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Our Ref: PSM3331-009R

5 September 2017

GHD Pty Ltd
Level 15, 133 Castlereagh St
SYDNEY NSW 2000

ATTENTION: MICHAEL ABBOTT

Dear Michael

RE: GREENWICH PUBLIC SCHOOL (KINGSLANGLEY ROAD CAMPUS)
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION

We are pleased to submit our geotechnical report for the proposed re-development of Greenwich Public School, NSW.

Please do not hesitate to contact the undersigned if you have any queries.

For and on behalf of
PELLS SULLIVAN MEYNINK

BERNARD SHEN

Distribution: pdf copy emailed to: michael.abbott@ghd.com.au
Original held by PSM

GHD Pty Ltd

GREENWICH PUBLIC SCHOOL (KINGSLANGLEY ROAD CAMPUS)
32 KINGSLANGLEY ROAD, GREENWICH
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION

PSM3331-009R SEPTEMBER 2017

CONTENTS

FIGURES

APPENDICES

1 INTRODUCTION

This report presents the results of the geotechnical and contamination investigation undertaken by Pells Sullivan Meynink (PSM) at Greenwich Public School (Kingslangley Road campus) for the new teaching spaces.

The work has been undertaken in accordance with the GHS Services Agreement (Ref. GHD Works Subcontract dated June 2017).

PSM were provided with the following which forms the basis of the investigation:

- GHD Request For Tender Document No. 20126108 "Schools-Geotech_Contamination_RFT"
- GHD Woodhead Preliminary Architectural Drawings "Greenwich Public School Redevelopment – 32 Kingslangley Road, Greenwich", dated 28 August 2017

2 BACKGROUND

Based on the information provided, we understand the proposed development comprises the following:

- Demolition of existing demountables, sports court and cricket nets
- Construction of a 3-storey building
- Extension of the existing hall

3 GEOTECHNICAL INVESTIGATION

3.1 Fieldwork

The fieldwork for the geotechnical investigation was undertaken on 16 and 17 August 2017 under the fulltime supervision of a PSM geotechnical engineer, who undertook the following tasks:

- Setting out investigation locations
- Preparation of engineering logs
- Collection of samples for environmental testing.

The investigation locations were recorded with a hand-held GPS unit with a horizontal accuracy of approximately ±5 m.

Prior to testing, on-site service location "scans" were undertaken by a service locator in the presence of a PSM geotechnical engineer to ensure the test locations were free from buried utilities.

3.2 Augured Boreholes

A total of eleven (11) augured boreholes were drilled using a 1.2 tonne tracked drill rig. Figure 1 presents the investigation locations. The boreholes were drilled with a tungsten carbide (TC) drill bit, with practical refusal occurring in bedrock between 0.4 m and 2.5 m depth.

The completed boreholes were reinstated using either cold-mix asphalt, concrete or excavated spoil (lightly compacted), depending upon the existing surface type at the location they were drilled.

Tabulated borehole logs are presented in Appendix A.

3.3 Salinity and Aggressivity Testing

Eleven (11) disturbed soil samples recovered on site were sent to a NATA accredited environmental laboratory for the following testing:

- Cation Exchange Capacity (CEC) of sodium, calcium, magnesium and potassium
- Exchange sodium percentage
- Salinity (EC 1:5, one part soil to five parts water)
- Soil pH
- Chlorides
- Sulphates

A summary of the soil salinity and agressivity test results is presented in Table 1. The laboratory report is provided in Appendix B.

TABLE 1
SOIL LABORATORY TEST RESULTS

SAMPLE ID/DEPTH	SOIL PH	ELECTRICAL CONDUCTIVITY	MOISTURE CONTENT	SOLUBLE SULPHATE BY ICPAES	CHLORIDE BY DISCRETE ANALYSER	EXCHANGEABLE CATIONS					ESP [%]
						[meq/100g]					
		[µS/cm]	[%]	[mg/kg]	[mg/kg]	Ca	Mg	K	Na	CEC	
BH04 1.0 m	5.3	49	18.5	720	<10	3.5	0.9	<0.1	0.1	5.5	3.0
BH05 0.4 m	6.2	47	38	250	40	3.7	0.6	0.1	<0.1	4.5	1.7
BH06 1.0 m	4.7	226	6.9	880	170	1.1	0.5	0.1	0.7	4.8	28.6
BH07 0.5 m	6.7	64	4.7	170	40	2.2	1.0	<0.1	0.5	3.9	13.8
BH08 0.9 m	10.7	257	14.8	160	20	5.6	<0.2	<0.2	<0.2	5.6	<0.2
BH09 1.0 m	6.0	78	17.4	180	80	0.6	0.4	<0.1	0.2	1.3	19.4
BH10 1.0 m	6.0	62	15.6	320	90	3.6	1.3	0.1	0.4	5.5	7.3
BH11 1.0 m	5.1	50	13	750	10	1.0	0.8	<0.1	0.1	2.0	6.9
BH12 1.8 m	6.0	22	13.5	150	150	2.2	0.7	0.2	0.2	3.3	5.6
BH13 1.1 m	6.0	117	17.4	560	70	4.1	2.0	0.3	0.9	7.2	12.2
BH14 0.4 m	5.1	57	19.3	610	20	0.6	0.4	0.1	0.2	1.4	16.9

3.4 Contamination Assessment

A contamination assessment was undertaken by environmental consultants JBS&G and the report prepared by JBS&G is appended to Appendix D.

As part of the contamination assessment, JBS&G completed a desktop study and sampling during the drilling works for contamination testing.

4 SITE CONDITIONS

4.1 Geological Setting

The 1:100,000 Sydney Geological map (1991) indicates the site is underlain by the Wianamatta Group formation (Hawkesbury Sandstone - *Rh*) comprising medium to coarse-grained quartz sandstone, very minor shale and laminate lenses.

4.2 Surface Conditions

The site comprises an existing public school with concrete pathways, sealed bitumen surfaces and some grassed and landscaped areas. A number of free-standing buildings and demountables occupy the school area.

Selected site photos are included in Appendix C.

4.3 Subsurface Conditions

The subsurface conditions encountered within the boreholes are summarised in Table 2 and Table 3.

The encountered subsurface conditions were consistent with the published information in the geological map.

TABLE 2
SUMMARY OF INFERRED SUBSURFACE CONDITIONS ENCOUNTERED IN PSM BOREHOLES

INFERRED UNIT	ENCOUNTERED DEPTH TO TOP OF INFERRED UNIT (m)	DESCRIPTION
WEARING COURSE	0.0	Existing asphalt/concrete – typically up to 0.1 m thick

INFERRED UNIT	ENCOUNTERED DEPTH TO TOP OF INFERRED UNIT (m)	DESCRIPTION
TOPSOIL	0.0	SAND; black, medium grained, rootlets down to depth of 0.3 m.
FILL	0.05	Gravelly SAND to Sandy CLAY; dark brown, medium plasticity, medium to coarse grained, sub-angular ironstone gravel up to 30 mm, firm to stiff consistency, moist.
SAND	0.0 to 0.03	SAND with some gravel; brown and grey, fine to medium grained, sub-angular gravel up to 50 mm, loose to very dense, moist
CLAY	0.05 to 0.7	Sandy CLAY to gravelly sandy CLAY; light grey to light red, low to medium plasticity, fine to medium grained sand, sub-angular gravel up to 50 mm, firm to very stiff consistency, moist.
BEDROCK	0.3 to 2.1	SANDSTONE; brown, light grey and light red, extremely weathered, extremely low to very low strength.

TABLE 3
DEPTH BELOW GROUND SURFACE OF TOP OF INFERRED GEOTECHNICAL UNITS ENCOUNTERED IN BOREHOLES

BOREHOLE	DEPTH BELOW GROUND SURFACE OF TOP OF INFERRED GEOTECHNICAL UNITS (m)						
	WEARING COURSE	TOPSOIL	FILL	SAND	CLAY	BEDROCK	END OF HOLE
BH04	0	N.E.	0.05	N.E.	0.7	1.7	1.7^{R}
BH05	N.E.	N.E.	N.E.	0.0	N.E.	0.4	0.4^{R}
BH06	N.E.	N.E.	N.E.	0.0	N.E.	1.4	1.9^{R}
BH07	N.E.	N.E.	N.E.	0.0	N.E.	0.5	0.5^{R}
BH08	0	N.E.	N.E.	0.03	0.6	1.0	1.2^{R}
BH09	0	N.E.	N.E.	0.03	N.E.	1.0	1.3^{R}
BH10	N.E.	0	N.E.	N.E.	N.E.	0.3	0.4^{R}
BH11	0	N.E.	N.E.	N.E.	0.05	2.1	2.3^{R}
BH12	0	N.E.	N.E.	N.E.	0.05	2.5	2.5^{R}
BH13	0	N.E.	0.05	N.E.	0.7	1.0	1.1^{R}
BH14	0	N.E.	N.E.	N.E.	0.05	0.5	0.6^{R}

Note: N.E. = Not Encountered
R = TC bit practical refusal

4.4 Groundwater

No groundwater was observed at any of the test locations.

4.5 Soil Chemistry

The salinity and aggressivity test results summarised in Table 1 indicate the following:

- pH of the soil samples analysed to be in the range of 4.7 to 10.7, with an average of 5.9.
- Concentrations of chlorides in samples analysed to be in the range of less than 10 mg/kg to 170 mg/kg.
- Concentrations of sulphates in samples analysed to be in the range of 150 mg/kg to 880 mg/kg.
- Cation Exchange Capacity (CEC) in samples analysed to be in the range 1.3 meq/100g to 7.2 meq/100g.
- The 1:5 soil to water extraction and subsequent electrical conductivity (EC1:5) of the soil samples analysed to be in the range of 22 µS/cm to 257 µS/cm.

5 ASSESSMENT

5.1 Acid Sulfate Soils

The Department of Land and Water Conservation has mapped the occurrence of Acid Sulfate Soils along the NSW coast. The Prospect/Parramatta River 1:25,000 map (1997) illustrates no known occurrence of acid sulfate soils at the location of the Greenwich Public School along Kingslangley Road.

It is noted that the map indicates a high probability of acid sulfate soils within the river system, and below the water level, to the south of Greenwich PS. There is also a small area mapped with a high probability of acid sulfate soils at or near the ground surface on the bank of the river.

5.2 Salinity

Site Investigations for Urban Salinity (DLWC 2002) classify soil salinity based on electrical conductivity (EC_e) as per Richards (1954). The method of conversion from $EC_{1:5}$ to EC_e (electrical conductivity of saturated extract) is based on DLWC (2002) and given by $EC_e = EC_{1:5} \times M$, where M is the multiplication factor based on "Soil Texture Group".

The "Soil Texture Group" of the samples tested has been assessed with a corresponding multiplication factor M. The salinity classification for the soil samples that were tested is presented in Table 4.

TABLE 4
SALINITY CLASSIFICATION

SAMPLE ID	$EC_{1:5}$ (dS/m)	SOIL TYPE	M	EC_e (dS/m)	SALINITY CLASS
BH04	0.049	Loam	10	0.490	Non-saline
BH05	0.047	Sandy loam	14	0.658	Non-saline
BH06	0.226	Sandy loam	14	3.164	Non-saline
BH07	0.064	Sandy loam	14	0.896	Non-saline
BH08	0.257	Clay loam	9	2.313	Non-saline
BH09	0.078	Sandy loam	14	1.092	Non-saline
BH10	0.062	Sandy loam	14	0.868	Non-saline
BH11	0.050	Clay loam	9	0.450	Non-saline

SAMPLE ID	$EC_{1:5}$ (dS/m)	SOIL TYPE	M	EC_e (dS/m)	SALINITY CLASS
BH12	0.022	Clay loam	9	0.198	Non-saline
BH13	0.117	Clay loam	9	1.053	Non-saline
BH14	0.057	Clay loam	9	0.513	Non-saline

It is assessed that the soils on site are classified as “Non-saline”.

Table 4.8.2 of Australian Standard AS3600-2009 “Concrete Structures” provides an exposure classification for concrete structures in saline soils based on soil electrical conductivity (EC_e). We assess the exposure classification for this site is “A2”.

5.3 Corrosivity

Table 4.8.1 of AS3600-2009 “Concrete Structures” provides criteria for exposure classification for concrete in sulphate soils based on sulphates in soil and groundwater, and pH of soil. On the basis of the sulphate and pH testing completed we assess the exposure classification for concrete in sulphate soils to be “A2”.

Similarly Table 6.4.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for concrete piles in soil, and here the exposure classification for concrete piles in soil is “Mild”.

Table 6.5.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for steel piles based on resistivity, soil and groundwater pH, and chlorides in soil and groundwater. On the basis of the resistivity, pH and chloride testing completed we assess the exposure classification for steel piles in the soil to be “Non-aggressive”.

6 DISCUSSION AND RECOMMENDATIONS

6.1 Excavation Conditions

The works will involve excavation in TOPSOIL, FILL, SAND, CLAY and weathered BEDROCK units and excavation should be achievable with conventional excavation equipment. We note that an experienced contractor should make their own assessment of the appropriate excavation equipment.

6.2 Site Classification

Based on the field observations and the inferred geotechnical units from the boreholes, we have classified the site in accordance with Australian Standard AS 2870 – 2011 “*Residential slabs and footings – Construction*”. We recommend that structures which are within the scope of AS 2870 (2011) be designed for a site classification of Class “M”.

6.3 Temporary and Permanent Batters

The batter slope angles shown in Table 5 are recommended for the design of batters up to 2 m height and subject to the following recommendations:

- The batters shall be protected from erosion.
- Permanent batters (if required) shall be drained.
- Temporary batters shall not be left unsupported for more than a month without further advice, and inspection by a geotechnical engineer should be undertaken following significant rain events.
- No buildings, loads or services should be located within 1 batter height of the crest.

If the conditions above cannot be met, further advice should be sought.

TABLE 5
BATTER SLOPE ANGLES

UNIT	TEMPORARY	PERMANENT (If required)
FILL	1.5H : 1V	2.5H : 1V
SAND/CLAY	1H : 1V	2H : 1V
BEDROCK	1H : 1V	2H : 1V

Proper and suitable safe work method statements and OHS documents need to be developed for works to be undertaken in the vicinity of the crest and toe of batters, including temporary batters for the BEDROCK unit.

Steeper batters may be possible subject to further advice, probably including inspection during construction.

6.4 Retaining Walls

Cuts in the FILL, SAND, CLAY and BEDROCK units steeper than the recommended permanent batter slopes in Section 6.3 will need to be supported by some form of retaining structure or soil nails etc.

The selection of the appropriate retention system is a matter of design. The designer should consider the following factors in making its selection:

- Technical factors:
  - Performance
  - Ground conditions (this is addressed below with the design parameters)
  - Surcharge loading and
  - Proximity of structures, buildings and roads, etc.

- Non- technical factors
  - Cost (to build and to maintain)
  - Other constraints such as real estate, neighbouring site / boundary, aesthetics, legislation, etc.

The design of these structures should be based on the following geotechnical properties:

- Effective soil strength parameters in Table 6, and
- A lateral pressure of 10 kPa for vertical cuts in the BEDROCK units. This is to allow for blocks and rock wedges formed due to adverse defects that may exist within the unit.

Note that design of retention systems may be based on either K_a or K_o earth pressures. Design using active earth pressures provides the minimum lateral earth pressure that must be supported to avoid failure and requires a wall that can rotate or translate to allow the pressures to reduce to these values (vertical and lateral movements up to 2% of height may occur, typical movements will be much less).

Where the design is based on K_o pressures, construction should be carefully controlled to avoid unwanted effects. It should be noted that designing for K_o pressures do not, of themselves, ensure that movement does not occur. Movements are controlled by the construction method, especially sequence.

Both surface and sub-surface drainage needs to be designed and constructed properly to prevent pore water pressures from building up behind the retaining walls or appropriate water pressures must be included in the design.

TABLE 6
ENGINEERING PARAMETERS OF INFERRED GEOTECHNICAL UNITS

INFERRED UNIT	BULK UNIT WEIGHT (kN/m^3)	SOIL EFFECTIVE STRENGTH PARAMETERS		ULTIMATE BEARING PRESSURE UNDER VERTICAL CENTRIC LOADING (kPa)	ALLOWABLE BEARING PRESSURE UNDER VERTICAL CENTRIC LOADING (kPa)	ELASTIC PARAMETERS	
		c' (kPa)	*ϕ'* (deg)			YOUNG's MODULUS (MPa)	POISSON'S RATIO
FILL	18	0	26	N.A.	N.A.	N.A.	N.A.
SAND	18	0	30	400*	150*	12	0.3
CLAY	18	2	28	400*	150*	10	0.3
BEDROCK	22	N.A.	N.A.	3000	1000	50	0.25

Note: * Minimum horizontal dimension of 1 m and embedment depth of at least 0.5 m
N.A. = Not Available

The above advice should be sufficient for design to proceed to completion. If further geotechnical design parameters are required, the designer should contact PSM for more advice.

6.5 Foundations

Pad footings could be founded on or within the SAND, CLAY and BEDROCK units. The design parameters in Table 6 can be adopted.

Footing deflection within the above units can be assessed using the moduli in Table 6. When assessing the settlement of the shallow footings, the designer needs to consider the additional ground settlement due to the total building load on both shallow and deeper units. The differential settlement due to the building load shall also be assessed. Settlement on the BEDROCK unit can be taken as 1% of the minimum plan footing dimension when the load is equal to allowable bearing pressure in Table 6.

We note that an allowable bearing pressure (ABP) is not a soil property. It depends on many factors such as the size of the footings, the embedment depth, the load direction and eccentricity, the stiffness of the footing, the adopted factor of safety (FOS), as well as the soil properties. As footings get bigger or deeper the capacity increases rapidly, as the load gains eccentricity or becomes inclined, the capacity reduces rapidly.

Higher ABPs in the SAND and CLAY unit may be available but these depend on the size, depth, loads, etc and would be subject to specific advice. Settlement and lateral movement of footings should be assessed based on a foundation material with a long term Young's modulus in Table 6.

Should there be any queries, do not hesitate to contact the undersigned.

For and on behalf of
PELLS SULLIVAN MEYNINK

WILLIAM PIPER
Senior Geotechnical Engineer

BERNARD SHEN
Principal

Notes:

1. Aerial photograph obtained from Google Earth, imagery date 3/05/2016

● Borehole location

N

PSM

GHD Pty Ltd

Greenwich Public School (Kingslangley Road Campus)

GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION

LOCALITY PLAN

PSM3331-009R	**Figure 1**

O:\PSM3331\Docs Out\PSM3331-009R\[Figure 1 - Locality Plan.xls]KINGSLANGLEY RD

APPENDIX A

BOREHOLE ENGINEERING LOGS

TABLE 1
SUMMARY OF SUBSURFACE CONDITIONS

BOREHOLE	DEPTH	MATERIAL ENCOUNTERED	SPT
BH04	0 – 0.05 m	ASPHALT.	
	0.05 – 0.7 m	FILL; Gravelly SAND; dark brown, medium to coarse grained, sub-angular gravel up to 30 mm, loose, moist.	
	0.7 – 1.7 m	Gravelly sandy CLAY; brown, medium plasticity, fine to medium grained sand, sub-angular ironstone gravel up to 50 mm, stiff to very stiff consistency, moist.	At 1 m, 4, 4, 12 N = 16
	1.7 m	Practical refusal at 1.7 m, on Sandstone bedrock	
BH05	0 – 0.4 m	SAND with some gravel; brown, fine to medium grained, sub-angular gravel up to 10 mm, loose to medium dense, moist.	
	0.4 m	Practical refusal at 0.4 m, on Sandstone bedrock	
BH06	0 – 1.4 m	SAND with some gravel; brown, fine to medium grained, sub-angular ironstone gravel up to 50 mm, dense to very dense, moist.	At 1 m, 10, 25, 27* *Refusal at 140 mm
	1.4 – 1.9 m	SANDSTONE; light grey and light red, extremely weathered, extremely low strength.	
	1.9 m	Practical refusal at 1.9 m.	

BOREHOLE	DEPTH	MATERIAL ENCOUNTERED	SPT
BH07	0 – 0.5 m	SAND with some gravel; brown, fine to medium grained, sub-angular gravel up to 10 mm, loose to medium dense, moist.	
	0.5 m	Practical refusal at 0.5 m, on Sandstone bedrock	
BH08	0 – 0.03 m	ASPHALT.	At 1 m, 4, 17* *Refusal at 80 mm
	0.03 – 0.6 m	SAND with some gravel; brown and grey, fine to medium grained, sub-angular gravel up to 20 mm, loose to medium dense, moist.	
	0.6 – 1.0 m	Sandy CLAY with some gravel; dark brown, low to medium plasticity, sub-angular gravel up to 20 mm, stiff consistency, moist.	
	1.0 – 1.2 m	SANDSTONE; brown, extremely weathered, extremely low to very low strength.	
	1.2 m	Practical refusal at 1.2 m.	
BH09	0 – 0.03 m	ASPHALT.	At 1 m, 3, 6, 15* *Refusal at 70 mm
	0.03 – 1.0 m	SAND with some gravel; brown and grey, fine to medium grained, sub-angular gravel up to 20 mm, loose to medium dense, moist.	
	1.0 – 1.3 m	SANDSTONE; brown, extremely weathered, extremely low to very low strength.	
	1.3 m	Practical refusal at 1.3 m.	
BH10	0 – 0.3 m	TOPSOIL; SAND; black, medium grained, rootlets down to 0.3 m.	
	0.3 – 0.4 m	SANDSTONE; grey and light red, extremely weathered, extremely low strength.	
	0.4 m	Practical refusal at 0.4 m	

BOREHOLE	DEPTH	MATERIAL ENCOUNTERED	SPT
BH11	0 – 0.05 m	ASPHALT.	
	0.05 – 2.1 m	Sandy CLAY with some gravel; brown, low to medium plasticity, medium grained sand, sub-angular ironstone gravel up to 10 mm, firm to stiff consistency, moist.	At 1 m, 4, 8, 11 N = 19
	1.5 m	Becoming light grey and light brown, sub-angular ironstone gravel up to 30 mm, stiff to very stiff consistency.	
	2.1 – 2.3 m	SANDSTONE; light grey, extremely weathered, extremely low strength.	At 2 m, 6, 10, 15* *Refusal at 50 mm
	2.3 m	Practical refusal at 2.3 m.	
BH12	0 – 0.05 m	ASPHALT.	
	0.05 – 2.5 m	Sandy CLAY with some gravel; brown, low to medium plasticity, sub-angular ironstone gravel up to 10 mm, firm consistency, moist.	At 1 m, 4, 2, 14 N = 16
	0.5 m	Becoming stiff consistency.	
	2.0 m	Some sub-angular ironstone gravel up to 30 mm.	At 2 m, 2, 4, 6 N = 10
	2.5 m	Practical refusal at 2.5 m, on Sandstone bedrock	

BOREHOLE	DEPTH	MATERIAL ENCOUNTERED	SPT
BH13	0 – 0.05 m	ASPHALT.	At 1 m, 16* *Refusal at 30 mm
	0.05 – 0.7 m	FILL; Sandy CLAY with some gravel; dark brown, medium plasticity, medium grained sand, sub-angular ironstone gravel up to 10 mm, firm to stiff consistency, moist.	
	0.7 – 1.0 m	Sandy CLAY with some gravel; light red and brown, medium plasticity, medium grained sand, sub-angular ironstone gravel up to 10 mm, stiff to very stiff consistency, moist.	
	1.0 m – 1.1 m	SANDSTONE; light grey and light red, extremely weathered, extremely low to very low strength.	
	1.1 m	Practical refusal at 1.1 m.	
BH14	0 – 0.05 m	ASPHALT.	
	0.05 – 0.5 m	Sandy CLAY, brown and light grey, low to medium plasticity, medium grained sand, firm consistency, moist.	
	0.5 – 0.6 m	SANDSTONE; light grey and light red, extremely weathered, very low strength.	
	0.6 m	Practical refusal at 0.6 m	

APPENDIX B

SOIL LABORATORY RESULTS

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1720394**	Page	: 1 of 4
Client	: **PELLS SULLIVAN MEYNINK T/A PSM Admin PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: WILL PIPER	Contact	: Customer Services ES
Address	: G3, 56 DELHI ROAD NORTH RYDE NSW, AUSTRALIA 2113	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9812 5000	Telephone	: +61-2-8784 8555
Project	: PSM3331-3 SCHOOLS (GREENWICH)	Date Samples Received	: 16-Aug-2017 16:30
Order number	: ----	Date Analysis Commenced	: 18-Aug-2017
C-O-C number	: ----	Issue Date	: 23-Aug-2017 16:17
Sampler	: SS		
Site	: ----		
Quote number	: SYBQ/441/15		
No. of samples received	: 9		
No. of samples analysed	: 9		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	G01	G02	G03	G04	G05
			Client sampling date / time	16-Aug-2017 00:00	16-Aug-2017 00:00	16-Aug-2017 00:00	16-Aug-2017 00:00	16-Aug-2017 00:00
Compound	CAS Number	LOR	Unit	ES1720394-001	ES1720394-002	ES1720394-003	ES1720394-004	ES1720394-005
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	5.6	5.5	5.5	5.3	6.2
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	25	26	48	49	47
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	29.5	23.8	5.8	18.5	38.0
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	1.0	0.2	1.2	3.5	3.7
Exchangeable Magnesium	----	0.1	meq/100g	0.7	0.6	0.6	0.9	0.6
Exchangeable Potassium	----	0.1	meq/100g	0.1	0.2	0.3	<0.1	0.1
Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.1	0.2	0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g	1.9	1.5	2.2	5.5	4.5
Exchangeable Sodium Percent	----	0.1	%	2.5	9.8	6.8	3.0	1.7
Calcium/Magnesium Ratio	----	0.1	-	1.4	0.3	2.0	3.9	6.2
Magnesium/Potassium Ratio	----	0.1	-	----	----	----	<0.1	----
Magnesium/Potassium Ratio	----	0.1	-	6.7	3.0	2.1	----	4.0
ED040: Sulfur as SO4 2-								
Sulfate as SO4 2-	14808-79-8	100	mg/kg	100	140	290	720	250
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	<10	<10	<10	<10	40

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	G06	G07	G08	G09	----
			Client sampling date / time	16-Aug-2017 00:00	16-Aug-2017 00:00	16-Aug-2017 00:00	16-Aug-2017 00:00	----
Compound	CAS Number	LOR	Unit	ES1720394-006	ES1720394-007	ES1720394-008	ES1720394-009	--------
				Result	Result	Result	Result	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	4.7	6.7	10.7	6.0	----
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	226	64	257	78	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	6.9	4.7	14.8	17.4	----
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	----	----	5.6	----	----
Exchangeable Magnesium	----	0.2	meq/100g	----	----	<0.2	----	----
Exchangeable Potassium	----	0.2	meq/100g	----	----	<0.2	----	----
Exchangeable Sodium	----	0.2	meq/100g	----	----	<0.2	----	----
Cation Exchange Capacity	----	0.2	meq/100g	----	----	5.6	----	----
Exchangeable Sodium Percent	----	0.2	%	----	----	<0.2	----	----
Calcium/Magnesium Ratio	----	0.2	-	----	----	<0.2	----	----
Magnesium/Potassium Ratio	----	0.2	-	----	----	<0.2	----	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	1.1	2.2	----	0.6	----
Exchangeable Magnesium	----	0.1	meq/100g	0.5	1.0	----	0.4	----
Exchangeable Potassium	----	0.1	meq/100g	0.1	<0.1	----	<0.1	----
Exchangeable Sodium	----	0.1	meq/100g	0.7	0.5	----	0.2	----
Cation Exchange Capacity	----	0.1	meq/100g	4.8	3.9	----	1.3	----
Exchangeable Sodium Percent	----	0.1	%	28.6	13.8	----	19.4	----
Calcium/Magnesium Ratio	----	0.1	-	2.2	2.2	----	1.5	----
Magnesium/Potassium Ratio	----	0.1	-	----	<0.1	----	<0.1	----
Magnesium/Potassium Ratio	----	0.1	-	4.9	----	----	----	----
ED040: Sulfur as SO4 2-								
Sulfate as SO4 2-	14808-79-8	100	mg/kg	880	170	160	180	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	170	40	20	80	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1720596**	Page	: 1 of 3
Client	: **PELLS SULLIVAN MEYNINK T/A PSM Admin PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: WILL PIPER	Contact	: Customer Services ES
Address	: G3, 56 DELHI ROAD NORTH RYDE NSW, AUSTRALIA 2113	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9812 5000	Telephone	: +61-2-8784 8555
Project	: PSM3331-3 SCHOOLS - GREENWICH (2)	Date Samples Received	: 18-Aug-2017 11:00
Order number	: ----	Date Analysis Commenced	: 22-Aug-2017
C-O-C number	: ----	Issue Date	: 25-Aug-2017 16:38
Sampler	: STEPHANIE SALIM		
Site	: ----		
Quote number	: SYBQ/441/15		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	G10	G11	G12	G13	G14
			Client sampling date / time	17-Aug-2017 00:00	17-Aug-2017 00:00	17-Aug-2017 00:00	17-Aug-2017 00:00	17-Aug-2017 00:00
Compound	CAS Number	LOR	Unit	ES1720596-001	ES1720596-002	ES1720596-003	ES1720596-004	ES1720596-005
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	6.0	5.1	6.0	6.0	5.1
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	62	50	22	117	57
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	15.6	13.0	13.5	17.4	19.3
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	3.6	1.0	2.2	4.1	0.6
Exchangeable Magnesium	----	0.1	meq/100g	1.3	0.8	0.7	2.0	0.4
Exchangeable Potassium	----	0.1	meq/100g	0.1	<0.1	0.2	0.3	0.1
Exchangeable Sodium	----	0.1	meq/100g	0.4	0.1	0.2	0.9	0.2
Cation Exchange Capacity	----	0.1	meq/100g	5.5	2.0	3.3	7.2	1.4
Exchangeable Sodium Percent	----	0.1	%	7.3	6.9	5.6	12.2	16.9
Calcium/Magnesium Ratio	----	0.1	-	2.8	1.2	3.1	2.0	1.5
Magnesium/Potassium Ratio	----	0.1	-	----	<0.1	----	----	----
Magnesium/Potassium Ratio	----	0.1	-	12.7	----	3.1	6.2	3.2
ED040: Sulfur as SO4 2-								
Sulfate as SO4 2-	14808-79-8	100	mg/kg	320	750	150	560	610
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	90	10	150	70	20

APPENDIX C

SELECTED SITE PHOTOS

Photo 1 - General Site Conditions (near the existing sports court)

Photo 2 - Outcrop visible near BH05, BH06 and BH07

GHD Pty Ltd

Greenwich Public School (Kingslangley Road Campus)

GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION

SELECTED SITE PHOTOS (1 OF 2)

PSM3331-009R	**ATTACHMENT C1**

Pells Sullivan Meynink

Photo 3 - Typical sandy CLAY material encountered

Photo 4 - Typical SAND material encountered

GHD Pty Ltd

Greenwich Public School (Kingslangley Road Campus)

GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION

SELECTED SITE PHOTOS (2 OF 2)

PSM3331-009R	**ATTACHMENT C2**

Pells Sullivan Meynink

APPENDIX D

JBS&G CONTAMINATION REPORT

Pells Sullivan Meynink

Environmental Site Assessment

Greenwich Public School
70A Greenwich Road & 32 Kingslangley Road
Greenwich NSW

5 September 2017

53033/110763 (Rev A)

JBS&G

www.jbsg.com.au

Pells Sullivan Meynink

Environmental Site Assessment

Greenwich Public School
70A Greenwich Road & 32 Kingslangley Road

Greenwich NSW

5 September 2017

53033/110763 (Rev A)

JBS&G

Table of Contents

List of Tables

List of Figures

Appendices

Executive Summary

JBS&G Australia Pty Ltd (JBS&G) was engaged by Pells Sullivan Meynink (PSM, the client), to conduct an environmental site assessment (ESA) with limited intrusive investigations of Greenwich Public School located at 70A Greenwich Road and 32 Kingslangley Road, Greenwich. The investigation areas were limited to part of lots legally identified as Lot 1 in DP746491 (Kingslangley Road campus) and part Lot 1 in DP930301 and part Lot A DP930344 (Greenwich Road campus). The investigation area of the Greenwich road campus was approximately 1192m^2 and the Kingslangley Road campus was approximately 10,028m^2. The site location and site layout are presented on **Figure 1** and **Figure 2** respectively.

At the time of the investigation, the site was used as a school. It is understood that classrooms are to be constructed within the investigation areas.

The objective of the investigation was to characterise potential contamination within the investigation areas that may pose an unacceptable risk to construction workers during construction or to school users.

The scope of work comprised a desktop review, 14 soil sampling locations and preparation of an ESA report. The soil sampling locations were preselected prior to undertaking the assessment in conjunction with geotechnical investigations by the client.

Based on the findings of this assessment and subject to the limitations in **Section 11**, the following conclusions are provided:

Greenwich Road campus:

- The 70A Greenwich Road, (Greenwich Road campus) has been used for education purposes (school) since 1907. The site use prior to this is unknown, however was likely residential.
- Fill material was encountered at the three sampling location at the Greenwich Road campus consisting of brown sandy silty clay with some trace gravel and organic matter. The fill material was observed at depths between 0.3 and 0.4mbgs. Fill material is preliminarily classified as General Solid Waste.
- There are no unacceptable contamination risks based on the sampling results at the Greenwich Road campus, and TRH and PAH related to asphalt materials not soil impacts. No further investigation or management of contamination is required at the Greenwich Road campus. An unexpected finds protocol should be implemented during future development works.

Kingslangley Road campus:

- The 32 Kingslangley Road (Kingslangley Road campus) has been used for education purposes since 1981. The southern portion of the site (adjacent to River Road) had been used as a school since 1942, where prior to this was used for residential purposes. The northern eastern portion of the site (previously two lots) was likely used for residential purposes prior to being amalgamated for schooling use.
- Fill material was encountered at 7 of the 11 sample locations at the Kingslangley Road campus generally consisting of brown sandy silty clay with some trace gravel and organic matter or brown silty sand, with sandstone, gravel or organic matter inclusions. No major anthropogenic inclusions were observed within the fill material. Fill material was observed at depths ranging from 0.15 mbgs to 2.5mbgs, however fill material may consist of

reworked natural soils associated with cut and fill activities likely undertaken for levelling purposes.

- An elevated concentration of lead was identified at one location (BH12). There is potential that additional data (through sampling and analysis) and statistical analysis may indicate that the lead concentration does not present a risk to the site occupants.
- Friable asbestos was identified within exposed surface soil at one location (BH10) at the site.
- Based on the soil and leachate analytical data, the fill material within the vicinity of BH12 would preliminary be considered Restricted Solid Waste. Fill material within the vicinity of BH10 would be classified as "Special Waste" due to the presence of asbestos materials. All other soils would preliminary be classified as General Solid Waste in accordance with EPA guidelines.
- No chemical mixtures, aesthetic issues or significant offsite migration risks were identified.

Based on the results of the investigation, the following recommendations are made for the Kingslangley Road campus:

- Due to the presence of friable asbestos material identified within the surface soils at BH10 and in accordance with the Asbestos Management Plan for NSW Government Schools, access to the area should be immediately restricted to all students until it is proven that no ACMs are present or until ACMs are removed or appropriately encapsulated.
- Additional surface soil sampling for the presence of friable asbestos should be undertaken to identify any additional locations which may present a risk to site occupants and future development workers.
- The construction management plan will also need to incorporate procedures to address the presence of asbestos within the soil which may be disturbed during works.
- Further soil sampling should be undertaken within the vicinity of BH12to delineate the lead impacted soil to allow the assessment of appropriate management procedures during development works.
- Due to the potential presence of additional contamination at the site, an appropriate unexpected finds protocol implemented during future development works would enable management of any unidentified contamination if encountered.

1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Pells Sullivan Meynink Pty Ltd (PSM, the client) to conduct an environmental site assessment (ESA) with limited intrusive investigations of the property located at 70A Greenwich Road & 32 Kingslangley Road, Greenwich, NSW (the site). The investigation areas were limited to part of lots legally identified as Lot 1 in DP746491 (32 Kingslangley Road campus) and part Lot 1 in DP930301 and part Lot A DP930344 (70A Greenwich Road campus). The site location and site layout are presented on **Figure 1** and **Figure 2** respectively.

The site is currently used as a school and it is understood that the investigation was undertaken to assess the contamination status for the development of additional classroom buildings. The investigation was limited to the locations of the proposed classrooms as provided by the client.

The investigation scope was provided by the client and has been developed in general accordance with NEPC (2013)[1], guidelines made or approved by the NSW Environment Protection Authority (EPA) and relevant Australian Standards.

1.2 Objective

The objectives are to investigate the potential for contamination within the investigation areas that may pose an unacceptable risk to construction workers during construction and or to school users. Where potential risks are identified, recommendations are to be made for further investigation or management.

1.3 Scope of Works

The scope of work for the assessment comprised:

- Desktop review of readily available relevant background and historical information including:
  - Site conditions and environmental setting;
  - s.149 certificate(s) obtained from council;
  - current and historical land title records;
  - historical aerial photographs;
  - heritage records held by the Department of Planning;
  - records of environmental incidents or former environmental licenses as held by the EPA;
- A detailed site inspection;
- Soil sampling at 14 locations;
- Laboratory analysis of representative soil samples; and
- Preparation of this Environmental Site Assessment (ESA) report in general accordance with relevant EPA guidelines.

[1] *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1),* National Environment Protection Council, 2013 (NEPC 2013).

2. Site Conditions and Surrounding Environment

2.1 Site Identification

The location of the site shown on **Figure 1**. The layout of the site and approximate site boundary are shown on **Figure 2**. The site details are summarised in **Table 2.1**.

Table 2.1: Summary Site Details

Site Address	70A Greenwich Road & 32 Kingslangley Road, Greenwich, NSW
Lot / DP	Lot 1 in DP746491, part Lot 1 in DP930301 and part Lot A DP930344
Local Government Authority	Lane Cove Council
Investigation Area	Greenwich Road campus - Approximately 1,192m^2 Kingslangley Road campus – Approximately 10,028 m^2
Approximate Geographical Coordinates (MGA 56)	Easting: 331859, Northing: 6255660 (Lot 1 DP746491) Easting: 332204, Northing: 6255012 (Lot 1 DP930301/Lot A DP930344)
Zoning	R2 – Low Density Residential (Lane Cove Local Environmental Plan 2009)
Previous Land-use	School/Education and Residential
Current Land-use	School/Education

2.2 Site Description

A detailed site inspection was undertaken on 16 and 17 August 2017 by one of JBS&G's trained and experienced field scientists. The site is divided into two separate areas, the K-1 Campus located off Greenwich Road and the main public school site located off Kingslangley Road. The site layout is shown on **Figure 2.** A Photographic Log is presented in **Appendix B**.

<u>70A Greenwich Road, Greenwich (K-1 Campus):</u>

The school was bound by residential properties to the north, Chisholm Street to the east, Wardrop Street to the south and Greenwich Road to the west. The school was secured by a 1 m high chain link fence and was generally flat. Greenwich Road was approximately 1 m lower than the school ground level.

Most of the school comprised sealed surfaces. Buildings were located along the western boundary and in the north eastern portion of the site. An asphalt sealed carpark and play area was located in the south east, and a grassed area and mulch based playground were observed in the north east. Garden beds were observed to follow the site fence line. The site investigation area was limited to the asphalt car park and basketball court in the south eastern portion of the school.

Fill material at the site was generally shallow at the site (>0.15 mbgs), comprising sand silty clay as a thin (maximum 0.1 m) layer beneath asphalt. Natural brown silty clayey sand and white and orange/red mottled sand was encountered to 1.6 mbgs underlain by bedrock.

No odours, asbestos containing material (ACM) or staining were observed within the soil profile at any investigation location.

<u>32 Kingslangley Road, Greenwich:</u>

The site investigation area is located within the grounds of Greenwich Public School campus at 32 Kingslangley Road, Greenwich NSW. Several demountable and permanent buildings, along with a carpark, playing field and play areas were observed within the grounds of Greenwich Public School during the investigation.

The school was bound by residential properties to the north, east and west, Kingslangley Road to the north east and River Road to the south. Garden beds were observed to follow the site boundary which was secured by a 1 m high chain link fence.

The north eastern portion of the school comprised an asphalt car park, buildings and concrete play areas. This area sloped steeply downward to the west and south. The sloped area was characterised

as a rocky outcrop with tree and shrub cover. An asphalt tennis court was located in the north west and grassed fields were present in the south west and south. Demountable classrooms were observed in the south east.

Fill material at the site was generally shallow at the site (>0.8 mbgs). However, fill material within BH12 was encountered to a maximum depth of 2.5 mbgs. BH12 was situated in the south-western corner of the tennis court and filling was likely required to build up the finished levels of the tennis court within this area.

No dangerous goods or indicators of current or former petroleum infrastructure were observed within the inspection area. No odours, asbestos containing material (ACM) or staining were observed within the soil profile at any investigation location. PID readings were generally reported at 0.0 ppm.

2.3 Surrounding Land-use

The surrounding land-uses of the investigation are (site) are detailed below.

70A Greenwich Road, Greenwich (K-1 Campus):

North – Remainder of Greenwich Public School and residential properties beyond.

East – Remainder of Greenwich Public School and Chisholm Street with residential properties beyond.

South – Wardrop Street with residential properties beyond.

West – Remainder of Greenwich Public School with Greenwich Road and mixed residential and commercial properties beyond.

32 Kingslangley Road, Greenwich:

North – Kingslangley Road and residential properties.

East –Remainder of Greenwich Public School and residential properties.

South – Remainder of Greenwich Public School and River Road with Greenwich Hospital and residential properties beyond.

West – residential.

2.4 Topography

70A Greenwich Road, Greenwich (K-1 Campus):

The site has an approximate elevation of 50 m Australian Height Datum (AHD) based on review of SIX Maps.

The central portion of the site is generally flat, with a slight gradient along the eastern and western site boundary. There is an overall gradual slope in an eastern direction.

32 Kingslangley Road, Greenwich:

The northern portion of the school where the school buildings and sports courts are located is significantly elevated in comparison to the southern portion where the sports field and cricket nets are positioned. A rock-shelf outcrop steeply slopes southwards, with an embankment leading to the area of lower topography. There is potential that cut and fill activities may have occurred at the site for levelling purposes.

The site has an approximate elevation of 40 m Australian Height Datum (AHD) based on review of SIX Maps.

2.5 Geology and Soil

According to the Sydney 1:100 000 Geological Sheet 9130 (1983), the site is underlain by a Triassic Period geological formation Hawkesbury Sandstone, part of the Wianamatta Group, comprising medium to coarse-grained quartz sandstone, very minor shale and laminate lenses.

Review of eSPADE[2] indicated that the site soils comprise Gymea soils, consisting of shallow to moderately deep (30-100cm) yellow earth and earthy sands with localised gleyed podzolic soils and yellow podzolic soils.

Minor fill beneath asphalt was encountered at the Greenwich Road campus. Investigations encountered fill material across the Kingslangley Road campus site to a maximum depth of 2.5m bgl in one location (BH12) located on the south-west corner of the tennis courts. The depth of fill material encountered within this location is assumed to be associated with the use of fill material (likely reworded natural soil) for levelling purposes to allow construction of the tennis court. All other fill identified across the Kingslangley Road campus was relatively shallow (>0.8m bgl), underlain by natural materials and bedrock. Observations of depths of fill materials are presented in the bore logs included in **Appendix C**.

2.6 Acid Sulfate Soils

A review of the Office of Environment and Heritage (OEH) – Acid Sulfate Soils Risk Map[3] indicated that the site is located within an area of "no known occurrence". Acid sulfate soils (ASS) are unlikely to be expected to occur in areas in having classification. This is consistent with the topographic and geological setting of the site. A review of the Lane Cove Local Environmental Plan 2009 indicated no known occurrence of acid sulfate soils at the site.

2.7 Hydrology

Greenwich Road campus

The site is predominantly sealed with minimal infiltration into the underlying geology expected. Berrys Creek is located approximately 150 southeast from the site boundary, associated with Balls Head Bay offsite in the south and south west.

The nearest flowing water receptor comprises Balls Head Bay approximately 250m to the south east of the site. Balls Head Bay discharges to the Parramatta River/Sydney Harbour.

Kingslangley Road campus

The site is partially unsealed and infiltration consistent with the fill material type and underlying natural soils / geology is anticipated across the site. Gore Creek is located approximately 130 southwest from the site boundary, associated with Woodford Bay offsite in the south.

The nearest flowing water receptor comprises Lane Cove River approximately 400m to the south of the site. The Lane Cove River discharges to the Parramatta River/Sydney Harbour.

2.8 Hydrogeology

A total of 18 registered groundwater bores were present within 1.0 km of 70A Greenwich Road and 32 Kingslangley Road, Greenwich on the NSW Office of Water Groundwater Database[4]. Details of the groundwater bores are provided in **Table 2.2**.

[2] http://www.environment.nsw.gov.au/eSpade2Webapp Department of Environment and Heritage, NSW Government. Accessed 29 August 2017.
[3] OEH – Acid Sulfate Soils Risk Map http://data.environment.nsw.gov.au/dataset/acid-sulfate-soils-risk0196c. Accessed 29 August 2017.
[4] http://allwaterdata.water.nsw.gov.au/water.stm. Accessed 29 August 2017.

Table 2.2 Registered Groundwater Bore Search Summary

Bore ID	Use	Property	Water Level (m bgs)	Well Depth (m)	Water Bearing Zones (m bgs)
GW072478	Domestic	Lot 101 DP 1075748	48.00	180.50	29.70 - 30.10 138 – 139.80 143.80 – 144.50
GW072959	Monitoring Bore, Irrigation (Cancelled)	Lot 2 DP 8423	N/A	24.50	16.80 – 18.10 21.10 – 22.30
GW103997	Monitoring Bore (Active)	Lot 971 DP 752067	N/A	4.50	N/A
GW108991	Domestic (Converted)	Lot 1 DP 270176	N/A	-	N/A
GW109241	Monitoring Bore (Active)	Lot 2 DP 9573	N/A	4.50	N/A
GW109242	Monitoring Bore (Active)	Lot C DP 317163	N/A	4.50	N/A
GW109243	Monitoring Bores	Lot D DP 317163	N/A	4.50	N/A
GW109244					
GW109589	Monitoring Bore (Active)	Lot 185 DP 752067	N/A	2.90	N/A
GW109590				4.40	
GW109591				2.00	
GW109592				4.50	
GW109593				4.00	
GW114318	Monitoring Bore (Active)	Lot 12 DP 863332	N/A	N/A	N/A
GW114319					
GW114320					
GW114321					
GW114322					

For the Greenwich campus, it is anticipated that the groundwater would move towards the south towards Balls Head Bay. For the Kingslangley Road campus, it is anticipated that on a regional scale groundwater would move towards the south - southeast, generally towards Gore Creek into Lane Cove River and Woodford Bay. The exact depth of groundwater is unknown; however, it is considered likely that the depth to groundwater would be greater than 10mbgs in bedrock. There may be some perched seepage water at the interface between residual soil and bedrock dependent on rainfall infiltration.

2.9 Meteorology

Based on data from Sydney (Observatory Hill) weather station[5] approximately 3.7 kilometres from the site, the mean monthly maximum temperature ranges from 16.4 degrees Celsius to 26.0 degrees Celsius and the mean monthly average rainfall ranges from 68.4 mm to 133.2 mm.

[5] http://www.bom.gov.au/climate/data/index.shtml. Accessed 29 August 2017.

3. Site History

3.1 Aerial Photograph

70A Greenwich Road, Greenwich (K-1 Campus):

Historical aerial photographs are provided in **Appendix D** and discussed below.

1943 – The investigation area consisted of a building in the northern portion and playground area. The investigation area was part of the larger school which was on the adjacent land to the north and west. School buildings were observed to the west of the investigation area. Small unidentified buildings/sheds and large mature trees are noted along the eastern boundary, possibly associated with residential properties offsite. Unreferenced roads bound the south and east. The surrounding land appeared to be used for residential purposes with the land to the south vacant and undeveloped.

1951 – The aerial photography is poor quality. The investigation area generally remained unchanged. A potential classroom was present to the south west of the investigation area. The surrounding land use remained generally unchanged, however the roads bound to the east and south are more defined.

1961 – Additional unreferenced structures had been constructed along the western boundary, with the eastern and central portion of the investigation area being used for car parking. No other significant changes were observed. The surrounding land remained for residential use. The northern portion offsite, appeared to be cleared from any structure and vegetation. The vacant land parcel offsite in the south appeared to be developed for a residential property.

1970 – The investigation area remained essentially unchanged from the previous 1961 aerial photograph. The classroom to the south west of the investigation area was no longer present. The surrounding land remained essentially unchanged from the previous 1961 aerial photograph, however building structures offsite to the north are no longer present.

1980 – The building located on the northern portion of the investigation area had been demolished. The investigation area appeared to be used as parking and appeared sealed with asphalt. It is unknown due to aerial photography if these areas were previously sealed. Large mature trees and vegetation appear to be located along the southern site boundary. The surrounding area appears to remain similar.

1991 – No significant changes to the investigation area form the previous 1980 aerial photograph was observed. The surrounding land use remained unchanged from the previous 1980 aerial photograph.

2002 –No significant changes from the previous 1991 aerial photograph were observed. The residential property offsite to the south appeared to be demolished and no longer present. The remaining surrounding land appeared to be unchanged.

2009 – A basketball court appeared to have been constructed in the northern portion of the investigation area which also extended to the north (outside the investigation area). The southern portion of the investigation area remained used for car parking purposes. No significant changes were observed to the surrounding land except for the vacant land parcel offsite in the south which had been developed for multiple residential properties.

2017 –No significant changes to the investigation area and the surrounding land use was observed from the 2009 aerial photography.

32 Kingslangley Road, Greenwich:

Historical aerial photographs are provided in **Appendix D** and discussed below.

1943 – The site appeared to be used for education/school purposes. The site appeared to contain three large buildings in the northern portion of the site. Possible agricultural appeared to be undertaken in the north western portion of the site. The remaining areas of the site appeared to consist of unsealed and vegetated areas. The surrounding land to the north and east appeared to be used for residential purposes with undeveloped land adjacent to the west and the remainder of the school to the south. Further to the south, the land was undeveloped.

1951 – The site and the surrounding land use generally remained unchanged from the previous 1943 aerial photograph.

1961 – The possible agricultural activities to the north west had ceased and earthworks had been undertaken. A sealed car park appeared to have been constructed in the north eastern portion of the site. No other significant changes were observed to site. The surrounding land to the west and to the south of the school had been developed for residential purposes. No other significant changes to the surrounding land were observed.

1970 – A building in the northern portion of the site had been demolished. In addition, vegetation located in the western portion of the site had been cleared. No other changes to the site were observed. The surrounding land remained essentially unchanged from the previous 1961 aerial photograph except for the land to the south of the school which appeared to have been developed as Greenwich Hospital.

1986 – A building had been constructed in the northern portion of the site in approximately the same location as the previously demolished building. A tennis court had been constructed in north western portion of the site (where the earthworks and vegetation clearance had been undertaken). No other significant changes were observed to the site. No significant changes to the surrounding land use were observed.

1991 – No significant changes to the site were observed form the previous 1986 aerial photograph. The surrounding land use appeared to remain unchanged from the previous 1986 aerial photograph.

2002 – No significant changes to the site or the surrounding land use were observed from the previous 1991 aerial photograph.

2009 – Additional buildings, (possibly demountable buildings) had been constructed in the northern portion of the site. No other significant changes were observed. The surrounding land use remained similar to the in the previous 2002 aerial photograph.

2017 – The previously identified buildings (possible demountable buildings) had been demolished/removed and a large building had been constructed. No other changes to the site were observed. Demountable buildings were located on the school to the south east of the investigation area. No changes to the surrounding land use were observed.

3.2 Historical Land Titles

Historical land title records are summarised in below and full records provided in **Appendix E**.

32 Kingslangley Road, Greenwich:

The site current comprises one lot (Lot 1 DP 746491) which is currently owned by Her Most Gracious Majesty Queen Elizabeth the Second, now Minister for Education, and has owned the site since 1981. Prior to 1981, the site comprised of three lots. The registered owners for these lots are provided below. A copy of the titles information and plans referring to the specific locations is provided on **Appendix E**.

Blue tinted area on Cadastre Record Map:

- 1901 to 1936 - Norman Leslie Gilfillan (Gentleman).

- 1936 to 1936 - Ann Gilfillan (Widow).
- 1936 to 1942 - Charles Thomas Richardson (Public Accountant), John Webb Alexander (Retired Grazier) and Dudley Francis John Harricks (Engineer).
- 1942 to 1942 - John Webb Alexander (Retired Grazier) and Dudley Francis John Harricks (Engineer).
- 1942 to 1950 - Hillcrest School.
- 1950 to Date - The Minister for Public Instruction (Resumed under the Public Works Act, 1912 for a Public School), now Minister for Education.

Associated Easements:

19.09.1995 (D.P. 853103) – Easement to Drain Water 1.2 wide

Pink tinted area on Cadastre Record Map:

- 1906 to 1917 - Elizabeth Hume (Widow) Now Elizabeth Armstrong (Married Woman).
- 1917 to 1931 - Ellen Colville (Married Woman).
- 1931 to 1970 - Robert Campbell (Motor Mechanic).
- 1970 to 1981) - Ruby Campbell (Widow).
- 1981 to Date - Her Most Gracious Majesty Queen Elizabeth the Second, now Minister for Education.

No easements or leases noted.

Green tinted area on Cadastre Record Map:

- 1900 to 1936 - Norman Leslie Gilfillan (Gentleman).
- 1936 to 1936 - Ann Gilfillan (Widow).
- 1936 to 1942 - Charles Thomas Richardson (Public Accountant), John Webb Alexander (Retired Grazier) and Dudley Francis John Harricks (Engineer).
- 1942 to 1942 - John Webb Alexander (Retired Grazier) and Dudley Francis John Harricks (Engineer).
- 1942 to 1950 - Hillcrest School.
- 1950 to Date - The Minister for Public Instruction (Resumed under the Public Works Act, 1912 for a Public School), now Minister for Education.

No easements or leases noted.

70A Greenwich Road, Greenwich (K-1 Campus)

The registered proprietors for 70A Greenwich Road were as follows:

- 1907 to Date - His Most Gracious Majesty King Edward the Seventh (For the Purposes of the Public Instruction Act of 1880), now Minister of Education.

No easements or leases noted.

3.3 EPA Records

A search of the NSW EPA's public register maintained under the Protection of the Environment Operations Act 1997 (POEO Act) was undertaken for the subject site and surrounding properties. The results of the search are present in **Appendix F**. The search identified that there were no current or former prevention, clean-up or prohibition notices for the site and immediate surrounds.

A search of the EPA's public contamination land register (**Appendix F**) was also undertaken. The search identified that there have been no notices issued under the Contaminated Land Management Act 1997 (CLM Act) for the site.

The site has not been notified to the EPA as containing significant contamination.

3.4 Council Records

A full copy of the Section 149 (2) and (5) planning certificate is provided in **Appendix G**. A summary of the information with respect to contamination is as follows:

70A Greenwich Road, Greenwich (K-1 Campus):

- The site is zoned R2 Low Density Residential under the Lane Cove Environmental Management Plan 2009.
- The site is subject to Lane Cove Development Control Plan 2010.
- The land does not comprise critical habitat.
- The land is not in a conservation area.
- Lane Cove LEP 2009 Heritage Schedule 5 (Environmental Heritage) applies to the site.
- The land has not been identified as bush fire prone land on the Lane Cover Bushfire Prone Land Map (2004).
- The Land is not affected by land slip.
- Acid sulfate soils are not considered likely at the site that would restrict the development of the land.
- The land is subject to flood related development controls, in particular overland flow assessment.
- The land is not biodiversity certified land.
- The council is not aware of the land as significantly contaminated within the meaning of the *Contaminated Land Management Act* 1997.
- The council is not aware of the land as subject of a management order within the meaning of the *Contaminated Land Management Act* 1997.
- The council is not aware of the land as subject of an approved voluntary management proposal within the meaning of the *Contaminated Land Management Act* 1997.
- The council is not aware of the land as subject to an ongoing maintenance order within the meaning of the *Contaminated Land Management Act* 1997.
- The council is not aware of the land as subject of a site audit statement within the meaning of the *Contaminated Land Management Act* 1997.

32 Kingslangley Road, Greenwich:

- The site is zoned R2 Low Density Residential under the Lane Cove Environmental Management Plan 2009.
- The site is subject to Lane Cove Development Control Plan 2010.
- The land does not comprise critical habitat.
- The land is not in a conservation area.
- Lane Cove LEP 2009 Heritage Schedule 5 (Environmental Heritage) applies to the site.

- The land has not been identified as bush fire prone land on the Lane Cover Bushfire Prone Land Map (2004).
- The Land is not affected by land slip.
- Acid sulfate soils are not considered likely at the site that would restrict the development of the land.
- The land is subject to flood related development controls, in particular overland flow assessment.
- The land is not biodiversity certified land.
- The council is not aware of the land as significantly contaminated within the meaning of the Contaminated Land Management Act 1997.
- The council is not aware of the land as subject of a management order within the meaning of the Contaminated Land Management Act 1997.
- The council is not aware of the land as subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.
- The council is not aware of the land as subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.
- The council is not aware of the land as subject of a site audit statement within the meaning of the Contaminated Land Management Act 1997.

3.5 Heritage Register

Results of searches on the NSW[6] and Australian[7] heritage registers are provided in **Appendix H.** No records relevant to the site were located on the heritage registers.

3.6 Dangerous Goods Records

A search of the Storage of Hazardous Chemicals database by SafeWork NSW was not undertaken due to time constraints. Given historical use of the site, it is considered unlikely that records and licences for significant use/storage of dangerous goods (including fuel storage) would be associated with the current site.

3.7 Previous Environmental Reports

3.7.1 Asbestos Register - Greenwich Public School (2076)

A review of the Asbestos Register for Greenwich Public School identified the presence of asbestos containing materials within the building at the site. All occurrence of asbestos containing materials were considered to present a low risk to site occupants.

3.7.1.1 Asbestos In Grounds, Asbestos Management Plan, Greenwich Public School, Greenwich, NSW (July 2013)

The report indicated that asbestos impacted soil was located at the site in four locations (Area A – D) which were all located on the Kingslangey Road campus. In order to manage the risk of exposure to asbestos, any fibrous cement fragments found were to be removed from the ground surface. Where cement fragments were identified, these areas were designated “asbestos zones”.

The remedial techniques for each area was:

[6] http://www.environment.nsw.gov.au/heritageapp/heritagesearch.aspx. Accessed 13 April 2017.
[7] http://www.environment.gov.au/cgi-bin/ahdb/search.pl. Accessed 13 April 2017.

- Area A – surface pick of the area and encapsulation using mulched garden beds and/or paving;
- Area B – surface pick and sealed using paving. Fencing was to be installed to direct students onto sealed surfaces;
- Area C – surface pick and sealed using mulched garden beds and/or paving. Fencing was to be installed to direct student traffic off garden beds; and
- Area D – surface pick and sealed using mulched garden beds and/or paving. Fencing was to be installed to direct student traffic off garden beds.

It was reported that the remediation works were completed in October 2006. The report indicated that the remediation works were only undertaken on the Kingslangley campus.

3.8 Integrity Assessment

The information obtained from the historical sources reviewed has been found to be in general agreement and of a suitable quality. It is therefore considered that the information provided in this historical assessment has an acceptable level of accuracy.

4. Conceptual Site Model (CSM)

NEPC (2013) identifies a conceptual site model (CSM) as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The development of a CSM is an essential part of all site assessments.

NEPC (2013) identified the essential elements of a CSM as including:

- Known and potential sources of contamination and contaminants of concern including the mechanism(s) of contamination;
- Potentially affected media (soil, sediment and ambient air);
- Potential receptors; and
- Potential and complete exposure pathways.

The CSM below represents a model of potential contamination that may be present at the site based on the desktop review. The potential contamination issues identified are not necessarily present at the site. The CSM usually informs the design of the intrusive sampling program. The results of the intrusive investigation allow conclusions to be drawn regarding the actual site contamination conditions identified as discussed in **Sections 9** and **10**.

4.1 AECs & COPCs

The identified areas of environmental concern (AECs) and associated contaminants of potential concern (COPCs) for the site are presented in **Table 4.1**.

Table 4.1: AECs & COPCs

AECs	COPCs
Fill of unknown origin across the site	Heavy metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX) and asbestos.

4.2 Potentially Impacted Media

Fill material is considered to be a potentially impacted media based upon:

- Unidentified sources of fill material historically imported to or originating from the site to form existing site levels.

Natural soils beneath the fill materials are not expected to be impacted considering the historical use of the site. There is potential that natural soils could be impacted based on possible leaching of contaminants from the fill materials, however considering the low probability of mobile contaminants within the fill, it is expected that any impact would be limited.

Given the anticipated deep levels of groundwater anticipated to occur beneath the site and the relatively low probability of mobile contaminants in fill material and/or natural soils, it is considered that there is a low probability that groundwater will have been significantly impacted as a result of site conditions.

4.3 Potential Receptors

Potential human and ecological receptors on or near the site include:

- Site occupants (including children) / workers and visitors;
- Construction / maintenance workers, including subsurface excavation/maintenance works; and

- Flora and fauna on the site.

4.4 Potential Exposure Pathways

Based on the COPCs identified in soil, groundwater and soil vapour, the potential exposure pathways for the site include:

- Oral and dermal pathways from impacted soils, surface water and groundwater (either through beneficial groundwater re-use or made accessible via excavation).
- Inhalation of airborne contaminants (including airborne asbestos fibres).
- Inhalation of vapours/gases migrating from impacted soils and/or groundwater.
- Contaminant uptake via vegetation (flora) or bioaccumulation within fauna.

4.5 Potential for Migration

Contaminants generally migrate from site via a combination of windblown dusts, rainwater infiltration, groundwater migration and surface water runoff. The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics);
- The extent of the contaminants (isolated or widespread);
- The location of the contaminants (surface soils or at depth); and
- The site topography, geology, hydrology and hydrogeology.

The potential contaminants of concern identified as part of the site history review and site inspection are in solid (e.g. asbestos, metals), liquid (e.g. TRH/BTEX) or vapour/gaseous (e.g. methane) form. In the event of significant soil and/or groundwater contamination, there is the potential for soil vapour impacts, including off-site migration.

The area of investigation was predominantly sealed with asphalt, concrete or grass. Due to the majority of the site being sealed, it is considered that the potential migration of dust and soil via windblown migration is considered to be low.

There is the potential for contaminants to migrate down and impact groundwater at the unsealed locations of the site, and to migrate offsite via groundwater. However, this is somewhat mitigated via the inferred depth of groundwater. It is noted that sandstone/siltstone bedrock underlies the fill and natural soil materials.

Migration of soil via surface water runoff is considered to be limited due to the general sealed nature of the site. In addition, it is expected that the presence of grass in the unsealed areas would limit the migration of any soil via surface water runoff.

4.6 Preferential Pathways

For the purpose of this assessment, preferential pathways have been identified as natural and/or man-made pathways that result in the preferential migration of COPC as either liquids or gasses.

Man-made preferential pathways are present on the site, generally associated with fill materials present beneath the current ground surface, and at near surface depths over the remainder of the site. Fill materials are anticipated to have a higher permeability than the underlying natural soil and/or bedrock.

5. Sampling and Analysis Plan

5.1 Data Quality Objectives

Data quality objectives (DQOs) were developed for the contamination assessment, as discussed in the following sections.

5.1.1 State the Problem

Additional classroom buildings are to be constructed at the site and an ESA is required to characterise potential contamination at the site to enable appropriate management if required during future development activities.

5.1.2 Identify the Decision

The following specific decisions are required to be made as part of these investigations:

- Are there any unacceptable risks to likely future receptors from impacted soil?
- Are there any issues relating to local area background soil concentrations that exceed the appropriate soil criteria?
- Are there any impacts of chemical mixtures?
- Are there any significant aesthetic concerns from impacted soils present at the site?
- Is there any evidence of, or potential for, migration of contaminants from the site?
- Is a site management strategy required?

5.1.3 Identify Inputs to the Decision

Inputs required to address the decisions will be:

- Potential AECs and COPCs as identified by site history review and detailed site inspection;
- Soil environmental data collected by soil sampling and analysis;
- Soil criteria based on the primary school (low density residential) land use;
- Confirmation that data generated by field measurements and sample analysis are of a sufficient quality to allow reliable comparison to assessment criteria as undertaken by assessment of quality assurance / quality control (QA/QC) as per the data quality indicators established in **Section 5.1.6.**

5.1.4 Define the Study Boundaries

The lateral extent of the study comprised the proposed development area, as presented on **Figure 2** and provided plan in **Appendix L**.

The vertical extent of the study comprised assessment of soils to bedrock which was identified between 0.4 and 2.5 mbgs. The investigation comprised only of soil sampling, with no groundwater monitoring wells or soil vapour ports installed or sampled.

The current study does not include assessment of temporal changes in identified COPCs which was beyond the scope of this investigation. Therefore, results were reflective of conditions at the time of the field assessment.

5.1.5 Develop a Decision Rule

The decision rules adopted to answer the decisions identified in **Section 5.1.2** are summarised in **Table 5.1** below.

Table 5.1: Summary of Decision Rules

Decision Required to be Made	Decision Rule
Are there any unacceptable risks to likely future receptors from impacted soil?	Soil analytical data was compared against appropriate criteria. Statistical analyses of the data in accordance with relevant guidance documents were undertaken, if appropriate, to facilitate the decisions. The following statistical criteria were adopted with respect to soils: Either: the reported concentrations were all below the site criteria; Or: the 95% upper confidence limit (UCL) of the average concentration for each analyte was below the adopted site criterion; no single analyte concentration exceeded 250% of the adopted site criterion; and the standard deviation of the results was less than 50% of the site criterion. If the statistical criteria stated above were satisfied, the decision was No. If the statistical criteria were not satisfied, the decision was Yes.
Are there any issues relating to the local area background soil concentrations that exceed appropriate soil criteria?	Analytical data in natural soil samples were compared to the background levels for urban areas of NSW as described in NEPC 2013. Where concentrations were less than the background levels, the answer to the decision was No. Otherwise the answer to the decision was Yes.
Are there any impacts from chemical mixtures?	Are there more than one group of contaminants present which increase the risk of harm? If there was, the decision was Yes. Otherwise, the decision was No.
Are there any significant aesthetic concerns from impacted soils present at the site?	Were significant odour or other aesthetic issues identified during the soil assessment? If yes, the decision was Yes. Otherwise, the decision was No. It is noted that staining/discolouration was not considered to be an aesthetic issue based on DEC 2006 guidance for commercial/industrial land use.
Is there any evidence of, or potential for, migration of contaminants from the site?	Based on the assessment results including soil and groundwater analytical data, was there any evidence of, or potential for, migration of contaminants from the site? If there was potential for unacceptable contaminant concentrations to migrate, the decision was Yes. Otherwise, the decision was No.
Is a site management strategy required?	Was the answer to any of the decisions Yes? If yes, a site management strategy was required. If no, a site management strategy was not required.

5.1.6 Specify Limits of Decision Error

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Data generated during this project must be appropriate to allow decisions to be made with confidence.

Specific limits with respect to the limits of decision error adopted for this project have been implemented in accordance with the appropriate guidance from NEPC (2013) and appropriate indicators of data quality (DQIs used to assess quality assurance / quality control) and standard JBS&G procedures for field sampling and handling.

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined Data Quality Indicators (DQIs).

The pre-determined DQIs established for the project are discussed below in relation to precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS parameters), and are shown in **Table 5.2**.

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD) of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** – expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** - expresses the appropriateness of the chosen field and laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted site assessment criteria.

Table 5.2: Summary of Quality Assurance / Quality Control Program

Data Quality Indicator	Frequency	Data Quality Criteria
Precision		
Blind duplicates (intra laboratory)	1 / 20 samples	<50% RPD[1]
Blind triplicates (inter laboratory)	1 / 20 samples	<50% RPD[1]
Laboratory duplicates	1 / 20 samples	<50% RPD[1]
Accuracy		
Surrogate spikes	All organic samples	70-130%
Laboratory control samples	1 per lab batch	70-130%
Matrix spikes	1 per lab batch	70-130%
Representativeness		
Sampling appropriate for media and analytes	-	-
Samples extracted and analysed within holding times.	-	organics (14 days), inorganics (6 months)
Trip spike	1 per sampling batch	70-130% recovery
Trip blank	1 per sampling batch	<LOR
Rinsate	1 per sampling batch with reusable sampling equipment	<LOR

Data Quality Indicator	Frequency	Data Quality Criteria
Laboratory Blanks	1 per analytical method	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All samples	All samples
Standard analytical methods used for all analyses	All samples	All samples
Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples
Limits of reporting appropriate and consistent	All samples	All samples
Completeness		
Sample description and COCs completed and appropriate	All samples	All samples
Appropriate documentation	All samples	All samples
Satisfactory frequency and result for QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		
Field and analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	All samples	LOR < adopted site criteria (where possible)

1 Relative percent difference (RPD)

If any of the DQIs are not met, further assessment will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data. Corrective actions may include requesting further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of the data.

A qualitative assessment of compliance with standard procures and appropriate sample collection methods will be completed during the DQI compliance assessment.

5.1.7 Optimise the Design for Obtaining Data

For a combined site of approximately 12,000 m^2 EPA (1995)[8] recommends a stratified approach to sampling. However, based on the requirement to co-locate contamination samples within geotechnical boreholes and the scope of works provided, a total of three (3) sample locations were undertaken on the Greenwich Road campus and eleven (11) sample locations were undertaken on the Kingslangley Road campus. The boreholes locations were generally within the vicinity of the geotechnical investigations location provided by the client. The soil sample locations are presented on **Figure 3**.

5.2 Investigation Methodology

5.2.1 Soil Sampling Methodology

Soil samples were collected during the site investigation works using a solid flight auger. Sample locations were extended to until bedrock was reached.

Samples were obtained directly from the auger wearing fresh disposable nitrile gloves for each sample. Disturbance of the soil sample was minimised where possible during sample collection and placement with laboratory supplied sample containers to reduce the potential for release of volatile organic contaminants.

[8] Contaminated Sites: Sampling Design Guidelines, *NSW EPA*, 1995 (EPA 1995).

Visual inspection of drilling spoil was undertaken at each location for the presence of discolouration, ACM or other indications of potentially contaminated materials. Where identified, the observations were recorded on field logs, which are presented in **Appendix C**.

During site works, sufficient sample material was collected to allow for field testing and laboratory analyses. Additional samples were collected from any soil horizons which exhibited staining, odours, seepage, discolouration, or other physical evidence of potential contamination.

Soil samples destined for laboratory analysis were immediately transferred to laboratory supplied sample jars and sealed with a Teflon-lined screw closure or placed into asbestos sample bags. The sample containers were then placed in a pre-cooled insulated box for sample preservation prior to and during shipment to the testing laboratory. Preservation of the primary soil and QA/QC samples obtained during this investigation was completed in accordance with recognised protocols (NEPC 2013).

The samples were transported under standard JBS&G chain-of-custody protocols to the National Association of Testing Authority (NATA) registered laboratory, Eurofins|mgt Pty Ltd (Eurofins).

Not all samples collected were analysed. Selected samples were analysed in accordance with the analytical schedule (**Section 5.3**). However, all samples remain at the primary laboratory for a period of two months. This allows for future analysis to be completed in the event that further information is required to characterise site conditions, provided that proposed analytes remain within analytical holding times.

5.2.2 Soil Sampling Decontamination

Prior to the commencement of sampling activities, non-disposable sampling equipment, including sampling trowel/knife were all cleaned with a high-pressure water/detergent spray and brush, rinsed with water and then air dried. The equipment was then inspected to ensure that no soil, oil, debris or other contaminants were apparent on the equipment prior to the commencement of works. Sampling equipment was subsequently decontaminated using the above process between each sampling location. New disposable nitrile gloves were used for each sampling event.

5.2.3 Soil Field PID Screening

Samples collected during the JBS&G sampling event were screened on site using a photo-ionisation detector (PID) to assess the potential presence of VOCs including petroleum hydrocarbons. Samples obtained for PID screening were placed in a sealed plastic bag for a period of approximately five minutes to equilibrate, prior to a PID being attached to the bag. Readings were then monitored for a period of approximately one minute or until values stabilise and the stabilised/highest reading were recorded on the borehole logs. PID screening results were recorded on the bore logs included as **Appendix C**. PID calibration records are included in **Appendix I**.

5.2.4 Soil Duplicate Preparation

Field soil duplicate samples were obtained during sampling using the above sampling methods. The collected samples were then divided laterally into two samples and placed in clean glass jars or sample bags as appropriate. Each sample was then labelled with a primary or duplicate sample identification before being placed in the same chilled esky for transport to the laboratory.

5.3 Laboratory Analysis

JBS&G contracted a NATA certified laboratory (Eurofins | mgt) for the required analysis to which the primary and duplicate samples were submitted. Laboratory analysis of samples was conducted as summarised in **Table 5.3**. Duplicate samples were collected at rate of at least 1 per 20 primary samples.

Table 5.3: Sampling and Analytical Program

Campus	Sample Media	No. Sample Locations	Analyses (exc. QA/QC)
Greenwich Road campus	Soil	3	Heavy metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn) – 3 samples PAH – 3 samples OCPs/PCBs – 3 samples TRH/BTEX – 3 samples Asbestos – 3 samples (500 mL) TOC – 3 samples CEC, Ph, % clay, TOC – 3 samples TCLP (metals/PAHs) – 3 samples
Kingslangley Road campus	Soil	11	Heavy metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn) – 11 samples PAH – 11 samples OCPs/PCBs – 11 samples TRH/BTEX – 11 samples Asbestos – 11 samples (500 mL) TOC – 11 samples CEC, Ph, % clay, TOC – 11 samples TCLP (metals/PAHs) – 11 samples

6. Assessment Criteria

6.1 Regulatory Guidelines

Development of site assessment criteria and the associated scope of investigation was undertaken with consideration to aspects of the following guidelines, as relevant:

- *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1),* National Environment Protection Council (NEPC 2013);
- *Contaminated Sites: Sampling Design Guidelines*, NSW EPA, 1995 (EPA 1995);
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*, NSW OEH, 2011 (OEH 2011);
- *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme*, 2nd Edition, NSW EPA, 2006 (DEC 2006); and
- *CRCCARE Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater*, 2011, Friebel and Nadebaum (CRCCARE 2011).

6.2 Soil Assessment Criteria

As per the decision process for assessment of urban development site (DEC 2006), a set of health and ecological assessment thresholds derived from NEPC (2013) or other EPA approved guidelines was used for evaluation of site contamination data collected for this assessment. The site is zoned R2 Low Density Residential and used as a primary school. On this basis, low density residential with gardens and accessibility soil land use criteria were adopted as the site assessment criteria. These land use criteria also apply to primary school. The site assessment criteria are presented on **Table A** and summarised as follows:

- Health based investigation levels (HILs) for residential land use with garden/accessible soils (HIL A);
- Health screening levels (HSLs) for vapour intrusion for low density land use, sand (HSL A);
- HSLs for direct contract for intrusive maintenance worker;
- Management limits for TRH fractions for residential, parkland and public open space, coarse soils;
- HSLs for asbestos in soil for residential land use with garden/accessible soils (HSL A);
- Ecological investigation levels (EILs) for urban residential/public open space land use, site specific; and
- Ecological screening levels (ESLs) for urban residential/public open space land use, coarse soils.

The results of the asbestos analysis were assessed in general accordance with NEPC (2013) including DOH (2009) guidance.

To derive EILs for the selected inorganics COPCs, consistent with NEPC (2013), the pH, cation exchange capacity (CEC) and percent clay content for surface soils at the site were analysed. The selected pH value, CEC and percent clay was based on the median concentration of the fourteen samples analysed. Based on the information, the following criteria for copper, nickel, chromium and zinc in **Table 6.1** were derived from the proposed residential land use scenarios using the EIL spreadsheet provided in the NEPC 2013. Additionally, NEPC 2013 provided generic EILs for lead, arsenic, DDT and naphthalene.

Where no criteria are present for a contaminant, the laboratory limit of reporting (LOR) has been used as an initial screening criterion.

Table 6.1: Derived EIL urban residential/public open space land use

pH	CEC (meq/100g)	Clay Content (%)	Cu (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Cr (mg/kg)
7.5	20	11	210	270	700	400

7. Quality Assurance/Quality Control

7.1 QA/QC Results

The QA/QC results are summarised in **Table 7.1** and discussed in **Section 7.2** below. Relevant QA/QC data is presented in **Appendix K**.

Table 7.1: QA/QC Results Summary

Data Quality Indicator	Results	DQI Met?
Precision		
Blind duplicates (intra laboratory) (soil)	Sampling rate greater than 1 in 20. RPDs = 0-89%	Partial[1]
Blind triplicates (inter laboratory) (soil)	Sampling rate greater than 1 in 20. RPDs = 0-<50%	No[1]
Laboratory duplicates	Sampling rate greater than 1 in 20. RPDs = 0-<50%	Yes
Accuracy		
Surrogate spikes	50-149% Surrogate spikes were completed for all organic samples	Partial[1]
Laboratory control samples	>70-<130% Laboratory control samples completed for each batch	Yes
Matrix spikes	13-301%. One matrix spike was completed for each batch	Partial[1]
Representativeness		
Sampling appropriate for media and analytes	All sampling was conducted in accordance with JBS&G procedures	Yes
Samples extracted and analysed within holding times.	All samples were extracted and analysed within holding times	Yes
Trip spike	77-110% One per sampling event when sampling for volatile or semi-volatile COPC	Yes
Trip blank	<LOR One per sampling event when sampling for volatile or semi-volatile COPC	Yes
Rinsate blank	One rinsate blank was collected.	Yes
Laboratory Blanks	<LOR One per laboratory method	Yes
Comparability		
Standard operating procedures for sample collection & handling	Field staff used same standard operating procedures throughout works	Yes
Standard analytical methods used for all analyses	Standard analytical methods were used	Yes
Consistent field conditions, sampling staff and laboratory analysis	Sampling was conducted using standard operating procedures in the same conditions throughout the works. The laboratory remained consistent throughout the investigation.	Yes
Limits of reporting appropriate and consistent	Limits of reporting were consistent and appropriate	Yes
Completeness		

Sample description and COCs completed and appropriate	All borehole logs, groundwater sampling sheets and COCs were completed appropriately.	Yes
Appropriate documentation	Field documentation was appropriately completed.	Yes
Satisfactory frequency and result for QC samples	All frequency and results for QA/QC were satisfactory	Yes
Data from critical samples is considered valid	Data from critical samples is considered valid.	Yes
Sensitivity		
Field and analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	Appropriate laboratory analysis methods and detection limits were considered to have been achieved to the extent practicable during the field and laboratory phases of this investigation.	Yes

Notes: 1 See discussion of DQI exceedances

7.2 QA/QC Discussion

7.2.1 Precision

Soil Blind Duplicates (intra laboratory)

Duplicate sample analysis was completed at the required frequency and the soil blind duplicate RPDs were reported within the acceptable limits for all COPCs except for TRH C_{29}-C_{36}. The RPD was considered elevated due to the low concentration reported within the duplicate sample and the primary sample concentration reported below the laboratory LOR and as such, it is considered that the results do not influence the investigation findings.

Soil Blind Triplicates (inter laboratory)

No triplicate samples were analysed as part of this investigation.

Laboratory Duplicates

Laboratory duplicate analysis was completed at the required frequency and the laboratory duplicate RPDs were reported within the acceptable limits for all COPCs.

7.2.2 Accuracy

Surrogate Spikes

The surrogate spikes samples have been reported for analysis of all organic constituents for soils and water. 37 surrogate spike samples reported were >30% variation ranging from 50% to 149%. Given that most organic COPCs were reported below the LOR and all volatile COPCs were reported below the site assessment criteria, this is not considered to influence the outcome of the investigation. Furthermore, field screening (PID) and observations (odour, staining and sheen) did not indicate the presence of any volatile contaminants. Additionally, the recovery percentages were generally within the NATA accredited lab method acceptance range for surrogate spike recoveries, which are 50-150%.

Laboratory Control Samples

Laboratory control samples have been reported for analysis of all constituents for the analytical batches. All laboratory control samples were within the 70 to 130% acceptance range.

Matrix Spikes

Arsenic, lead and zinc matrix spike recoveries were reported outside the JBS&G acceptable range of 70 – 130% with a reported recovery of 69%, 301% and 13% for sample locations BH10 to BH14. It was noted that a soil sample collected from location BH12 identified an elevated concentration of lead. It was noted that the laboratory control sample was reported within the acceptable range. The laboratory considered the various in the RPDs due to matrix interference of the matrix spike

sample. A review of the matrix spikes sample for the leachate for locations BH10 to BH14 was within the acceptable range. As such, while it is noted that the matrix spike recoveries for lead and zinc are well outside the acceptable range, when considered in conjunction with the above, it is considered that it is unlikely to significantly impact the outcome of this assessment.

All other matrix spike recoveries were reported within the acceptable range.

7.2.3 Representativeness

Sampling appropriate for media and analytes

All soil sampling works completed during the investigation were conducted in accordance with JBS&G standard operating procedures. Solid flight augers with 300 mm diameter were advanced for the purposes of visual inspection of fill conditions and the collection of 500mL asbestos soil samples, which is considered appropriate for the assessment of asbestos.

All samples were collected wearing a new pair of disposable nitrile gloves. Where possible, disturbance of the sample was minimised during placement into the laboratory supplied sample container and during shipment.

Given the absence of specific information in relation to the potential for volatile contaminant sources, this sampling method was considered appropriate to achieve investigation objectives.

Samples extracted and analysed within holding times

All analyses have been undertaken within holding times.

Trip spikes

A single trip spike was submitted with the soil samples collected during the assessment. Trip spike recoveries were within the JBS&G acceptable limit of 70-130%, with a reported range of 77% to 110%.

Trip blanks

A two trip blanks were submitted with the soil sampling event. There were no reported concentrations of BTEX compounds above the laboratory LOR.

Rinsate Blanks

A rinsate blank was submitted for analysis. There were no reported concentrations above the laboratory LOR.

Laboratory Blanks

Reported concentrations of all analytes were <LOR in laboratory blank samples.

7.2.4 Comparability

Experienced JBS&G personnel undertook all sampling in accordance with standard JBS&G sampling methods.

All field works and sampling were undertaken by one experienced JBS&G field scientist.

The laboratory LORs are consistent and are considered appropriate.

7.2.5 Completeness

Samples were generally transported under full chain of custody (COC) documentation. The COC documentation was generally completed correctly and the selected analyses were correctly conducted.

All field documentation was completed appropriately and were correct.

The frequency of analysis and result for all QC samples are appropriate.

7.2.6 Sensitivity

The adopted analytical methods generally provided suitable LORs with respect to the adopted site assessment criteria.

7.3 QA/QC Conclusion

The field sampling and handling procedures produced QA/QC results which indicate that the soil data are of an acceptable quality and suitable for use in site characterisation.

The NATA certified laboratory results sheets indicate that the project laboratory was generally achieving levels of performance within its recommended control limits during the period when the samples from this program were analysed.

The non-conformances described in **Section 7.2** are considered to be minor in nature and acceptable given the consistency of the data and results significantly below the adopted site assessment criteria.

On the basis of the results of the field and laboratory QA/QC program, the soil data are of an acceptable quality upon which to draw conclusions regarding the environmental condition of the site.

8. Soil Results

8.1 Soil Field Observations

A total of 14 sample locations were advanced. Soil sample locations are presented on **Figure 3** and bore logs are provided in **Appendix C**.

Greenwich Road campus

Asphalt was encountered at all three sampling locations.

Fill material was encountered at all sample locations and generally comprised brown sandy silty clay, medium to high plasticity, heterogeneous, damp, firm with some trace gravel and organic matter. No major anthropogenic inclusions were observed within the fill material. Fill material was observed at all three of the sampling locations at depths ranging from 0.3 mbgs to 0.4 mbgs.

Natural soils underlying the fill material generally comprised orange or white sand or silty sand, fine grained, homogenous, dense with occasional sandstone fragments.

Kingslangley Road campus

Asphalt was encountered at the surface of 9 of the 11 locations. The remaining two locations were undertaken in grass/unsealed areas.

Fill material was encountered at all sample locations and generally comprised brown sandy silty clay, medium to high plasticity, heterogeneous, damp, firm with some trace gravel and organic matter or brown silty sand, fine-coarse grained, sub-rounded, dry, medium dense with sandstone, gravel or organic matter inclusions. No major anthropogenic inclusions were observed within the fill material. Fill material was observed at seven (7) of the sampling locations at depths ranging from 0.15 mbgs to 2.5mbgs, however fill material may consist of reworked natural soils associated with cut and fill activities likely undertaken for levelling purposes.

Natural soils underlying the fill material generally comprised orange or white sand or silty sand, fine grained, homogenous, dense with occasional sandstone fragments in the eastern portion of the Kingslangley Road campus. The western portion of the Kingslangley Road campus identified natural soils generally consisting of brown sandy clay, red mottled, homogeneous, damp, firm, medium to high plasticity. grey mottled red, low plasticity, homogeneous.

No odours, staining or asbestos containing material (ACM) were observed within the fill material or natural soils at the site.

PID results during field screen for volatile contaminants were generally 0 ppm, consistent with the lack of observed odours and staining.

8.2 Soil Analytical Results

Summarised soil analytical results are presented in **Table A** and discussed in the following sections. Laboratory documentation is provided in **Appendix K**.

8.2.1 Metals

The concentrations of the heavy metals in the soil samples selected for analysis were all less than the site assessment criteria except for sample BH12_0.4-0.5 (Kingslangley Rd campus), which returned a concentration of lead at 440mg/kg, exceeding the adopted human health criterion of 300mg/kg. A statistical assessment of the lead was undertaken at the site. While the concentration was reported less than 250% of the criteria, the standard deviation was outside the acceptable range and as such, no statistical assessment of the samples could be undertaken.

8.2.2 PAHs

Elevated concentrations of Benzo(a)pyrene (BaP) were identified within four samples and BaP TEQ above the adopted human health-based and/or ecological criteria in three samples (BH01_0.05-0.15, BH03_0.05-0.15, BH04_01.-0.2 and BH13_0.1-0.2). It was noted that all samples containing elevated PAHs were collected from directly beneath asphalt. It is considered that the source of the elevated PAH concentrations is asphalt immediately over the sample intervals, and not representative of PAH concentrations in fill soil material. All other concentrations of PAHs in the soil samples selected for analyses were all less than the site assessment criteria and below the LOR.

8.2.3 Asbestos

Friable asbestos was identified in one sample (BH10_0.0-0.1) collected from the surface of an unsealed area in the Kingslangley Rd campus. The sample was reported to containing fibrous asbestos (FA) in the form of weathered fibre cement sheeting. The percentage weight of the asbestos as FA (0.0158 % w/w) was reported above the adopted health-based criterion (0.001 % w/w). All other samples reported all forms of asbestos in the soil samples selected for analyses were not detected above the LOR and as such were less than the site assessment criteria.

8.2.4 TRH

The concentration of TRH in the soil samples selected for analyses identified three samples above the adopted ecological criteria. These samples were collected directly beneath the asphalt, and coincided with elevated PAH concentrations noted above at BH01, BH03 and BH04. It is considered that the reported concentration of TRH is associated with asphalt from above the samples and is not considered to represent TRH concentrations within the fill material. All other samples analysed for TRH were all less than the site assessment criteria and generally below the LOR.

8.2.5 BTEX

The concentration of BTEX in the soil samples selected for analyses were all less than the site assessment criteria and below the LOR.

8.2.6 OCPs

The concentration of OCPs in the soil samples selected for analyses were all less than the site assessment criteria and below the LOR.

8.2.7 PCBs

The concentration of PCBs in the soil samples selected for analyses were all less than the site assessment criteria and below the LOR.

8.2.8 Soil Properties for Site Specific EILs

The reported % clay ranged from 6.3% (BH09) to16% (BH02, BH12 & BH13). The cation exchange capacity ranged from 2.8 meq/100g (BH14) to 89 meq/100g (BH08). pH ranged from 5.3 pH (BH14) to 12 pH (BH08). Total organic carbon ranged from <0.1% (BH14) to 4.1% (BH03).

8.3 Preliminary Waste Classification

Toxicity characteristic leaching procedure (TCLP) was undertaken on the soil samples at the site to assess the likely leaching of heavy metal and PAH contaminants within the soils. Sample BH04_0.4-0.5 identified moderate potential for leaching of lead. All other samples were generally below the laboratory LOR.

The soil concentration and TCLP of sample BH04_0.4-0.5 reported concentrations above the specific contaminant concentration 1 (SSC1) for general solid waste, however was within the criteria for specific contaminant concentration 2 (SSC2) for restricted solid waste. As such, fill material within the vicinity of BH04 is considered to be preliminary classified as Restricted Solid Waste. Fill soil from

location BH10 is classified as Special Waste due to the reported presence of asbestos. Based on the results of the soil and TCLP data, the remaining fill material at the site has been preliminarily classified as General Solid Waste.

9. Site Characterisation

The following sections provide a summary discussion of the decision outcomes for this assessment.

9.1 Are there any unacceptable risks to likely future receptors from impacted soil?

Boreholes completed at the site in conjunction with the geo-technical investigation works were broadly spread across the site. The boreholes were limited to areas understood to be redeveloped and the locations of the boreholes were pre-selected at geotechnical investigation locations completed by the client.

Friable asbestos was identified in one sample (BH10_0.0-0.1) collected from the surface of an unsealed area. The sample was reported to containing asbestos in the form of weathered fibre cement sheeting. The percentage weight of the asbestos was reported above the adopted criteria.

The concentrations of the heavy metals in the soil samples selected for analysis were all less than the site assessment criteria except for sample BH12_0.4-0.5 which returned a concentration of lead at 440mg/kg which is above the adopted human health criterion of 300mg/kg.

The presence of friable asbestos in exposed surface soils at BH10 location have the potential to present an unacceptable risk to current site users and future receptors during the proposed development. The elevated lead concentration at BH12 at 0.4-0.5 m depth may pose an unacceptable risk to future receptors during proposed development, but is unlikely to pose an unacceptable risk while asphalt surface at this location is in place. Risk mitigation systems will need to be put in place prior to any development works for these locations. The exposed soil at BH10 location should be isolated and covered to prevent access to the soil and potential migration of fibres, until such time as asbestos impact can be managed/removed.

The reported elevated TRH and/or PAH concentrations at four locations beneath asphalt paving are not considered to represent an unacceptable health risk as the concentrations are associated with asphalt materials mixed into the fill soil immediately below the asphalt. The concentrations do not pose an unacceptable ecological risk given the asphalt covering and lack of vegetation.

9.2 Are there any issues relating to the local area background soil concentrations?

A total of four natural samples were collected and analysed. These were retrieved from directly below sealed areas or from the surface soil. Heavy metals were generally reported within background ranges as per Olszowy et al. (1995). In addition, all other COPCs were reported below or marginally above the LOR. On this basis, there are not considered to be any issues relating to local area background soil concentrations. The physical observations of natural soil/rock conditions is considered sufficient to confirm the absence of conditions of concern for natural materials at the site.

9.3 Are there any impacts from chemical mixtures?

There were no soil conditions identified with significant concentrations of more than one contaminant of concern and therefore no potential chemical mixtures were identified during the investigation that may pose an unacceptable contamination risk at the site with respect to future site users.

9.4 Are there any aesthetic concerns?

Based on the lack of observed odours or staining within site soils, the lack of anthropogenic inclusions and that no visible ACM was observed within surface soils (or at depth), no unacceptable aesthetic concerns have been identified during this assessment.

9.5 Is there any evidence of, or potential for, migration of contaminants from the site?

The presence of friable asbestos within exposed soil at BH10 presents a potential risk via windblown migration. The exposed soil at this location should be covered with geofabric, mulch or turf and the area isolated until such time as the asbestos in soil can be managed/removed.

No evidence of volatile compounds were identified during the analytical program. As such, it is considered that migration of contamination via migration is negligible.

No groundwater investigation was undertaken at the site. Groundwater was not intercepted during the investigation, and is anticipated to be at depth in bedrock. Considering the concentrations identified within the fill material and the surrounding land uses, it is considered that the risk to groundwater is low and no groundwater assessment would be required.

9.6 Is a site management strategy required?

Based on the scope of works completed, including a desktop review and limited intrusive investigations, and the limitations presented in **Section 11**, the presence of lead and friable asbestos within the soil at the Kingslangley Road campus site is considered to present a potentially unacceptable risk and appropriate site management is required during any development works.

In accordance with the Asbestos Management Plan for NSW Government Schools, access to the area should be immediately restricted to all students until it is proven that no ACMs are present or until ACMs are removed or appropriately encapsulated.

An appropriate unexpected find protocol implemented during development works would enable management of any additional unidentified contamination if encountered.

10. Conclusions and Recommendations

10.1 Conclusions

Based on the findings of this assessment and subject to the limitations in **Section 11**, the following conclusions are provided:

Greenwich Road campus:

- The 70A Greenwich Road, (Greenwich Road campus) has been used for education purposes (school) since 1907. The site use prior to this is unknown, however was likely residential.
- Fill material was encountered at the three sampling location at the Greenwich Road campus consisting of brown sandy silty clay with some trace gravel and organic matter. The fill material was observed at depths between 0.3 and 0.4mbgs. Fill material is preliminarily classified as General Solid Waste.
- There are no unacceptable contamination risks based on the sampling results at the Greenwich Road campus, and TRH and PAH related to asphalt materials not soil impacts. No further investigation or management of contamination is required at the Greenwich Road campus. An unexpected finds protocol should be implemented during future development works.

Kingslangley Road campus:

- The 32 Kingslangley Road (Kingslangley Road campus) has been used for education purposes since 1981. The southern portion of the site (adjacent to River Road) had been used as a school since 1942, where prior to this was used for residential purposes. The northern eastern portion of the site (previously two lots) was likely used for residential purposes prior to being amalgamated for schooling use.
- Fill material was encountered at 7 of the 11 sample locations at the Kingslangley Road campus generally consisting of brown sandy silty clay with some trace gravel and organic matter or brown silty sand, with sandstone, gravel or organic matter inclusions. No major anthropogenic inclusions were observed within the fill material. Fill material was observed at depths ranging from 0.15 mbgs to 2.5mbgs, however fill material may consist of reworked natural soils associated with cut and fill activities likely undertaken for levelling purposes.
- An elevated concentration of lead was identified at one location (BH12). There is potential that additional data (through sampling and analysis) and statistical analysis may indicate that the lead concentration does not present a risk to the site occupants.
- Friable asbestos was identified within exposed surface soil at one location (BH10) at the site.
- Based on the soil and leachate analytical data, the fill material within the vicinity of BH12 would preliminary be considered Restricted Solid Waste. Fill material within the vicinity of BH10 would be classified as “Special Waste” due to the presence of asbestos materials. All other soils would preliminary be classified as General Solid Waste in accordance with EPA guidelines.
- No chemical mixtures, aesthetic issues or significant offsite migration risks were identified.

Based on the results of the investigation, the following recommendations are made for the Kingslangley Road campus:

- Due to the presence of friable asbestos material identified within the surface soils at BH10 and in accordance with the Asbestos Management Plan for NSW Government Schools, access to the area should be immediately restricted to all students until it is proven that no ACMs are present or until ACMs are removed or appropriately encapsulated.
- Additional surface soil sampling for the presence of friable asbestos should be undertaken to identify any additional locations which may present a risk to site occupants and future development workers.
- The construction management plan will also need to incorporate procedures to address the presence of asbestos within the soil which may be disturbed during works.
- Further soil sampling should be undertaken within the vicinity of BH12to delineate the lead impacted soil to allow the assessment of appropriate management procedures during development works.
- Due to the potential presence of additional contamination at the site, an appropriate unexpected finds protocol implemented during future development works would enable management of any unidentified contamination if encountered.

11. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

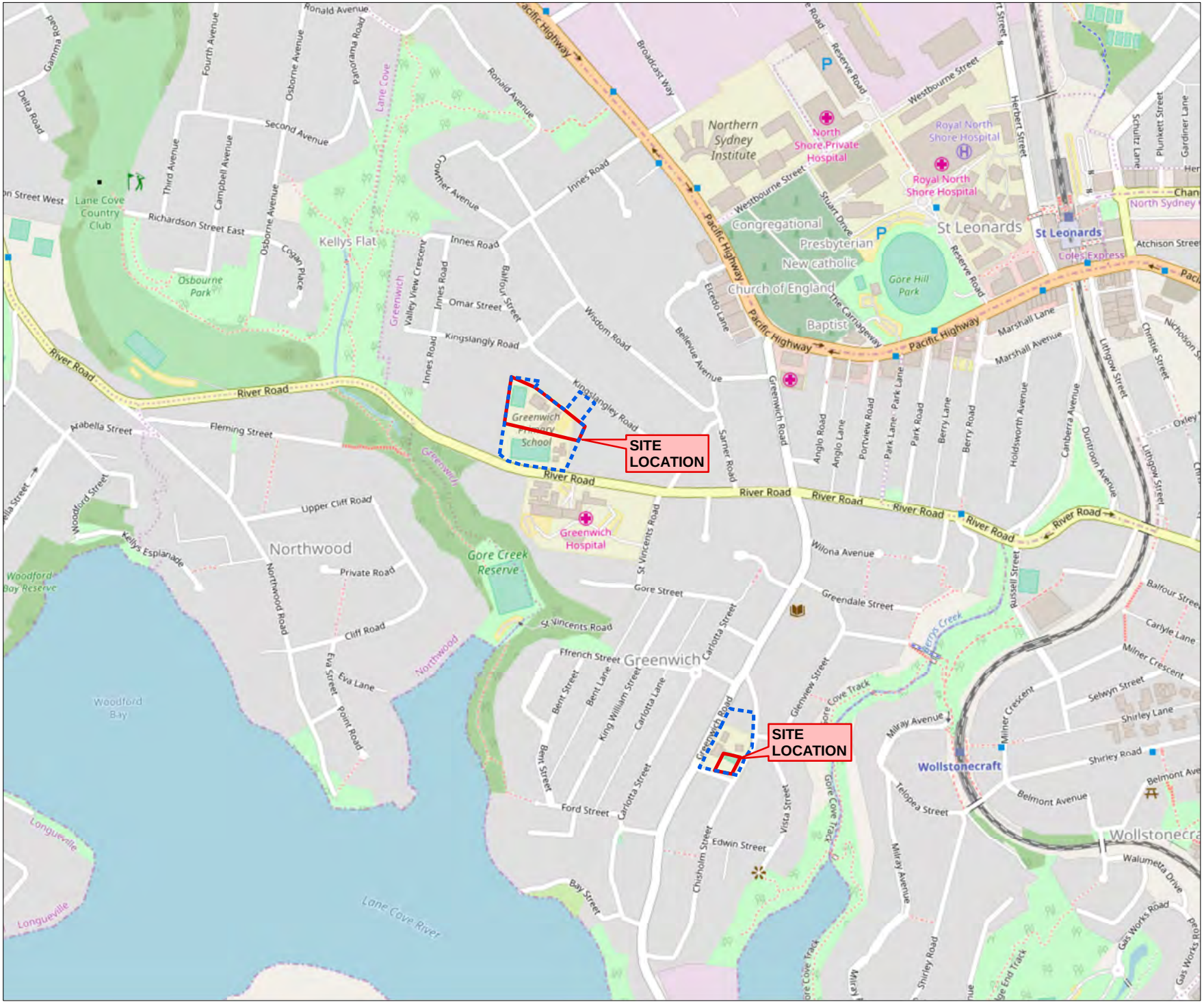
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Figures



Legend:

- Greenwich Public School Boundary
- Approximate Investigation Area

JBS&G

Job No: 53033

Client: Pells Sullivan Meynink

Version: R02 Rev A	Date: 01-Sep-2017
Drawn By: BC	Checked By: SB

Scale 1:10,000

0 120 240

metres

Coor. Sys. GDA 1994 MGA Zone 56

72 Greenwich Road
& 32 Kingslangley Road
Greenwich, NSW

SITE LOCATION

FIGURE 1

File Name: 53033_01

Legend:

Greenwich Public School Boundary

Approximate Investigation Area

JBS&G

Job No: 53033

Client: Pells Sullivan Meynink

Version: R02 Rev A	Date: 01-Sep-2017
Drawn By: BC	Checked By: SB

Scale 1:1,250

0 10 20

metres

Coor. Sys. GDA 1994 MGA Zone 56

72 Greenwich Road
& 32 Kingslangley Road
Greenwich, NSW

SITE LAYOUT

FIGURE 2

File Name: 53033_02
Reference: Near Maps - http://www.nearmap.com.au/. Imagery - 18-07-2017.

Legend:

- Greenwich Public School Boundary
- Approximate Investigation Area
- Sample Location

JBS&G

Job No: 53033

Client: Pells Sullivan Meynink

Version: R02 Rev A	Date: 01-Sep-2017
Drawn By: BC	Checked By: SB

Scale 1:800

0 9.5 19
metres

Coor. Sys. GDA 1994 MGA Zone 56

72 Greenwich Road
& 32 Kingslangley Road
Greenwich, NSW

SAMPLE LOCATIONS

FIGURE 3

File Name: 53033_03
Reference: Near Maps - http://www.nearmap.com.au/. Imagery - 18-07-2017.

Appendix A Summary Tables

Table A
Project Number: 53033
Project Name: Greenwich Public School

Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Matrix_Description
BH01_0.05-0.15	BH01	0.05-0.15	16-Aug-17	Sandy Silty Clay
BH02_0.1-0.2	BH02	0.1-0.2	16-Aug-17	Silty Clayey Sand
BH03_0.05-0.15	BH03	0.05-0.15	16-Aug-17	Sandy Silty Clay
BH04_0.1-0.2	BH04	0.1-0.2	16-Aug-17	Sandy Silty Clay
BH05_0-0.1	BH05	0-0.1	16-Aug-17	Silty Sand
BH06_0.1-0.2	BH06	0.1-0.2	16-Aug-17	Silty Sand
BH07_0.1-0.2	BH07	0.1-0.2	16-Aug-17	Sandy Silt
QA20170816	BH07	0.1-0.2	16-Aug-17	Sandy Silt
BH08_0.1-0.2	BH08	0.1-0.2	16-Aug-17	Silty Sand
BH09_0.1-0.2	BH09	0.1-0.2	16-Aug-17	Silty Sand
BH10_0.0-0.1	BH10	0-0.1	17-Aug-17	Silty Sand
BH11_0.1-0.2	BH11	0.1-0.2	17-Aug-17	Clayey Sand
QA20170817	BH11	0.1-0.2	17-Aug-17	Clayey Sand
BH12_0.4-0.5	BH12	0.4-0.5	17-Aug-17	Clayey Sand
BH13_0.1-0.2	BH13	0.1-0.2	17-Aug-17	Sandy Clay
BH14_0.1-0.2	BH14	0.1-0.2	17-Aug-17	Clayey Sand

	Metals & Metalloids								TPHs (NEPC 1999)				
Field_ID	Arsenic (Total)	Cadmium	Chromium (Total)	Copper	Lead	Mercury (Inorganic)	Nickel	Zinc	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Total)
	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	2.00	0.40	5.00	5.00	5.00	0.10	5.00	5.00	20.00	20.00	50.00	50.00	50.00
NEPM 2013 EIL - Urban Residential (generic)	100		400	210	1100		270	700					
NEPM 2013 ESL Urban Residential and Public Open Space, Coarse Soil													
NEPM 2013 HSL Asbestos in Soil - Bonded ACM - Residential - HSL A													
NEPM 2013 HSL Asbestos in Soil - FA & AF - HSL													
NEPM 2013 Soil HIL A	100	20	100	6000	300	40	400	7400					
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Sand 0 to <1m													
BH01_0.05-0.15	57	<0.4	42	22	110	<0.1	<5	72	<20	<20	560	410	970
BH02_0.1-0.2	8	<0.4	24	<5	20	<0.1	<5	13	<20	<20	<50	57	57
BH03_0.05-0.15	2.8	<0.4	45	47	20	<0.1	46	60	<20	<20	270	1000	1270
BH04_0.1-0.2	2.8	<0.4	20	170	15	<0.1	24	63	<20	<20	160	330	490
BH05_0-0.1	3.1	<0.4	8.4	5.8	17	<0.1	<5	61	<20	<20	<50	63	63
BH06_0.1-0.2	2.2	<0.4	7.2	<5	22	<0.1	<5	18	<20	<20	<50	<50	<50
BH07_0.1-0.2	3.4	<0.4	10	15	52	<0.1	16	75	<20	<20	<50	<50	<50
QA20170816	3.7	<0.4	11	16	59	<0.1	16	86	<20	<20	<50	130	130
BH08_0.1-0.2	2.1	<0.4	7.2	<5	13	<0.1	<5	13	<20	<20	<50	<50	<50
BH09_0.1-0.2	6.5	<0.4	7.4	20	110	<0.1	<5	54	<20	<20	<50	<50	<50
BH10_0.0-0.1	3	<0.4	9.5	9.5	45	<0.1	<5	60	<20	<20	<50	<50	<50
BH11_0.1-0.2	3.7	<0.4	18	10	23	<0.1	10	36	<20	<20	<50	<50	<50
QA20170817	3.4	<0.4	33	13	17	<0.1	23	39	<20	<20	<50	<50	<50
BH12_0.4-0.5	3.5	<0.4	14	9.7	440	<0.1	7.4	42	<20	<20	<50	<50	<50
BH13_0.1-0.2	7.2	<0.4	34	24	36	<0.1	23	76	<20	<20	79	<50	79
BH14_0.1-0.2	2.8	<0.4	7.5	5.2	7.5	<0.1	<5	<5	<20	<20	<50	<50	<50

	TRHs (NEPC 2013)						BTEX					
Field_ID	>C10-C16 Fraction	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C16 less Naphthalene (F2)	C6-C10 Fraction	C6-C10 less BTEX (F1)	Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylene (Total)
	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	50.00	100.00	100.00	50.00	20.00	20.00	0.10	0.10	0.10	0.10	0.20	0.30
NEPM 2013 EIL - Urban Residential (generic)												
NEPM 2013 ESL Urban Residential and Public Open Space, Coarse Soil		300	2800	120		180	50	70	85			105
NEPM 2013 HSL Asbestos in Soil - Bonded ACM - Residential - HSL A												
NEPM 2013 HSL Asbestos in Soil - FA & AF - HSL												
NEPM 2013 Soil HIL A									160			
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Sand 0 to <1m				110		45	0.5	55	160			40
BH01_0.05-0.15	<50	760	210	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH02_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH03_0.05-0.15	<50	1100	820	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH04_0.1-0.2	<50	380	370	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH05_0-0.1	<50	110	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH06_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH07_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
QA20170816	<50	160	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH08_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH09_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH10_0.0-0.1	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH11_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
QA20170817	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH12_0.4-0.5	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH13_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH14_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3

	Polycyclic Aromatic Hydrocarbons																				
Field_ID	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (lower bound)*	Benzo(a)pyrene TEQ (medium bound)*	Benzo(a)pyrene TEQ (upper bound)*	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Carcinogenic PAHs as B(a)P TEQ	Phenanthrene	Pyrene	PAHs (Total)
	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	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50	0.50
NEPM 2013 EIL - Urban Residential (generic)																	170				
NEPM 2013 ESL Urban Residential and Public Open Space, Coarse Soil					0.7																
NEPM 2013 HSL Asbestos in Soil - Bonded ACM - Residential - HSL A																					
NEPM 2013 HSL Asbestos in Soil - FA & AF - HSL																					
NEPM 2013 Soil HIL A																		3			300
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Sand 0 to <1m																	3				
BH01_0.05-0.15	<0.5	1.6	2.5	12	13	22	22	22	20	9.5	10	12	3.5	22	0.7	7.3	<0.5	21.65[#4]	10	22	146.1
BH02_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#7]	<0.5	<0.5	<0.5
BH03_0.05-0.15	<0.5	<0.5	<0.5	0.7	1.3	1.6	1.9	2.1	0.8	0.9	0.9	0.9	<0.5	1.7	<0.5	0.6	<0.5	1.868[#4]	1	1.8	10.6
BH04_0.1-0.2	<0.5	<0.5	<0.5	1.7	2.3	3.5	3.5	3.5	1.5	1.9	1.3	1.9	0.6	2.7	<0.5	1.2	<0.5	3.508[#4]	1.9	4.5	21.5
BH05_0-0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<1.21[#7]	<0.5	<0.5	<1
BH06_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#7]	<0.5	<0.5	<0.5
BH07_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#7]	<0.5	<0.5	<0.5
QA20170816	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21#7	<0.5	<0.5	<0.5
BH08_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#7]	<0.5	<0.5	<0.5
BH09_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#7]	<0.5	<0.5	<0.5
BH10_0.0-0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#7]	<0.5	<0.5	<0.5
BH11_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#7]	<0.5	<0.5	<0.5
QA20170817	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21#7	<0.5	<0.5	<0.5
BH12_0.4-0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#7]	<0.5	<0.5	<0.5
BH13_0.1-0.2	<0.5	<0.5	0.6	2.5	2.6	3.9	3.9	3.9	2.1	1.7	2.2	2.5	0.5	8.1	<0.5	1.2	<0.5	3.942[#4]	2.7	6.8	33.5
BH14_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#7]	<0.5	<0.5	<0.5

	Chlorinated Benzenes	Polychlorinated Biphenyls								
Field_ID	Hexachlorobenzene	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	PCBs (Total)	4,4-DDE
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.05	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.05
NEPM 2013 EIL - Urban Residential (generic)										
NEPM 2013 ESL Urban Residential and Public Open Space, Coarse Soil										
NEPM 2013 HSL Asbestos in Soil - Bonded ACM - Residential - HSL A										
NEPM 2013 HSL Asbestos in Soil - FA & AF - HSL										
NEPM 2013 Soil HIL A	10								1	
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Sand 0 to <1m										
BH01_0.05-0.15	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
BH02_0.1-0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH03_0.05-0.15	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH04_0.1-0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH05_0-0.1	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
BH06_0.1-0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH07_0.1-0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
QA20170816	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH08_0.1-0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH09_0.1-0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH10_0.0-0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH11_0.1-0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
QA20170817	<0.05	-	-	-	-	-	-	-	-	<0.05
BH12_0.4-0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH13_0.1-0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH14_0.1-0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05

Statistical Summary

Statistic	Arsenic (Total)	Cadmium	Chromium (Total)	Copper	Lead	Mercury (Inorganic)	Nickel	Zinc	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Total)	>C10-C16 Fraction	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C16 less Naphthalene (F2)	C6-C10 Fraction	C6-C10 less BTEX (F1)	Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylene (Total)
Number of Results	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Number of Detects	16	0	16	13	16	0	8	15	0	0	4	6	7	0	5	3	0	0	0	0	0	0	0	0	0
Minimum Concentration	2.1	<0.4	7.2	<5	7.5	<0.1	<5	<5	<20	<20	<50	<50	<50	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
Minimum Detect	2.1	ND	7.2	5.2	7.5	ND	7.4	13	ND	ND	79	57	57	ND	110	210	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	57	<0.4	45	170	440	<0.1	46	86	<20	<20	560	1000	1270	<50	1100	820	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
Maximum Detect	57	ND	45	170	440	ND	46	86	ND	ND	560	1000	1270	ND	1100	820	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	7.2	0.2	19	23	63	0.05	12	48	10	10	86	140	205	25	191	128	25	10	10	0.05	0.05	0.05	0.05	0.1	0.15
Median Concentration	3.4	0.2	12.5	11.5	22.5	0.05	4.95	57	10	10	25	25	25	25	50	50	25	10	10	0.05	0.05	0.05	0.05	0.1	0.15
Standard Deviation	13	0	13	41	105	0	12	26	0	0	143	257	379	0	307	204	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances	0	0	0	1	1	0	1	4	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	1	1	0	1	4	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0

Statistic	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (lower bound)*	Benzo(a)pyrene TEQ (medium bound)*	Benzo(a)pyrene TEQ (upper bound)*	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Carcinogenic PAHs as B(a)P TEQ	Phenanthrene	Pyrene	PAHs (Total)
Number of Results	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Number of Detects	0	1	2	4	4	4	16	16	4	4	4	4	3	4	1	4	0	4	4	4	4
Minimum Concentration	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21	<0.5	<0.5	<0.5
Minimum Detect	ND	1.6	0.6	0.7	1.3	1.6	0.6	1.2	0.8	0.9	0.9	0.9	0.5	1.7	0.7	0.6	ND	1.868	1	1.8	10.6
Maximum Concentration	<0.5	1.6	2.5	12	13	22	22	22	20	9.5	10	12	3.5	22	<1	7.3	<0.5	21.65	10	22	146.1
Maximum Detect	ND	1.6	2.5	12	13	22	22	22	20	9.5	10	12	3.5	22	0.7	7.3	ND	21.65	10	22	146.1
Average Concentration	0.25	0.33	0.41	1.2	1.4	2.1	2.4	2.9	1.7	1.1	1.1	1.3	0.49	2.3	0.29	0.83	0.25	2.4	1.2	2.4	13
Median Concentration	0.25	0.25	0.25	0.25	0.25	0.25	0.6	1.2	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.605	0.25	0.25	0.25
Standard Deviation	0	0.34	0.56	2.9	3.2	5.4	5.3	5.2	4.9	2.3	2.4	2.9	0.81	5.6	0.13	1.8	0	5.2	2.5	5.6	37
Number of Guideline Exceedances	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0

Statistic	Hexachlorobenzene	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	PCBs (Total)	4,4-DDE
Number of Results	16	15	15	15	15	15	15	15	15	16
Number of Detects	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.025	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.025
Median Concentration	0.025	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.025
Standard Deviation	0	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0

Data Comments

#4 ESDAT Combined with Non-Detect Multiplier of 0.5.
#7 ESDAT Combined.

Table A
Project Number: 53033
Project Name: Greenwich Public School

	Organochlorine Pesticides																					Ionic Balance			Asbestos										Asbestos	Asbestos - Trace Analysis						Other		A VIC - IWRG6	
	Aldrin	Aldrin + Dieldrin (Sum of Total)	alpha-BHC	beta-BHC	Dieldrin	DDD	DDT	DDT+DDE+DDD (Sum of Total)	Chlordane	delta-BHC	Endosulfan alpha	Endosulfan beta	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	Heptachlor	Heptachlor Epoxide	Lindane	Methoxychlor	Toxaphene	Cation Exchange Capacity	EC 1:5 soil:water	pH 1:5 soil:water	Approx. Sample Mass	Asbestos from ACM in Soil	Asbestos from FA & AF in Soil	Mass ACM	Mass Asbestos in ACM	Mass FA	Mass Asbestos in FA	Mass AF	Mass Asbestos in AF	Mass Asbestos in FA & AF	Asbestos Reported Result	ACM - Comment	AF - Comment	FA - Comment	Organic Fibres - Comment	Respirable Fibres - Comment	Synthetic Fibres - Comment	% Clay	% Moisture 103oC	Organochlorine Pesticides EPAVic	Other Organochlorine Pesticides EPAVic
	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	meq/100g	µS/cm	pH Units	g	%w/w	%w/w	g	g	g	g	g	g	g	Comment	Comment	Comment	Comment	Comment	Comment	Comment	%	%	mg/kg	mg/kg
EQL	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	1.00	0.05	10.00	0.10																			1.00	1.00	0.10	0.10
NEPM 2013 EIL - Urban Residential (generic)							180																																						
NEPM 2013 ESL Urban Residential and Public Open Space, Coarse Soil																																												
NEPM 2013 HSL Asbestos in Soil - Bonded ACM - Residential - HSL A																										0.01																				
NEPM 2013 HSL Asbestos in Soil - FA & AF - HSL																											0.001																		
NEPM 2013 Soil HIL A		6						240	50					10			6			300	20																									
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Sand 0 to <1m																																													

Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Matrix_Description																																											
BH01_0.05-0.15	BH01	0.05-0.15	16-Aug-17	Sandy Silty Clay	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	16	120	7.9	602	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Organic Fibres Detected	No respirable fibres detected	Nil	15	9.4	<0.1	<0.1
BH02_0.1-0.2	BH02	0.1-0.2	16-Aug-17	Silty Clayey Sand	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	4.1	130	6.5	645	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	16	14	<0.1	<0.1
BH03_0.05-0.15	BH03	0.05-0.15	16-Aug-17	Sandy Silty Clay	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	21	140	9.3	567	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	10	8.1	<0.1	<0.1
BH04_0.1-0.2	BH04	0.1-0.2	16-Aug-17	Sandy Silty Clay	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	26	73	9.5	677	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	10	8.7	<0.1	<0.1
BH05_0-0.1	BH05	0-0.1	16-Aug-17	Silty Sand	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	6.4	25	8.2	656	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	7.5	7.1	<0.1	<0.1
BH06_0.1-0.2	BH06	0.1-0.2	16-Aug-17	Silty Sand	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	7	57	8.1	709	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	10	5.5	<0.1	<0.1
BH07_0.1-0.2	BH07	0.1-0.2	16-Aug-17	Sandy Silt	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	10	76	8.1	826	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	7.5	5.5	<0.1	<0.1
QA20170816	BH07	0.1-0.2	16-Aug-17	Sandy Silt	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	<0.1	<0.1
BH08_0.1-0.2	BH08	0.1-0.2	16-Aug-17	Silty Sand	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	89	1300	12	636	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	8.8	11	<0.1	<0.1
BH09_0.1-0.2	BH09	0.1-0.2	16-Aug-17	Silty Sand	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	7.7	85	8.4	486	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	6.3	8.3	<0.1	<0.1
BH10_0.0-0.1	BH10	0-0.1	17-Aug-17	Silty Sand	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	9.3	61	5.9	458	0	0.0158	0	0	0	0.1444	0.0722	0	0	0.0722	FA:Chrysotile asbestos detected in weathered fibre cement fragments.Approximate raw weight of FA = 0.14gEstimated asbestos content in FA = 0.072g**Total estimated asbestos concentration in FA = 0.016% w/w*Organic fibre detected	Nil	Nil	FA:Chrysotile asbestos detected in weathered fibre cement fragments	Organic Fibres Detected	No respirable fibres detected	Nil	12	16	<0.1	<0.1
BH11_0.1-0.2	BH11	0.1-0.2	17-Aug-17	Clayey Sand	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	20	59	6.8	821	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Organic Fibres Detected	No respirable fibres detected	Nil	15	13	<0.1	<0.1
QA20170817	BH11	0.1-0.2	17-Aug-17	Clayey Sand	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	<0.1	<0.1
BH12_0.4-0.5	BH12	0.4-0.5	17-Aug-17	Clayey Sand	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	7.8	16	5.9	497	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Organic Fibres Detected	No respirable fibres detected	Nil	16	13	<0.1	<0.1
BH13_0.1-0.2	BH13	0.1-0.2	17-Aug-17	Sandy Clay	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	16	86	6.6	566	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Organic Fibres Detected	No respirable fibres detected	Nil	16	13	<0.1	<0.1
BH14_0.1-0.2	BH14	0.1-0.2	17-Aug-17	Clayey Sand	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	2.8	48	5.3	413	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected	Nil	Nil	Nil	Organic Fibres Detected	No respirable fibres detected	Nil	8.8	12	<0.1	<0.1

Statistical Summary

Number of Results	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	14	14	14	14	14	14	14	14	14	14	14	14	14	0	0	0	0	0	0	14	16	16	16
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14	14	14	0	0	0	0	0	0	14	16	0	0
Minimum Concentration	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.8	16	5.3	413	0	0	0	0	0	0	0	0	0	0	0.001	99999	99999	99999	99999	99999	99999	6.3	5.5	<0.1	<0.1
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.8	16	5.3	413	ND	0.0158	ND	ND	0.1444	0.0722	ND	ND	0.0722	0.001	ND	ND	ND	ND	ND	ND	6.3	5.5	ND	ND
Maximum Concentration	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	89	1300	12	826	0	0.0158	0	0	0.1444	0.0722	0	0	0.0722	0.14	0	0	0	0	0	0	16	16	<0.1	<0.1
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	89	1300	12	826	ND	0.0158	ND	ND	0.1444	0.0722	ND	ND	0.0722	0.14	ND	ND	ND	ND	ND	ND	16	16	ND	ND
Average Concentration	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.05	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.5	17	163	7.8	611	0	0.0011	0	0	0.01	0.0052	0	0	0.0052	0.011							11	10	0.05	0.05
Median Concentration	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.05	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.5	9.65	74.5	8	619	0	0	0	0	0	0	0	0	0	0.001							10	10.2	0.05	0.05
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	329	1.8	125	0	0.0042	0	0	0.039	0.019	0	0	0.019	0.037							3.6	3.2	0	0
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Comments

#4 ESDAT Combined with Non-Detect Multiplier of 0.5.
#7 ESDAT Combined.

Table B
Project Number: 53033
Project Name: Greenwich Public School

Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Matrix_Description	Scheduled Chemicals Combined (NSW 2014)	PAH Combined (NSW 2014)	Arsenic (Total)	Cadmium	Chromium (Total)	Copper	Lead	Mercury (Inorganic)	Nickel	Zinc	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Total)
						PAH/Phenols	Metals & Metalloids								TPHs (NEPC 1999)				
					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							2.00	0.40	5.00	5.00	5.00	0.10	5.00	5.00	20.00	20.00	50.00	50.00	50.00
NSW EPA 2014 General Solid Waste (with leached)					50-0	200	500	100			1500	50	1050		650				10000
NSW EPA 2014 Restricted Solid Waste (with leached)					50-0	800	2000	400			6000	200	4200		2600				40000
BH01_0.05-0.15	BH01	0.05-0.15	16-Aug-17		<0.55[#5]	126.6[#2]	57	<0.4	42	22	110	<0.1	<5	72	<20	<20	560	410	970
BH02_0.1-0.2	BH02	0.1-0.2	16-Aug-17		<0.55[#5]	<7.5[#3]	8	<0.4	24	<5	20	<0.1	<5	13	<20	<20	<50	57	57
BH03_0.05-0.15	BH03	0.05-0.15	16-Aug-17		<0.55[#5]	11.3[#2]	2.8	<0.4	45	47	20	<0.1	46	60	<20	<20	270	1000	1270
BH04_0.1-0.2	BH04	0.1-0.2	16-Aug-17		<0.55[#5]	21.25[#2]	2.8	<0.4	20	170	15	<0.1	24	63	<20	<20	160	330	490
BH05_0-0.1	BH05	0-0.1	16-Aug-17		<0.55[#5]	<8[#3]	3.1	<0.4	8.4	5.8	17	<0.1	<5	61	<20	<20	<50	63	63
BH06_0.1-0.2	BH06	0.1-0.2	16-Aug-17		<0.55[#5]	<7.5[#3]	2.2	<0.4	7.2	<5	22	<0.1	<5	18	<20	<20	<50	<50	<50
BH07_0.1-0.2	BH07	0.1-0.2	16-Aug-17		<0.55[#5]	<7.5[#3]	3.4	<0.4	10	15	52	<0.1	16	75	<20	<20	<50	<50	<50
QA20170816	BH07	0.1-0.2	16-Aug-17		<0.55#5	<7.5#3	3.7	<0.4	11	16	59	<0.1	16	86	<20	<20	<50	130	130
BH08_0.1-0.2	BH08	0.1-0.2	16-Aug-17		<0.55[#5]	<7.5[#3]	2.1	<0.4	7.2	<5	13	<0.1	<5	13	<20	<20	<50	<50	<50
BH09_0.1-0.2	BH09	0.1-0.2	16-Aug-17		<0.55[#5]	<7.5[#3]	6.5	<0.4	7.4	20	110	<0.1	<5	54	<20	<20	<50	<50	<50
BH10_0.0-0.1	BH10	0-0.1	17-Aug-17		<0.55[#5]	<7.5[#3]	3	<0.4	9.5	9.5	45	<0.1	<5	60	<20	<20	<50	<50	<50
BH11_0.1-0.2	BH11	0.1-0.2	17-Aug-17		<0.55[#5]	<7.5[#3]	3.7	<0.4	18	10	23	<0.1	10	36	<20	<20	<50	<50	<50
QA20170817	BH11	0.1-0.2	17-Aug-17		<0.55#5	<7.5#3	3.4	<0.4	33	13	17	<0.1	23	39	<20	<20	<50	<50	<50
BH12_0.4-0.5	BH12	0.4-0.5	17-Aug-17		<0.55[#5]	<7.5[#3]	3.5	<0.4	14	9.7	440	<0.1	7.4	42	<20	<20	<50	<50	<50
BH13_0.1-0.2	BH13	0.1-0.2	17-Aug-17		<0.55[#5]	32.4[#2]	7.2	<0.4	34	24	36	<0.1	23	76	<20	<20	79	<50	79
BH14_0.1-0.2	BH14	0.1-0.2	17-Aug-17		<0.55[#5]	<7.5[#3]	2.8	<0.4	7.5	5.2	7.5	<0.1	<5	<5	<20	<20	<50	<50	<50

Field_ID	>C10-C16 Fraction	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C16 less Naphthalene (F2)	C6-C10 Fraction	C6-C10 less BTEX (F1)	Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylene (Total)
	TRHs (NEPC 2013)						BTEX					
	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	50.00	100.00	100.00	50.00	20.00	20.00	0.10	0.10	0.10	0.10	0.20	0.30
NSW EPA 2014 General Solid Waste (with leached)							18	1080	518			1800
NSW EPA 2014 Restricted Solid Waste (with leached)							72	4320	2073			7200
BH01_0.05-0.15	<50	760	210	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH02_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH03_0.05-0.15	<50	1100	820	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH04_0.1-0.2	<50	380	370	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH05_0-0.1	<50	110	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH06_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH07_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
QA20170816	<50	160	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH08_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH09_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH10_0.0-0.1	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH11_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
QA20170817	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH12_0.4-0.5	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH13_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
BH14_0.1-0.2	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3

Field_ID	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (lower bound)*	Benzo(a)pyrene TEQ (medium bound)*	Benzo(a)pyrene TEQ (upper bound)*	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene
	Polycyclic Aromatic Hydrocarbons										
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
NSW EPA 2014 General Solid Waste (with leached)					10						
NSW EPA 2014 Restricted Solid Waste (with leached)					23						
BH01_0.05-0.15	<0.5	1.6	2.5	12	13	22	22	22	20	9.5	10
BH02_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
BH03_0.05-0.15	<0.5	<0.5	<0.5	0.7	1.3	1.6	1.9	2.1	0.8	0.9	0.9
BH04_0.1-0.2	<0.5	<0.5	<0.5	1.7	2.3	3.5	3.5	3.5	1.5	1.9	1.3
BH05_0-0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
BH06_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
BH07_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
QA20170816	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
BH08_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
BH09_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
BH10_0.0-0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
BH11_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
QA20170817	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
BH12_0.4-0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
BH13_0.1-0.2	<0.5	<0.5	0.6	2.5	2.6	3.9	3.9	3.9	2.1	1.7	2.2
BH14_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5

Field_ID	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Carcinogenic PAHs as B(a)P TEQ	Phenanthrene	Pyrene	PAHs (Total)	Hexachlorobenzene	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260
	Polycyclic Aromatic Hydrocarbons										Chlorinated Benzenes	Polychlorinated Biphenyls						
	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	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50	0.50	0.05	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NSW EPA 2014 General Solid Waste (with leached)																		
NSW EPA 2014 Restricted Solid Waste (with leached)																		
BH01_0.05-0.15	12	3.5	22	0.7	7.3	<0.5	21.65[#7]	10	22	146.1	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH02_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#10]	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH03_0.05-0.15	0.9	<0.5	1.7	<0.5	0.6	<0.5	1.868[#7]	1	1.8	10.6	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH04_0.1-0.2	1.9	0.6	2.7	<0.5	1.2	<0.5	3.508[#7]	1.9	4.5	21.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH05_0-0.1	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<1.21[#10]	<0.5	<0.5	<1	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH06_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#10]	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH07_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#10]	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
QA20170816	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21#10	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH08_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#10]	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH09_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#10]	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH10_0.0-0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#10]	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH11_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#10]	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
QA20170817	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21#10	<0.5	<0.5	<0.5	<0.05	-	-	-	-	-	-	-
BH12_0.4-0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#10]	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH13_0.1-0.2	2.5	0.5	8.1	<0.5	1.2	<0.5	3.942[#7]	2.7	6.8	33.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH14_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21[#10]	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Statistical Summary

Statistic	Scheduled Chemicals Combined (NSW 2014)	PAH Combined (NSW 2014)	Arsenic (Total)	Cadmium	Chromium (Total)	Copper	Lead	Mercury (Inorganic)	Nickel	Zinc	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Total)
Number of Results	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Number of Detects	0	4	16	0	16	13	16	0	8	15	0	0	4	6	7
Minimum Concentration	<0.55	<7.5	2.1	<0.4	7.2	<5	7.5	<0.1	<5	<5	<20	<20	<50	<50	<50
Minimum Detect	ND	11.3	2.1	ND	7.2	5.2	7.5	ND	7.4	13	ND	ND	79	57	57
Maximum Concentration	<0.55	126.6	57	<0.4	45	170	440	<0.1	46	86	<20	<20	560	1000	1270
Maximum Detect	ND	126.6	57	ND	45	170	440	ND	46	86	ND	ND	560	1000	1270
Average Concentration	0.28	15	7.2	0.2	19	23	63	0.05	12	48	10	10	86	140	205
Median Concentration	0.275	3.75	3.4	0.2	12.5	11.5	22.5	0.05	4.95	57	10	10	25	25	25
Standard Deviation	0	31	13	0	13	41	105	0	12	26	0	0	143	257	379
Number of Guideline Exceedances	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Statistic	>C10-C16 Fraction	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C16 less Naphthalene (F2)	C6-C10 Fraction	C6-C10 less BTEX (F1)	Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylene (Total)
Number of Results	16	16	16	16	16	16	16	16	16	16	16	16
Number of Detects	0	5	3	0	0	0	0	0	0	0	0	0
Minimum Concentration	<50	<100	<100	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
Minimum Detect	ND	110	210	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<50	1100	820	<50	<20	<20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3
Maximum Detect	ND	1100	820	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	25	191	128	25	10	10	0.05	0.05	0.05	0.05	0.1	0.15
Median Concentration	25	50	50	25	10	10	0.05	0.05	0.05	0.05	0.1	0.15
Standard Deviation	0	307	204	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0

Statistic	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (lower bound)*	Benzo(a)pyrene TEQ (medium bound)*	Benzo(a)pyrene TEQ (upper bound)*	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene
Number of Results	16	16	16	16	16	16	16	16	16	16	16
Number of Detects	0	1	2	4	4	4	16	16	4	4	4
Minimum Concentration	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5
Minimum Detect	ND	1.6	0.6	0.7	1.3	1.6	0.6	1.2	0.8	0.9	0.9
Maximum Concentration	<0.5	1.6	2.5	12	13	22	22	22	20	9.5	10
Maximum Detect	ND	1.6	2.5	12	13	22	22	22	20	9.5	10
Average Concentration	0.25	0.33	0.41	1.2	1.4	2.1	2.4	2.9	1.7	1.1	1.1
Median Concentration	0.25	0.25	0.25	0.25	0.25	0.25	0.6	1.2	0.25	0.25	0.25
Standard Deviation	0	0.34	0.56	2.9	3.2	5.4	5.3	5.2	4.9	2.3	2.4
Number of Guideline Exceedances	0	0	0	0	1	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	1	0	0	0	0	0	0

Statistic	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Carcinogenic PAHs as B(a)P TEQ	Phenanthrene	Pyrene	PAHs (Total)	Hexachlorobenzene	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260
Number of Results	16	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15	15	15
Number of Detects	4	3	4	1	4	0	4	4	4	4	0	0	0	0	0	0	0	0
Minimum Concentration	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.21	<0.5	<0.5	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Minimum Detect	0.9	0.5	1.7	0.7	0.6	ND	1.868	1	1.8	10.6	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	12	3.5	22	<1	7.3	<0.5	21.65	10	22	146.1	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Maximum Detect	12	3.5	22	0.7	7.3	ND	21.65	10	22	146.1	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	1.3	0.49	2.3	0.29	0.83	0.25	2.4	1.2	2.4	13	0.025	0.077	0.077	0.077	0.077	0.077	0.077	0.077
Median Concentration	0.25	0.25	0.25	0.25	0.25	0.25	0.605	0.25	0.25	0.25	0.025	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Standard Deviation	2.9	0.81	5.6	0.13	1.8	0	5.2	2.5	5.6	37	0	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Comments

#2 ESDAT Combined with Non-Detect Multiplier of 0.5. Some analytes are reported multiple times; the lowest non-detect or the highest detect is used. Some Analytes are missing from this Combined Compound.
#3 ESDAT Combined. Some analytes are reported multiple times; the lowest non-detect or the highest detect is used. Some Analytes are missing from this Combined Compound.
#5 ESDAT Combined. Some Analytes are missing from this Combined Compound.
#7 ESDAT Combined with Non-Detect Multiplier of 0.5.
#10 ESDAT Combined.

Table B
Project Number: 53033
Project Name: Greenwich Public School

		Organochlorine Pesticides																					Ionic Balance			Asbestos										Asbestos	Asbestos - Trace Analysis						Other		A VIC - IWRGE	
	PCBs (Total)	4,4-DDE	Aldrin	Aldrin + Dieldrin (Sum of Total)	alpha-BHC	beta-BHC	Dieldrin	DDD	DDT	DDT+DDE+DDD (Sum of Total)	Chlordane	delta-BHC	Endosulfan alpha	Endosulfan beta	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	Heptachlor	Heptachlor Epoxide	Lindane	Methoxychlor	Toxaphene	Cation Exchange Capacity	EC 1:5 soil:water	pH 1:5 soil:water	Approx. Sample Mass	Asbestos from ACM in Soil	Asbestos from FA & AF in Soil	Mass ACM	Mass Asbestos in ACM	Mass FA	Mass Asbestos in FA	Mass AF	Mass Asbestos in AF	Mass Asbestos in FA & AF	Asbestos Reported Result	ACM - Comment	AF - Comment	FA - Comment	Organic Fibres - Comment	Respirable Fibres - Comment	Synthetic Fibres - Comment	% Clay	% Moisture 103oC	Organochlorine Pesticides EPAVic	Other Organochlorine Pesticides EPAVic
	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	meq/100g	µS/cm	ph Units	g	%w/w	%w/w	g	g	g	g	g	g	g	Comment	Comment	Comment	Comment	Comment	Comment	Comment	%	%	mg/kg	mg/kg
EQL	0.10	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	1.00	0.05	10.00	0.10																			1.00	1.00	0.10	0.10
NSW EPA 2014 General Solid Waste (with leached)	50-0|50-0												108	108	108																																
NSW EPA 2014 Restricted Solid Waste (with leached)	50-0|50-0												432	432	432																																
Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Matrix_Description																																											
BH01_0.05-0.15	BH01	0.05-0.15	16-Aug-17		<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	16	120	7.9	602	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Organic fibres detected	No respirable fibres detected	Nil	15	9.4	<0.1	<0.1
BH02_0.1-0.2	BH02	0.1-0.2	16-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	4.1	130	6.5	645	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	16	14	<0.1	<0.1
BH03_0.05-0.15	BH03	0.05-0.15	16-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	21	140	9.3	567	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	10	8.1	<0.1	<0.1
BH04_0.1-0.2	BH04	0.1-0.2	16-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	26	73	9.5	677	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	10	8.7	<0.1	<0.1
BH05_0-0.1	BH05	0-0.1	16-Aug-17		<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	6.4	25	8.2	656	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	7.5	7.1	<0.1	<0.1
BH06_0.1-0.2	BH06	0.1-0.2	16-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	7	57	8.1	709	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	10	5.5	<0.1	<0.1
BH07_0.1-0.2	BH07	0.1-0.2	16-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	10	76	8.1	826	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	7.5	5.5	<0.1	<0.1
QA20170816	BH07	0.1-0.2	16-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	<0.1	<0.1
BH08_0.1-0.2	BH08	0.1-0.2	16-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	89	1300	12	636	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	8.8	11	<0.1	<0.1
BH09_0.1-0.2	BH09	0.1-0.2	16-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	7.7	85	8.4	486	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Nil	No respirable fibres detected	Nil	6.3	8.3	<0.1	<0.1
BH10_0.0-0.1	BH10	0-0.1	17-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	9.3	61	5.9	458	0	0.0158	0	0	0.1444	0.0722	0	0	0.0722	FA:Chrysotile asbestos detected in weathered fibre cement fragments.Approximate raw weight of FA = 0.14gEstimated asbestos content in FA = 0.072g*Total estimated asbestos concentration in FA = 0.016% w/w*Organic fibre detected	Nil	Nil	FA:Chrysotile asbestos detected in weathered fibre cement fragments	Organic fibres detected	No respirable fibres detected	Nil	12	16	<0.1	<0.1
BH11_0.1-0.2	BH11	0.1-0.2	17-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	20	59	6.8	821	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Organic fibres detected	No respirable fibres detected	Nil	15	13	<0.1	<0.1
QA20170817	BH11	0.1-0.2	17-Aug-17		-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	<0.1	<0.1
BH12_0.4-0.5	BH12	0.4-0.5	17-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	7.8	16	5.9	497	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Organic fibres detected	No respirable fibres detected	Nil	16	13	<0.1	<0.1
BH13_0.1-0.2	BH13	0.1-0.2	17-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	16	86	6.6	566	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Organic fibres detected	No respirable fibres detected	Nil	16	13	<0.1	<0.1
BH14_0.1-0.2	BH14	0.1-0.2	17-Aug-17		<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	2.8	48	5.3	413	0	0	0	0	0	0	0	0	0	No asbestos detected at the reporting limit of 0.001% w/w.*Organic fibre detected.No respirable fibres detected.	Nil	Nil	Nil	Organic fibres detected	No respirable fibres detected	Nil	8.8	12	<0.1	<0.1

Statistical Summary

Number of Results	15	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	14	14	14	14	14	14	14	14	14	14	14	14	14	0	0	0	0	0	0	14	16	16	16
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14	14	14	0	0	0	0	0	0	14	16	0	0
Minimum Concentration	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	2.8	16	5.3	413	0	0	0	0	0	0	0	0	0	0.001	99999	99999	99999	99999	99999	99999	6.3	5.5	<0.1	<0.1
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.8	16	5.3	413	ND	0.0158	ND	ND	0.1444	0.0722	ND	ND	0.0722	0.001	ND	ND	ND	ND	ND	ND	6.3	5.5	ND	ND
Maximum Concentration	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	89	1300	12	826	0	0.0158	0	0	0.1444	0.0722	0	0	0.0722	0.14	0	0	0	0	0	0	16	16	<0.1	<0.1
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	89	1300	12	826	ND	0.0158	ND	ND	0.1444	0.0722	ND	ND	0.0722	0.14	ND	ND	ND	ND	ND	ND	16	16	ND	ND
Average Concentration	0.077	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.05	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.5	17	163	7.8	611	0	0.0011	0	0	0.01	0.0052	0	0	0.0052	0.011							11	10	0.05	0.05
Median Concentration	0.05	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.05	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.5	9.65	74.5	8	619	0	0	0	0	0	0	0	0	0	0.001							10	10.2	0.05	0.05
Standard Deviation	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	329	1.8	125	0	0.0042	0	0	0.039	0.019	0	0	0.019	0.037							3.6	3.2	0	0
Number of Guideline Exceedances	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Comments

#2 ESDAT Combined with Non-Detect Multiplier of 0.5. Some analytes are reported multiple times; the lowest non-detect or the highest dete
#3 ESDAT Combined. Some analytes are reported multiple times; the lowest non-detect or the highest detect is used. Some Analytes are misc
#5 ESDAT Combined. Some Analytes are missing from this Combined Compound.
#7 ESDAT Combined with Non-Detect Multiplier of 0.5.
#10 ESDAT Combined.

INSERT TABLE NAME
Project Number: [Project_Number]
Project Name: [Project_Name]

Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Matrix_Description	Metals & Metalloids							
					Arsenic (Total)	Cadmium	Chromium (Total)	Copper	Lead	Mercury (Inorganic)	Nickel	Zinc
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL					0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01
NSW EPA 2014 General Solid Waste (leached)					5	1			5	0.2	2	
NSW EPA 2014 Restricted Solid Waste (leached)					20	4			20	0.8	8	
BH01 0.05-0.15	BH01	0.05-0.15	16-Aug-17		<0.01	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	0.03
BH02 0.1-0.2	BH02	0.1-0.2	16-Aug-17		<0.01	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	<0.01
BH03 0.05-0.15	BH03	0.05-0.15	16-Aug-17		<0.01	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	<0.01
BH04 0.1-0.2	BH04	0.1-0.2	16-Aug-17		<0.01	<0.005	<0.01	0.04	<0.01	<0.001	0.01	0.03
BH05 0.0-0.1	BH05	0-0.1	16-Aug-17		<0.01	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	0.18
BH06 0.1-0.2	BH06	0.1-0.2	16-Aug-17		<0.01	<0.005	<0.01	<0.01	0.01	<0.001	<0.01	0.02
BH07 0.1-0.2	BH07	0.1-0.2	16-Aug-17		<0.01	<0.005	<0.01	<0.01	0.02	<0.001	<0.01	0.04
BH08 0.1-0.2	BH08	0.1-0.2	16-Aug-17		<0.01	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	<0.01
BH09 0.1-0.2	BH09	0.1-0.2	16-Aug-17		<0.01	<0.005	<0.01	<0.01	0.02	<0.001	<0.01	0.03
BH10_0.0-0.1	BH10	0-0.1	17-Aug-17		<0.01	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	0.07
BH11_0.0-0.2	BH11	0-0.2	17-Aug-17		<0.01	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	0.01
BH12_0.4-0.5	BH12	0.4-0.5	17-Aug-17		<0.01	<0.005	<0.01	<0.01	5.8	<0.001	<0.01	0.09
BH13_0.1-0.2	BH13	0.1-0.2	17-Aug-17		<0.01	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	0.03
BH14_0.1-0.2	BH14	0.1-0.2	17-Aug-17		<0.01	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	<0.01

Field_ID	Polycyclic Aromatic Hydrocarbons																
	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Total)
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NSW EPA 2014 General Solid Waste (leached)					0.04												
NSW EPA 2014 Restricted Solid Waste (leached)					0.16												
BH01 0.05-0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH02 0.1-0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH03 0.05-0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH04 0.1-0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH05 0.0-0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH06 0.1-0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH07 0.1-0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH08 0.1-0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH09 0.1-0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH10_0.0-0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH11_0.0-0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH12_0.4-0.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH13_0.1-0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH14_0.1-0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Field_ID	Ionic Balance			
	pH (TCLP - HCl addition)	pH (TCLP - initial)	pH (TCLP - off)	pH (Leachate fluid)
	ph Units	ph Units	ph Units	ph Units
EQL	0.10	0.10	0.10	0.10
NSW EPA 2014 General Solid Waste (leached)				
NSW EPA 2014 Restricted Solid Waste (leached)				
BH01 0.05-0.15	1.9	5.2	5.5	5
BH02 0.1-0.2	1.9	5.2	6.2	5
BH03 0.05-0.15	1.9	5.7	6.1	5
BH04 0.1-0.2	2	5.8	5.6	5
BH05 0.0-0.1	0	4.8	5	5
BH06 0.1-0.2	1.9	5.3	5.1	5
BH07 0.1-0.2	1.8	5.4	5	5
BH08 0.1-0.2	2	9.6	11	5
BH09 0.1-0.2	2	6.2	5.1	5
BH10_0.0-0.1	0	4.3	5.2	5
BH11_0.0-0.2	1.9	5.1	5.1	5
BH12_0.4-0.5	1.9	5.2	5	5
BH13_0.1-0.2	2	5.2	5.1	5
BH14_0.1-0.2	2	5.3	5.1	5

Statistical Summary

	Arsenic (Total)	Cadmium	Chromium (Total)	Copper	Lead	Mercury (Inorganic)	Nickel	Zinc
Number of Results	14	14	14	14	14	14	14	14
Number of Detects	0	0	0	1	4	0	1	10
Minimum Concentration	<0.01	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	<0.01
Minimum Detect	ND	ND	ND	0.04	0.01	ND	0.01	0.01
Maximum Concentration	<0.01	<0.005	<0.01	0.04	5.8	<0.001	0.01	0.18
Maximum Detect	ND	ND	ND	0.04	5.8	ND	0.01	0.18
Average Concentration	0.005	0.0025	0.005	0.0075	0.42	0.0005	0.0054	0.039
Median Concentration	0.005	0.0025	0.005	0.005	0.005	0.0005	0.005	0.03
Standard Deviation	0	0	0	0.0094	1.5	0	0.0013	0.048
Number of Guideline Exceedances	0	0	0	0	1	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	1	0	0	0

	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Total)
Number of Results	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Median Concentration	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	pH (TCLP - HCl addition)	pH (TCLP - initial)	pH (TCLP - off)	pH (Leachate fluid)
Number of Results	14	14	14	14
Number of Detects	14	14	14	14
Minimum Concentration	0	4.3	5	5
Minimum Detect	1.8	4.3	5	5
Maximum Concentration	2	9.6	11	5
Maximum Detect	2	9.6	11	5
Average Concentration	1.7	5.6	5.7	5
Median Concentration	1.9	5.25	5.1	5
Standard Deviation	0.7	1.2	1.6	0
Number of Guideline Exceedances	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0

Appendix B Photographic Log

PHOTOGRAPH 1: THE GRASS SURFACE, NORTH EASTERN END OF THE SITE, FACING NORTH WEST

PHOTOGRAPH 2: FILL AND NATURAL MATERIAL ENCOUNTERED AT BH01

PHOTOGRAPH 3: NATURAL MATERIAL ENCOUNTERED BH02

PHOTOGRAPH 4: FILL MATERIAL ENCOUNTERED BH03

JBS&G

Job No: 53033

Client: PSM

Version: R02 Rev A	Date: 29/08/17
Drawn By: SG	Checked By: SB

Not to Scale

Coord. Sys n/a

Greenwich Public School
(K-1 Campus)

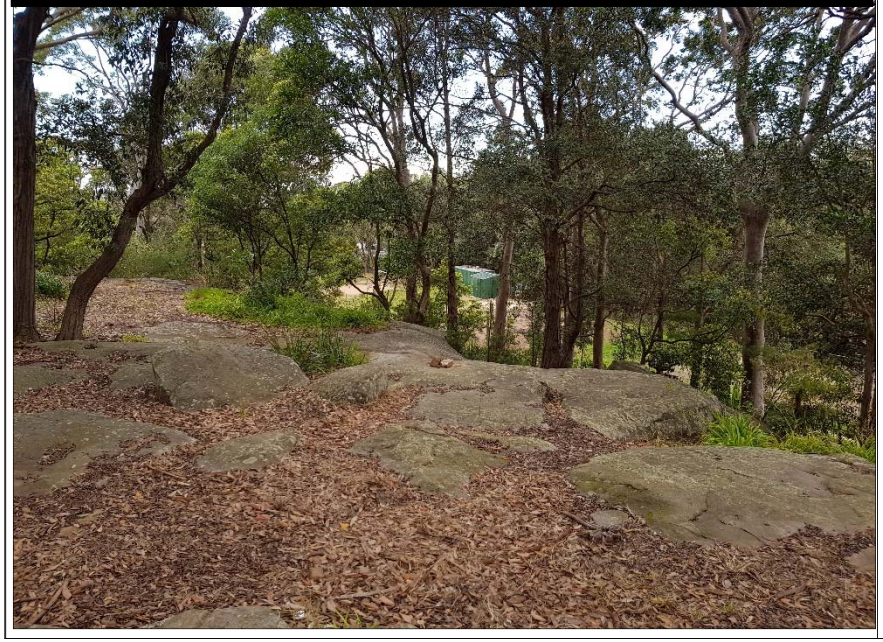
70A Greenwich Road
Greenwich, NSW

APPENDIX B

PHOTOGRAPH 5: LOCATION OF BH04, FACING SOUTH WEST

PHOTOGRAPH 6: FILL MATERIAL ENCOUNTERED BH04

PHOTOGRAPH 7: ROCKY OUTCROP SEPARATING THE NORTH EASTERN PORTION FROM THE REST OF THE SITE, FACING SOUTH WEST



PHOTOGRAPH 8: FILL MATERIAL ENCOUNTERED BH05

JBS&G

Job No: 53033

Client: PSM

Version: R02 Rev A	Date: 29/08/17
Drawn By: SG	Checked By: SB

Not to Scale

Coord. Sys n/a

Greenwich Public School

32 Kingslangley Road
Greenwich, NSW

APPENDIX B

PHOTOGRAPH 9: FILL MATERIAL ENCOUNTERED BH06

PHOTOGRAPH 10: FILL MATERIAL ENCOUNTERED BH07

PHOTOGRAPH 11: FILL MATERIAL ENCOUNTERED BH08

PHOTOGRAPH 12: FILL AND NATURAL MATERIAL ENCOUNTERED BH09

JBS&G

Job No: 53033	
Client: PSM	
Version: R02 Rev A	Date: 29/08/17
Drawn By: SG	Checked By: SB
Not to Scale	
Coord. Sys n/a	

Greenwich Public School

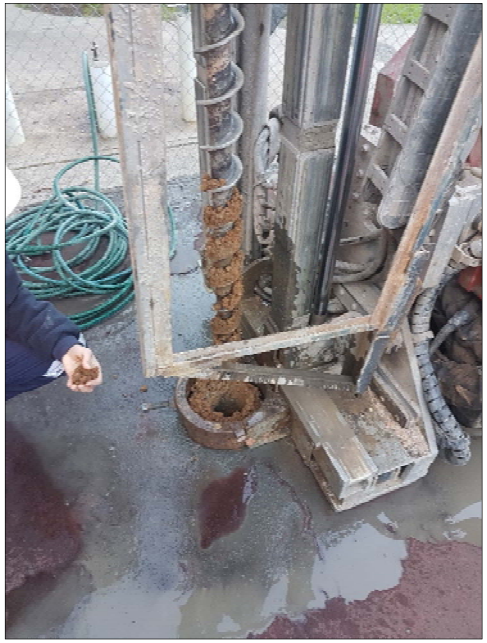
32 Kingslangley Road
Greenwich, NSW

APPENDIX B

PHOTOGRAPH 13: FILL MATERIAL ENCOUNTERED BH10

PHOTOGRAPH 14: INVESTIGATION AREA FOR BOREHOLES BH11-BH14

PHOTOGRAPH 15: FILL MATERIAL ENCOUNTERED BH11



PHOTOGRAPH 16: FILL MATERIAL ENCOUNTERED AT BH12

JBS&G

Job No: 53033

Client: PSM

Version: R02 Rev A | Date: 29/08/17

Drawn By: SG | Checked By: SB

Not to Scale

Coord. Sys n/a

Greenwich Public School

32 Kingslangley Road
Greenwich, NSW

APPENDIX B

PHOTOGRAPH 17: FILL MATERIAL ENCOUNTERED BH13

PHOTOGRAPH 18: NATURAL MATERIAL ENCOUNTERED AT BH14

PHOTOGRAPH 19: CRICKET NETS NEAR BH12 LOOKING NORTH TOWARDS TENNIS COURTS

PHOTOGRAPH 20: CRICKET NETS LOOKING SOUTH FROM TENNIS COURTS, NOTE BH10 WAS LOCATED SOUTH-EAST OF CRICKET NETS

JBS&G

Job No: 53033

Client: PSM

Version: R02 Rev A	Date: 29/08/17
Drawn By: SG	Checked By: SB

Not to Scale

Coord. Sys n/a

Greenwich Public School

32 Kingslangley Road
Greenwich, NSW

APPENDIX B

Appendix C Borelogs

BH01

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 70A Greenwich Rd, Greenwich NSW

Date: 16/08/2017
Logged By: S.Gray
Contractor: BG Drilling
Total Hole Depth (mbgs): 1.6
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - ASPHALT		
		0.05		Fill	Fill - Sandy Silty CLAY - brown, heterogeneous, dry, soft, non-plastic, with inclusions of sandstone gravels	BH01 0.05-0.15 PID = 0 ppm	No staining, odour, or ACM observed
		0.15		SM-SC	Silty Clayey SAND - orange brown, mottled orange, homogeneous, medium grained, dense, less clay with depth	BH01 0.2-0.3 PID = 0 ppm	No staining, odour, or ACM observed
	0.5						
		0.80		SP	SAND - White, orange mottled, homogeneous, damp, very dense		
	1.0						
	1.5						
		1.60			Borehole BH01 terminated at 1.6m		
	2.0						
	2.5						

BH02

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 70A Greenwich Rd, Greenwich NSW

Date: 16/08/2017
Logged By: S.Gray
Contractor: BG Drilling
Total Hole Depth (mbgs): 1.6
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - Asphalt		
		0.05		SM-SC	Silty Clayey SAND - orange brown, mottled orange, homogeneous, fine-medium grained, dense	BH02 0.1-0.2 PID = 0 ppm	No staining, odour, or ACM observed
	0.5						
		0.50		SP	SAND - White, orange mottled, homogeneous, fine grained, dry, very dense	BH02 0.5-0.6 PID = 0 ppm	No staining, odour, or ACM observed
	1.0						
	1.5						
		1.60			Borehole BH02 terminated at 1.6m		
	2.0						
	2.5						

BH03

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 70A Greenwich Rd, Greenwich NSW

Date: 16/08/2017
Logged By: S.Gray
Contractor: BG Drilling
Total Hole Depth (mbgs): 1.8
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - ASPHALT		
		0.05		Fill	Fill - Sandy Silty CLAY - brown, heterogeneous, dry, soft, non-plastic, with inclusions of sandstone gravels	BH03 0.05-0.15 PID = 0 ppm	No staining, odour, or ACM observed
		0.15		CH-SC-MH	Sandy Silty CLAY - orange brown, red mottled, homogeneous, stiff, medium plasticity, less clay and becoming red with depth	BH03 0.2-0.3 PID = 0 ppm	No staining, odour, or ACM observed
	0.5						
		0.50		SP	SAND - white, red mottled, homogeneous, fine grained, dry, dense		
	1.0						
	1.5						
		1.80			Borehole BH03 terminated at 1.8m		
	2.0						
	2.5						

BH04

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 16/08/2017
Logged By: S.Gray
Contractor: BG Drilling
Total Hole Depth (mbgs): 1.7
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - ASPHALT		
		0.05		Fill	Fill - Gravelly Silty SAND - brown, heterogeneous, medium to coarse grain, sub-angular, loose, moist	BH04 0.1-0.2 PID = 0 ppm	No staining, odour, or ACM observed
		0.40		CH-MH	Silty CLAY - brown, red and orange mottled, homogeneous, damp, firm, high plasticity		
	0.5					BH04 0.5-0.6 PID = 0 ppm	No staining, odour, or ACM observed
		0.60		CH-SC-MH	Sandy Silty CLAY - orange, red mottled, homogeneous, damp, stiff, high plasticity	BH04 0.6-0.7 PID = 0 ppm	No staining, odour, or ACM observed
	1.0						
	1.5						
		1.50		CH-SC-MH	Sandy Silty CLAY - orange brown, damp, stiff, with inclusions of sandstone and shale gravels		
		1.70			Borehole BH04 terminated at 1.7m		
	2.0						
	2.5						

BH05

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 16/08/2017
Logged By: S.Gray
Contractor: BG Drilling
Total Hole Depth (mbgs): 0.4
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				SM	Silty SAND - homogeneous, fine-medium grained, sub-rounded, dry, loose to medium dense with depth	BH05 0-0.1 PID = 0 ppm	No staining, odour, or ACM observed
		0.40			Borehole BH05 terminated at 0.4m		
	0.5						
	1.0						
	1.5						
	2.0						
	2.5						

BH06

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 16/08/2017
Logged By: S.Gray
Contractor: BG Drilling
Total Hole Depth (mbgs): 1.9
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - ASPHALT		
		0.05		Fill	Fill - Silty SAND - brown, heterogeneous, fine grained, dry, dense, with inclusions of gravels	BH06 0.1-0.2 PID = 0 ppm	No staining, odour, or ACM observed
		0.20		SM	Silty SAND - orange brown, heterogeneous, fine grained, dry, dense, with inclusions of sandstone at 0.6m bgs		
	0.5					BH06 0.6-0.7 PID = 0 ppm	No staining, odour, or ACM observed
	1.0						
		1.40		SP	SAND - white, red mottled, homogeneous, fine grained, sub-rounded, damp, very dense		
	1.5						
		1.90			Borehole BH06 terminated at 1.9m		
	2.0						
	2.5						

BH07

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 16/08/2017
Logged By: S.Gray
Contractor: BG Drilling
Total Hole Depth (mbgs): 0.5
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
				Fill	Fill - ASPHALT		
Solid Flight Auger		0.05		Fill	Fill - Sandy SILT - brown, heterogeneous, fine grained, sub-rounded, dry, medium dense, with trace inclusions of gravels	BH07 0.1-0.2 PID = 0 ppm	No staining, odour, or ACM observed
	0.5	0.50			Borehole BH07 terminated at 0.5m		
	1.0						
	1.5						
	2.0						
	2.5						

BH08

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 16/08/2017
Logged By: S.Gray
Contractor: BG Drilling
Total Hole Depth (mbgs): 1.2
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - ASPHALT		
		0.05		Fill	Fill - Silty SAND - brown, coarse-fine grained, sub-rounded, medium dense, with inclusions of white sandstone	BH08 0.1-0.2 PID = 0 ppm	No staining, odour, or ACM observed
		0.25		Fill	Fill - Sandy Silty CLAY - brown, heterogeneous, damp, firm, high plasticity, lighter colour with depth	BH08 0.3-0.4 PID = 0 ppm	No staining, odour, or ACM observed
	0.5						
		0.80		CH-SC-MH	Sandy Silty CLAY - grey/orange mottled, homogeneous, damp, stiff, high plasticity	BH08 0.8-0.9 PID = 0 ppm	No staining, odour, or ACM observed
	1.0						
		1.20			Borehole BH08 terminated at 1.2m		
	1.5						
	2.0						
	2.5						

BH09

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 16/08/2017
Logged By: S.Gray
Contractor: BG Drilling
Total Hole Depth (mbgs): 1.3
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - ASPHALT		
		0.05		Fill	Fill - Silty SAND - brown, heterogeneous, fine-medium grained, sub-rounded, dry, medium dense	BH09 0.1-0.2 PID = 0 ppm	No staining, odour, or ACM observed
	0.5	0.40		SC	Silty Clayey SAND - light brown, orange mottled, homogeneous, sub-rounded, damp, dense, increased sandstone inclusions with depth	BH09 0.4-0.5 PID = 0 ppm	No staining, odour, or ACM observed
	1.0						
		1.30			Borehole BH09 terminated at 1.3m		
	1.5						
	2.0						
	2.5						

BH10

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 17/08/2017
Logged By: N.Wells
Contractor: BG Drilling
Total Hole Depth (mbgs): 0.3
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - Silty SAND - brown, fine-grained, damp, loose, trace grass, organic matter, with inclusions of gravels	BH10 0.0-0.1 PID = 0 ppm	No staining, odour, or ACM observed
		0.30			Borehole BH10 terminated at 0.3m		
	0.5						
	1.0						
	1.5						
	2.0						
	2.5						

BH11

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 17/08/2017
Logged By: N.Wells
Contractor: BG Drilling
Total Hole Depth (mbgs): 2.3
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
C				Fill	Fill - ASPHALT		
Solid Flight Auger		0.05		SC	Fill - Clayey SAND - brown, heterogeneous, medium grained, medium dense, with inclusions of gravels, trace inclusions of asphalt	BH11 0.1-0.2 PID = 0 ppm	No staining, odour, or ACM observed, QC1/QA1
	0.5					BH11 0.4-0.5 PID = 0 ppm	No staining, odour, or ACM observed
		0.50		CL-SC	Sandy CLAY - pale brown, homogeneous, damp, firm, medium plasticity, becoming light grey/brown, at 1.9m bgs	BH11 0.8-0.9 PID = 0 ppm	No staining, odour, or ACM observed
	1.0						
	1.5						
	2.0						
		2.30			Borehole BH11 terminated at 2.3m		
	2.5						

BH12

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 17/08/2017
Logged By: N.Wells
Contractor: BG Drilling
Total Hole Depth (mbgs): 2.5
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - ASPHALT		
		0.05		Fill	Fill - Silty Gravelly SAND - brown, heterogeneous, fine grained, damp, medium dense	BH12 0.1-0.2 PID = 0 ppm	No staining, odour, or ACM observed
		0.30		Fill	Fill/Reworked Natural - Clayey SAND - pale brown, heterogeneous, medium grained, damp, firm, trace inclusions of ironstone gravels		
	0.5					BH12 0.4-0.5 PID = 0 ppm	No staining, odour, or ACM observed
	1.0					BH12 0.9-1.0 PID = 0 ppm	No staining, odour, or ACM observed
		1.10		Fill	Fill/Reworked Natural - Sandy CLAY - brown, heterogeneous, damp, firm, medium plasticity, trace inclusions of ironstone gravels		
	1.5					BH12 1.4-1.5 PID = 0 ppm	No staining, odour, or ACM observed
	2.0					BH12 1.9-2.0 PID = 0 ppm	No staining, odour, or ACM observed
	2.5						
		2.50			Borehole BH12 terminated at 2.5m		

BH13

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 17/08/2017
Logged By: N.Wells
Contractor: BG Drilling
Total Hole Depth (mbgs): 1.1
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - ASPHALT		
		0.05		Fill	Fill - Sandy CLAY - dark brown, heterogeneous, medium grained, damp, firm, trace inclusions of gravels	BH13 0.1-0.2 PID = 0 ppm	No staining, odour, or ACM observed
	0.5					BH13 0.4-0.5 PID = 0 ppm	No staining, odour, or ACM observed
		0.70		CH-SC	Sandy CLAY - pale brown, mottled red, homogeneous, damp, firm, medium to high plasticity		
	1.0					BH13 0.9-1.0 PID = 0 ppm	No staining, odour, or ACM observed
		1.10			Borehole BH13 terminated at 1.1m		
	1.5						
	2.0						
	2.5						

BH14

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Greenwich Public School
Site Address: 32 Kingslangley Rd, Greenwich NSW

Date: 17/08/2017
Logged By: N.Wells
Contractor: BG Drilling
Total Hole Depth (mbgs): 0.6
Bore Diameter (mm): 100

Eastings (GDA 94):
Northings (GDA 94):
Zone/Area:
Reference Level: Ground Surface
Elevation (m):

Method	Depth (mbgs)	Contact (mbgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - ASPHALT		
		0.05		SC	Clayey SAND - pale brown, homogeneous, medium-fine grained, damp, medium dense, becoming pale grey at 0.5m bgs	BH14 0.1-0.2 PID = 0 ppm	No staining, odour, or ACM observed
	0.5						
		0.60			Borehole BH14 terminated at 0.6m		
	1.0						
	1.5						
	2.0						
	2.5						