	2.4	3.0	22	[NT]	[NT]
s-Net Acidity without ANCE	%w/w S	0.005	Inorg-068	<0.005	6	0.052	0.064	21	[NT]	[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.

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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-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.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86059.00	**Suburb:**	Glebe	**To:**	Envirolab Services
Project Name:	Glebe Island Multi User Facility	**Order Number**			
Project Manager:	STE	**Sampler:**	SI/JN	**Attn:**	Aileen Hie
Emails:	scott.easton@douglaspartners.com.au			**Phone:**	02 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐	No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, E - enviro)	Container Type (B - bulk, J - jar)	Analytes: combo 8a		aggressivity		ass screening					Notes/preservation
BH5 17.5-17.95	BH5		S/E	R					1					
BH5 19-19.45	BH5		S/E											
BH5 20.5-20.95	BH5		S/E											
BH5 22-22.45	BH5		S/E											
BH5 23.5-23.95	BH5		S/E											
BH4 2.0-2.1	BH4		A/E											
BH4 3.0-3.1	BH4		A/E											
BD1	BD1	5/47		J	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:

Lab Report/Reference No:

Total number of samples in container:	**Relinquished by:**	**Transported to laboratory by:**	
Send Results to: Douglas Partners Pty Ltd	**Address:**	**Phone:**	**Fax:**
Signed:	**Received by:** PRaj	**Date & Time:** 24/8/2017 17:20	

Aileen Hie

From: Jessica Paulsen <Jessica.Paulsen@douglaspartners.com.au>
Sent: Friday, 1 September 2017 9:33 AM
To: Aileen Hie; Nancy Zhang
Cc: SydneyMailbox; Scott Easton
Subject: Chromium Red Suite Request FW: Results for Registration 174177 86059.00, Glebe Island Multi User Facility

Hi Aileen and Nancy,
Please complete Chromium Reducible Suite at standard turnaround on the following samples from 174177:

6 • BH2/5.5-5.95
16 • BH3/4-4.45
25 • BH4/5.5-5.95
33 • BH4/19-19.45
41 • BH5/7-7.45

Envirolab Ref: 174177A
Due: 8/9/17
Std TAT.

Please send results to Scott Easton and myself.
Thanks.

Jessica Paulsen | Geo-environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | F: 02 9809 4095 | E: Jessica.Paulsen@douglaspartners.com.au

FINANCIAL REVIEW
CLIENT CHO
WINNER

This email is confidential. If you are not the intended recipient, please notify us immediately and be aware that any disclosure, copying, distribution or use of the contents of this information is prohibited. Please note that the company does not make any commitment through emails not confirmed by fax or letter.

From: Scott Easton
Sent: Thursday, 31 August 2017 7:26 PM
To: Jessica Paulsen
Cc: Paul Gorman
Subject: Fwd: Results for Registration 174177 86059.00, Glebe Island Multi User Facility

Jessica
Can you review attached and schedule any tclp needed thanks. Will you be able to tabulate and do waste class report? It is part of geotech.
Scott

Sent from my iPhone

Begin forwarded message:

> **From:** "Nancy Zhang" <NZhang@envirolab.com.au>
> **To:** "Scott Easton" <Scott.Easton@douglaspartners.com.au>
> **Subject: Results for Registration 174177 86059.00, Glebe Island Multi User Facility**
>
> Please refer to attached for:
> a copy of the Certificate of Analysis

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

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Jessica Paulsen

Sample Login Details

Your reference	86059.00, Glebe Island Multi User Facility
Envirolab Reference	174177-A
Date Sample Received	24/08/2017
Date Instructions Received	01/09/2017
Date Results Expected to be Reported	08/09/2017

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	Additional Testing on 5 Soils
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	18.1
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
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customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	Chromium Suite	On Hold
BH1-1.4-1.5		✓
BH1-2.4-2.5		✓
BH2-1.2-1.3		✓
BH2-2.5-2.6		✓
BH2-4-4.45		✓
BH2-5.5-5.95	✓	
BH2-7-7.45		✓
BH2-8.5-8.95		✓
BH2-10-10.45		✓
BH2-11.5-11.95		✓
BH2-13-13.45		✓
BH2-14.5-14.95		✓
BH2-16-16.45		✓
BH3-1.0-1.27		✓
BH3-2.4-2.5		✓
BH3-4-4.45	✓	
BH3-5.5-5.95		✓
BH3-11.5-11.95		✓
BH3-13-13.45		✓
BH3-14.5-14.95		✓
BH3-16-16.45		✓
BH3-17.5-17.95		✓
BH4-1-1.45		✓
BH4-2.0-2.1		✓
BH4-5.5-5.95	✓	
BH4-7-7.45		✓
BH4-8.5-8.95		✓
BH4-10-10.45		✓
BH4-11.5-11.95		✓
BH4-13-13.45		✓
BH4-14.5-14.95		✓
BH4-17.5-17.95		✓

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Sample ID	Chromium Suite	On Hold
BH4-19-19.45	✓	
BH4-20.5-20.95		✓
BH4-22-22.15		✓
BH5-1.1-1.2		✓
BH5-2-2.1		✓
BH5-2.5-2.7		✓
BH5-4-4.45		✓
BH5-5.5-5.95		✓
BH5-7-7.45	✓	
BH5-8.5-8.95		✓
BH5-10-10.45		✓
BH5-11.5-11.95		✓
BH5-13-13.45		✓
BH5-16-16.45		✓
BD1		✓
BH1 - [TRIPLICATE]-1.4-1.5		✓

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.