Appendix D

Photographs

Photo 1 - UNSW Hall

Photo 2 - UNSW Hall

Douglas Partners Geotechnics | Environment | Groundwater	**Site Photographs** **UNSW Hall** **Contamination Investigation**	PROJECT: 86457.04 PLATE No: 1 REV: A
	CLIENT: UNSW	DATE: 7-Aug-18

Photo 3 - UNSW Hall Lawn

Photo 4 - UNSW Village

Douglas Partners Geotechnics | Environment | Groundwater	**Site Photographs** **UNSW Hall** **Contamination Investigation**	PROJECT: 86457.04 PLATE No: 2 REV: A
	CLIENT: UNSW	DATE: 7-Aug-18

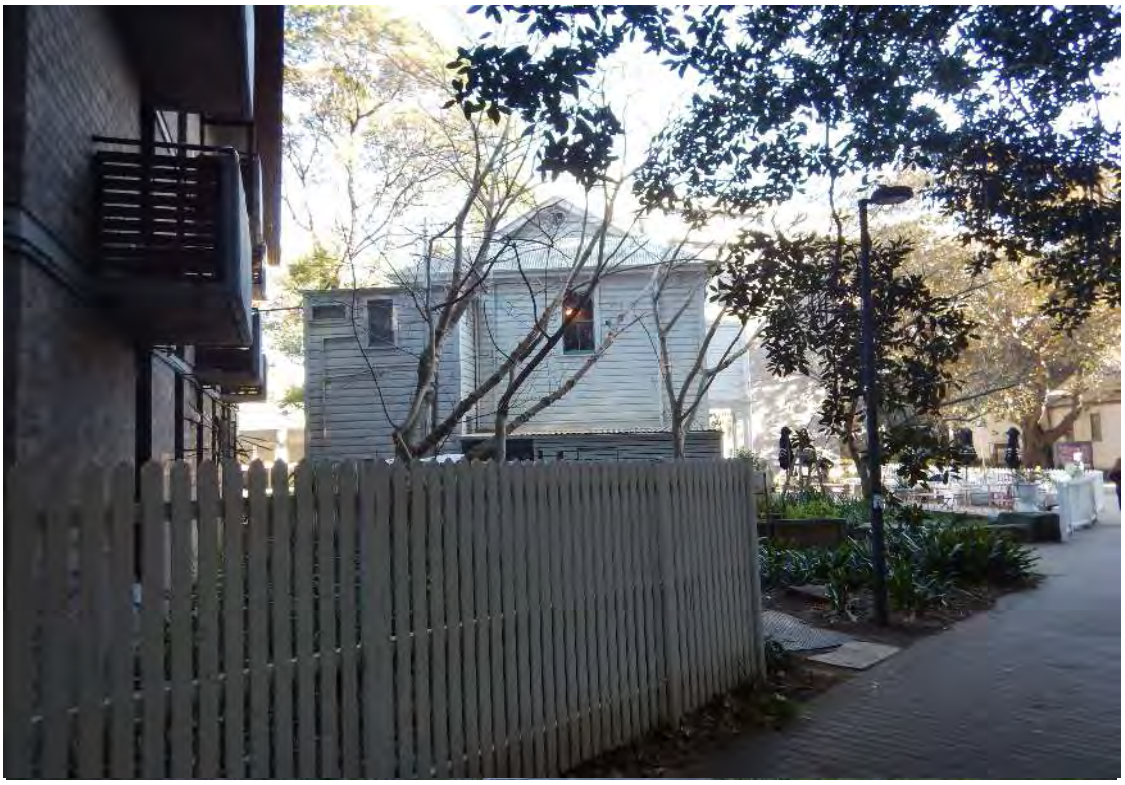

Photo 5 - White House

Photo 6 - Goldstein Hall

Douglas Partners Geotechnics | Environment | Groundwater	**Site Photographs** **UNSW Hall** **Contamination Investigation**	PROJECT: 86457.04 PLATE No: 1 REV: A
	CLIENT: UNSW	DATE: 7-Aug-18

Photo 7 - Business School

Photo 8 - Alumni Park

Douglas Partners Geotechnics | Environment | Groundwater	**Site Photographs** **UNSW Hall** **Contamination Investigation**	PROJECT: 86457.04 PLATE No: 4 REV: A
	CLIENT: UNSW	DATE: 7-Aug-18

Appendix E

Descriptive Notes and

Borehole Log Results

Sampling Methods

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Sampling

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

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

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

Test Pits

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

Large Diameter Augers

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

Continuous Spiral Flight Augers

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

Non-core Rotary Drilling

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

Continuous Core Drilling

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

Standard Penetration Tests

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

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

The test results are reported in the following form.

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

  4,6,7
  N=13

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

  15, 30/40 mm

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

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

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

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

Soil Descriptions

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Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

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

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

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

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

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

Definitions of grading terms used are:

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

Cohesive Soils

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

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

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

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

Soil Descriptions

Soil Origin

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

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

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

Rock Strength

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

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

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

Degree of Weathering

The degree of weathering of rock is classified as follows:

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

Degree of Fracturing

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

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

Rock Descriptions

Rock Quality Designation

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

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

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

Stratification Spacing

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

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

Symbols & Abbreviations

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Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

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

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

Coating or Infilling Term

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

Coating Descriptor

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

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

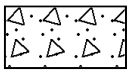
Symbols & Abbreviations

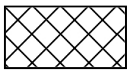
Graphic Symbols for Soil and Rock

General

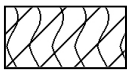

Asphalt

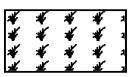

Road base

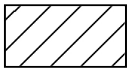

Concrete

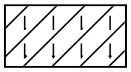

Filling

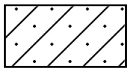
Soils


Topsoil

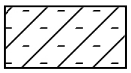

Peat

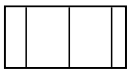

Clay

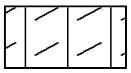

Silty clay

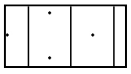

Sandy clay

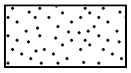

Gravelly clay

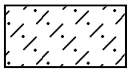

Shaly clay

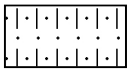

Silt


Clayey silt


Sandy silt


Sand

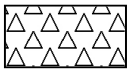

Clayey sand


Silty sand


Gravel

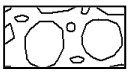

Sandy gravel


Cobbles, boulders

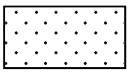

Talus

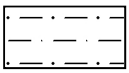
Sedimentary Rocks

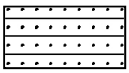

Boulder conglomerate

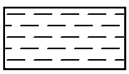

Conglomerate


Conglomeratic sandstone

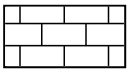

Sandstone


Siltstone

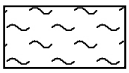

Laminite

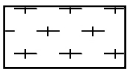

Mudstone, claystone, shale

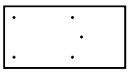

Coal


Limestone

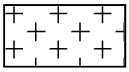
Metamorphic Rocks

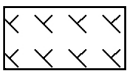

Slate, phyllite, schist

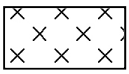

Gneiss

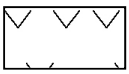

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: University of New South Wales
PROJECT: Proposed Upgrade UNSW HALL SITE
LOCATION: High Street, Kensington

SURFACE LEVEL: 30.7 AHD
EASTING: 336344
NORTHING: 6245725
DIP/AZIMUTH: 90°/--

BORE No: 1
PROJECT No: 86457.00
DATE: 25/7/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
30	0.2	FILLING: brown, fine to medium sand filling with a trace of fine sandstone gravel and some rootlets, moist		E*	0.0				
				A	0.1				
	0.5	FILLING: dark grey, fine to medium sand filling with a trace of fine to medium gravel			0.2				
				A	0.4				
				E	0.5				
	0.7	FILLING: dark grey, sandy gravel filling, gravel is medium sandstone, sand is fine to medium, moist, terracotta and tile fragments (10-30mm)		B	0.7				
				E	0.9				
1				A	1.0				1
		SAND: medium dense, yellow mottled light grey fine to medium sand, moist							
				A	1.5				
29		1.5m: becoming yellow-brown		E	1.6				
					1.7				
2									2
28									
3	3.0	Bore discontinued at 3.0m		A/E	2.9				3
		Target depth reached			3.0				
27									
4									4
26									
5									5
25									
6									6
24									
7									7
23									
8									8
22									
9									9
21									

RIG: 3t Excavator **DRILLER:** Brian **LOGGED:** SLB **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 3.0m

WATER OBSERVATIONS: No free ground water observed whilst augering

REMARKS: *BD1/20182507taken from 0.0-0.1m

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: University of New South Wales
PROJECT: Proposed Upgrade UNSW HALL SITE
LOCATION: High Street, Kensington

SURFACE LEVEL: 31.9 AHD
EASTING: 336388
NORTHING: 6245721
DIP/AZIMUTH: 90°/--

BORE No: 2
PROJECT No: 86457.00
DATE: 25/7/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
31.9	0.0	FILLING: dark brown fine to medium sand filling with a trace of asphaltic gravel, moist		E*	0.0				
				A	0.1				
	0.3				0.2				
31.6	0.305	ASPHALTIC CONCRETE		A/E	0.4				
					0.5				
	0.8	FILLING: dark brown, fine to medium sand filling with some fine to medium gravel, gravel is sandstone and asphaltic concrete, moist			0.9				
31	1			A	1.0				1
		0.6m: piece of steel wire		E					
				B	1.2				
		SAND: dense, yellow-brown fine to medium sand, moist							
		1.2m: becoming yellow							
					1.7				
30	2			A	1.8				2
				E					
					2.9				
29	3			A	3.0				3
	3.0	Bore discontinued at 3.0m		E					
		Target depth reached							
28	4								4
27	5								5
26	6								6
25	7								7
24	8								8
23	9								9
22									

RIG: 3t Excavator **DRILLER:** Brian **LOGGED:** SLB **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 3.0m

WATER OBSERVATIONS: No free ground water observed whilst augering

REMARKS: *BD3/20182507 taken from 0.0-0.1m

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: University of New South Wales
PROJECT: Proposed Upgrade UNSW HALL SITE
LOCATION: High Street, Kensington

SURFACE LEVEL: 33.2 AHD
EASTING: 336433
NORTHING: 6245705
DIP/AZIMUTH: 90°/--

BORE No: 3
PROJECT No: 86457.00
DATE: 26/7/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
33	0.05	BRICK PAVEMENT		A/E*	0.05				
	0.2	FILLING: dark brown, sandy gravel filling, gravel is fine to medium igneous and sandstone, sand is fine to coarse			0.1				
		Bore discontinued at 0.2m Auger refusal on sandstone boulder							
32	1								
31	2								
30	3								
29	4								
28	5								
27	6								
26	7								
25	8								
24	9								

RIG: Hand Auger **DRILLER:** SLB **LOGGED:** SLB **CASING:** Uncased

TYPE OF BORING: Hand auger to 0.2m

WATER OBSERVATIONS: No free ground water observed whilst augering

REMARKS: *BD5/20182607 taken from 0.0-0.1m

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: University of New South Wales
PROJECT: Proposed Upgrade UNSW HALL SITE
LOCATION: High Street, Kensington

SURFACE LEVEL: 33.7 AHD
EASTING: 336431
NORTHING: 6245705
DIP/AZIMUTH: 90°/--

BORE No: 3A
PROJECT No: 86457.00
DATE: 26/7/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
33	0	FILLING: dark brown, fine to medium sand filling with a trace of fine to medium sandstone gravel, damp, trace of rootlets and bark (topsoil)		A/E	0.1 0.2				
	0.45			A/E	0.4				
	0.5	FILLING: dark brown sandy gravel filling, gravel is fine to medium igneous and sandstone, sand if fine to medium, damp, trace of carbonaceous material			0.5				
32	1	Bore discontinued at 0.5m Auger refusal on sandstone boulder							
31	2								
30	3								
29	4								
28	5								
27	6								
26	7								
25	8								
24	9								

RIG: Hand Auger **DRILLER:** SLB **LOGGED:** SLB **CASING:** Uncased

TYPE OF BORING: Hand auger to 0.5m

WATER OBSERVATIONS: No free ground water observed whilst augering

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: University of New South Wales
PROJECT: Proposed Upgrade UNSW HALL SITE
LOCATION: High Street, Kensington

SURFACE LEVEL: 30.2 AHD
EASTING: 336341
NORTHING: 6245700
DIP/AZIMUTH: 90°/--

BORE No: 4
PROJECT No: 86457.00
DATE: 26/7/2018
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
30	0.5	FILLING: dark brown, fine to medium sand filling with trace fine to medium gravel, moist							A/E*			
		0.3m: piece of slag							A			
		SAND: loose to medium dense, light grey fine to medium sand, damp							E			
29	1								A			
									E			
	1.8	SAND: loose to medium dense, yellow mottled brown fine to medium sand, trace of fine sandstone gravel, damp										
28	2								A			
27	3	3.5m: becoming medium dense to dense, yellow										
26	4								A			
25	5											
									A			
24	6											
23	7					▼ 05-08-18			S			7,7,8 N = 15
22	8	8.0m: thin band of silty fine sandy clay										
		8.65m: becoming very dense							S			8,17,25/110 refusal
21	9											
		9.8m: with some sandstone and ironstone gravel and some mottled grey silty sand										

RIG: Scout 4 **DRILLER:** RK **LOGGED:** SLB **CASING:** HW to 6.0m, HQ to 10.8m

TYPE OF BORING: Solid flight auger to 6.0m, rotary wash boring to 10.8m, NMLC-coring to 16.8m

WATER OBSERVATIONS: No free goundwater observed whilst augering

REMARKS: *BD4/20182507 taken from 0.0-0.1m, Well Installed (screen 16.8-7.8m, blank 7.8-GL, gravel 16.8-6.5m, bentonite 6.5-5.5m, backfill to GL, gatic cover)

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: University of New South Wales
PROJECT: Proposed Upgrade UNSW HALL SITE
LOCATION: High Street, Kensington

SURFACE LEVEL: 30.2 AHD
EASTING: 336341
NORTHING: 6245700
DIP/AZIMUTH: 90°/--

BORE No: 4
PROJECT No: 86457.00
DATE: 26/7/2018
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
20		SAND: loose to medium dense, yellow mottled brown fine to medium sand, trace of fine sandstone gravel, damp *(continued)*						Unless otherwise stated rock is fractured along rough planar bedding dipping 0°-5°	S			30,30/140 refusal
	10.7	SAND: very dense, yellow sand, with										
	10.8	some sandstone and ironstone gravel and some mottled grey silty sand										
19	11	SANDSTONE: very low strength, highly weathered, yellow-brown medium to coarse sandstone										
		SANDSTONE: medium strength, slightly weathered, slightly fractured to unbroken, yellow-brown medium to coarse grained sandstone						11.46m: B 0°, pl, ro, cly co 11.53m: B 5°, pl, ro, cly 3mm 11.65m: B 10°, he, cbs				PL(A) = 0.4
18	12							12.28m: J 30°, pl, ro, cly 5mm	C	100	99	PL(A) = 1
17	13							13.27m: B 10°, pl, ro, cly 1mm				PL(A) = 0.7
16	14											
	14.28	SANDSTONE: high strength, fresh, slightly fractured then unbroken, light grey medium to coarse grained sandstone with carbonaceous laminations and some low strength bands										PL(A) = 0.5
15	15							14.75m: B 3°, pl, ro, cly 10mm				
								15.25-15.27m: B 0°, pl, ro, cly 20mm J 45°, pl, ro, cly co J 45°, pl, ro, cly co	C	100	99	PL(A) = 1.4
14	16											PL(A) = 1.2
	16.8	Bore discontinued at 16.8m										
13	17	Target depth reached										
12	18											
11	19											

RIG: Scout 4 **DRILLER:** RK **LOGGED:** SLB **CASING:** HW to 6.0m, HQ to 10.8m

TYPE OF BORING: Solid flight auger to 6.0m, rotary wash boring to 10.8m, NMLC-coring to 16.8m

WATER OBSERVATIONS: No free goundwater observed whilst augering

REMARKS: *BD4/20182507 taken from 0.0-0.1m, Well Installed (screen 16.8-7.8m, blank 7.8-GL, gravel 16.8-6.5m, bentonite 6.5-5.5m, backfill to GL, gatic cover)

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: University of New South Wales
PROJECT: Proposed Upgrade UNSW HALL SITE
LOCATION: High Street, Kensington

SURFACE LEVEL: 31 AHD
EASTING: 336405
NORTHING: 6245662
DIP/AZIMUTH: 90°/--

BORE No: 5
PROJECT No: 86457.00
DATE: 27/7/2018
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
31	0.05	ASPHALTIC CONCRETE							A/E*			
	0.25	FILLING: grey fine to medium gravel filling with some fine sand, humid (roadbase)							A/E			
	0.6	FILLING: light brown, fine to medium sand filling with some fine sandstone gravel and trace of medium igneous gravel, humid										
30	1	SAND: dense to very dense, yellow-brown fine to medium sand, humid							A			
		1.7m: becoming moist										
29	2	2.0m: becoming medium dense to dense							A/E			
28	3											
27	4								A			
		4.7m: becoming yellow										
26	5							Unless otherwise stated rock is fractured along rough planar bedding dipping at 0°-5°	A			
	5.4								A			
	5.5	SANDSTONE: low strength, highly to moderately weathered, red-brown medium to coarse grained sandstone										PL(A) = 0.7
25	6	SANDSTONE: medium then high strength, moderately then slightly weathered, slightly fractured, red-brown and grey medium to coarse grained sandstone						5.85m: B 0°, pl, ro, cln 5.91m: B 0°, pl, ro, cly 5mm 5.95m: B 0°, pl, ro, cly 5mm				
								6.61m: J 30°, pl, ro, cln, ti				PL(A) = 1.1
24	7								C	100	100	
	7.21	SANDSTONE: high strength, fresh, slightly fractured and unbroken, pale grey medium to coarse grained sandstone with some low strength bands, trace of carbonaceous flecks										PL(A) = 1.4
								7.47m: B 0°, pl, ro, cly, fg 10mm				
23	8							8.02 & 8.10m: B (x2) 0°, pl, ro, cly co 8.2m: B 5°, pl, ro, cly 5mm 8.29m: B 5°, pl, ro, fe 8.35m: J 20°, pl, ro, cln				PL(A) = 1.4
22	9							9.08m: J 20°, pl, ro, cln	C	100	100	PL(A) = 1.3
								9.54m: B 0°, pl, ro, cly 8mm 9.61m: B 5°, pl, ro, cly				

RIG: Scout 4 **DRILLER:** RK **LOGGED:** SLB **CASING:** HW to 5.5m

TYPE OF BORING: Solid flight auger to 5.5m, NMLC-coring to 11.68m

WATER OBSERVATIONS: No free ground water observed whilst augering

REMARKS: *BD2/20182507 taken from 0.1-0.2m

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
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BOREHOLE LOG

CLIENT: University of New South Wales
PROJECT: Proposed Upgrade UNSW HALL SITE
LOCATION: High Street, Kensington

SURFACE LEVEL: 31 AHD
EASTING: 336405
NORTHING: 6245662
DIP/AZIMUTH: 90°/--

BORE No: 5
PROJECT No: 86457.00
DATE: 27/7/2018
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
21		SANDSTONE: high strength, fresh, slightly fractured and unbroken, pale grey medium to coarse grained sandstone with some low strength bands, trace of carbonaceous flecks *(continued)*						co 10.07m: B 0°, pl, ro, cly co 10.6m: B 0°, pl, ro, cly co 10.74m: J 30°, pl, ro, cly 5mm				PL(A) = 0.9
20	11								C	100	100	PL(A) = 1.4
	11.68	Bore discontinued at 11.68m Target depth reached										
19	12											
18	13											
17	14											
16	15											
15	16											
14	17											
13	18											
12	19											

RIG: Scout 4 **DRILLER:** RK **LOGGED:** SLB **CASING:** HW to 5.5m

TYPE OF BORING: Solid flight auger to 5.5m, NMLC-coring to 11.68m

WATER OBSERVATIONS: No free ground water observed whilst augering

REMARKS: *BD2/20182507 taken from 0.1-0.2m

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: University of New South Wales
PROJECT: Proposed Upgrade UNSW HALL SITE
LOCATION: High Street, Kensington

SURFACE LEVEL: 34.7 AHD
EASTING: 336464
NORTHING: 6245682
DIP/AZIMUTH: 90°/--

BORE No: 6
PROJECT No: 86457.00
DATE: 25/7/2018
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Water	Fracture Spacing (m)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
34	0.1	ASPHALTIC CONCRETE							A			
	0.3	FILLING: yellow-grey, gravelly medium sand filling, gravel is fine sandstone, humid (possible roadbase gravel)							A			
	0.6	FILLING: dark grey, slightly gravelly filling with some silt, humid							A			
1		SAND: loose to medium dense, light yellow-white fine to medium sand, humid							S			4,4,4 N = 8
33	1.9	SAND: loose to medium dense, yellow fine to coarse sand, damp							A			
2												
32									S			3,4,5 N = 9
3												
31												
4		4.0m: medium dense							S			3,5,8 N = 13
30												
5												
29								Unless otherwise stated rock is fractured along rough planar bedding dipping 0°-5°	S			3,8,20/130 refusal Bouncing
6	5.83	SANDSTONE: very low becoming low strength, highly weathered, fractured, orange and yellow-brown medium to coarse grained sandstone with some low strength bands				05-08-18		6.27m: B 10°, un, fe, pl, ro				PL(A) = 0.1
28	6.65							6.57m: CORE LOSS: 80mm				
	6.71	SANDSTONE: high strength, slightly weathered then fresh, slightly fractured and unbroken red-brown and pale grey medium to coarse grained sandstone						6.65-6.71m: Cs				
7								7.1m: B 10°, pl, sm, cly co	C	97	90	PL(A) = 0.8
27												
8												PL(A) = 1.4
26								8.81m: B 5°pl, sm, cly inf 10mm				
9									C	100	98	PL(A) = 1.1
25												

RIG: Scout 4 **DRILLER:** RK **LOGGED:** SB/SLB **CASING:** HQ to 6.0m, HW to 5.5m

TYPE OF BORING: Solid flight auger to 5.5m, rotary wash boring to 6.0m, NMLC-coring to 12.05m

WATER OBSERVATIONS: Free ground water observed at 5.8m

REMARKS: Well Installed (screen 12.05-4.0m, blank 4.0-GL, gravel 12.05-3.5m, bentonite 3.5m-2.5m, backfill to GL, gatic cover)

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: University of New South Wales
PROJECT: Proposed Upgrade UNSW HALL SITE
LOCATION: High Street, Kensington

SURFACE LEVEL: 34.7 AHD
EASTING: 336464
NORTHING: 6245682
DIP/AZIMUTH: 90°/--

BORE No: 6
PROJECT No: 86457.00
DATE: 25/7/2018
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
24	11	SANDSTONE: high strength, slightly weathered then fresh, slightly fractured and unbroken red-brown and pale grey medium to coarse grained sandstone *(continued)*						10.09m: B 5°, pl, sm, cly co 10.19m: B 10°, pl, sm, st, cly 10.85m: B 10°, cln 11.19m: B 5°, pl, sm, inf, cly 10mm	C	100	98	PL(A) = 1.2 PL(A) = 1.5
23	12											
	12.05	Bore discontinued at 12.05m Target depth reached										
22	13											
21	14											
20	15											
19	16											
18	17											
17	18											
16	19											
15												

RIG: Scout 4 **DRILLER:** RK **LOGGED:** SB/SLB **CASING:** HQ to 6.0m, HW to 5.5m

TYPE OF BORING: Solid flight auger to 5.5m, rotary wash boring to 6.0m, NMLC-coring to 12.05m

WATER OBSERVATIONS: Free ground water observed at 5.8m

REMARKS: Well Installed (screen 12.05-4.0m, blank 4.0-GL, gravel 12.05-3.5m, bentonite 3.5m-2.5m, backfill to GL, gatic cover)

SAMPLING & IN SITU TESTING LEGEND

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

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Appendix F

Results Tables F1 to F3

Laboratory Certificates and Chain of Custody

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Table F1: Summary of Laboratory Results for Soil Analysis

Sample		Soil Type [b]	Date Sampled	Heavy Metals								PAH				TRH (NEPM 2013) [e]						BTEX				VOC [d]	phenol	PCB	OCP [d]	OPP [d]	Asbestos [j]
				As	Cd	Cr [c]	Cu	Pb	Hg	Ni	Zn	total	BaP TEQ	BaP	Naphthalene	C6-C10	>C10-C16	F1 - C6 – C10 less BTEX	F2 - >C10-C16 less naphthalene	>C16-C34	>C34-C40	Benzene	Toluene	Ethylbenzene	xylene						
				Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
Soil Assessment Criteria (SAC) - (NEPC, 2013) (refer to report body for details)																															
HIL D				3,000	900	3,600	240,000	1,500	730/180	6,000	400,000	4,000	40														660	7	refer to note h	refer to note i	
EIL/ ESL				*160*		*680*	*320*	*1,800*		*320*	*1,000*			*1.4*	*370*		*170*	*215*		*2,500*	*6,600*	*95*	*135*	*185*	*95*				*640* [f]		
Ecological Reference Level														172 [g]																	
Management Limit		Coarse														700	1,000			3,500	10,000										
HSLs - Vapour Intrusion																															
HSL D	0-<1m	Sand													NL			260	NL			3	NL	NL	230						
HSL D, direct contact															11,000			26,000	20,000	27,000	38,000	430	99,000	27,000	81,000						
Intrusive Maintenance Workers																															
HSLs - Vapour Intrusion																															
HSL	0-<2m	Sand													NL			NL	NL			77	NL	NL	NL						
HSL, direct contact															29,000			82,000	62,000	85,000	120,000	1,100	120,000	85,000	130,000						
Laboratory Results																															
Sample Location		**Depth**																													
1		0-0.1	Fill	25-Jul-18	<4	<0.4	7	23	35	<0.1	5	80	1.55	<0.5	0.2	<0.1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<5	<0.1	<0.1	<0.1	NAD
BD1/20180725	a		Fill	25-Jul-18	<5	<1	4	13	28	<0.1	2	71	<7.5	0.6	<0.5	<0.5	<10	<50	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	-	-	-	-	-	-
1		1.7	Natural	25-Jul-18	<4	<0.4	2	1	2	<0.1	<1	5	<1.35	<0.5	<0.05	<0.1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
2		0.5	Fill	25-Jul-18	<4	<0.4	8	47	6	<0.1	37	32	1.125	<0.5	<0.05	<0.1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<5	<0.1	<0.1	<0.1	NAD
2		1.8	Fill	25-Jul-18	<4	<0.4	<1	<1	<1	<0.1	<1	<1	<1.35	<0.5	<0.05	<0.1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
3A		0.1-0.2	Fill	25-Jul-18	<4	<0.4	15	81	67	0.4	11	150	14.7	1.9	1.4	<0.1	<25	<50	<25	<50	180	<100	<0.2	<0.5	<1	<1	<1	<5	<0.1	0.1	<0.1	NAD
3A		0.4-0.5	Fill	25-Jul-18	<4	<0.4	6	37	100	0.3	10	120	3.4	0.6	0.4	<0.1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
4		0-0.1	Fill	25-Jul-18	<4	<0.4	6	16	14	0.1	14	33	0.96	<0.5	0.06	<0.1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
BD4/20180725	a		Fill	25-Jul-18	<4	<0.4	7	20	24	0.2	12	61	9.95	1.5	1.1	<0.1	<25	<50	<25	<50	150	130	<0.2	<0.5	<1	<1	-	-	-	-	-	-
4		1.5	Natural	25-Jul-18	<4	<0.4	<1	<1	<1	<0.1	<1	<1	<1.35	<0.5	<0.05	<0.1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
5		0-0.1	Fill	25-Jul-18	<4	<0.4	6	53	20	<0.1	6	31	<1.35	<0.5	<0.05	<0.1	<25	<50	<25	<50	540	670	<0.2	<0.5	<1	<1	<1	<5	<0.1	<0.1	<0.1	NAD
BD2/20180725	a		Fill	25-Jul-18	<4	<0.4	7	70	16	<0.1	5	30	0.725	<0.5	<0.05	<0.1	<25	<50	<25	<50	730	890	<0.2	<0.5	<1	<1	-	-	-	-	-	-
5		0.5	Fill	25-Jul-18	<4	<0.4	6	35	53	<0.1	5	36	<1.35	<0.5	<0.05	<0.1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
6		0.1	Fill	25-Jul-18	5	<0.4	12	42	55	0.3	55	68	<1.35	<0.5	<0.05	<0.1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<5	<0.1	<0.1	<0.1	NAD
6		0.5	Fill	25-Jul-18	5	<0.4	5	61	230	0.9	10	110	15.75	3.6	2.5	<0.1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD

Notes

a	Replicate sample of sample listed directly above
b	Fill or naturally
c	Analysis result for total Cr, SAC and waste classification guidelines for Cr(VI), background ranges for Cr(III)
d	Where results of one or more component compound are above PQL sum of all results above PQL given, when all results are below PQL results quoted as <PQL of majority of individual analytes
e	Analysis result for TRH, guidelines for TPH
f	EIL for DDT
g	Sourced from CRC CARE Technical Report No. 39, Risk-based management and remediation guidance for benzo(a)pyrene (2017)
h	DDT+DDE+DDD - 3600 mg/kg, Aldrin + Dieldrin - 45 mg/kg, chlordane - 530 mg/kg, endosulfan - 2000 mg/kg, endrin - 100 mg/kg, heptachlor - 50 mg/kg, HCB - 80 mg/kg and methoxychlor - 2500 mg/kg
i	chloropyifos - 2000 mg/kg
j	Refer to Table F2, Appendix F for further information
Italic	Exceedance of EIL/ESL

Acronyms

As	arsenic
BaP	benzo(a)pyrene
BaP TEQ	benzo(a)pyrene toxic equivalent
BTEX	benzene, toluene, ethyl benzene, xylenes
Cd	cadmium
Cr	chromium (total)
Cu	copper
EIL	ecological investigation level
ESL	ecological screening level
Hg	mercury
HIL	health investigation level
HSL	health screening level
NAD	no asbestos detected at the limit of reporting
Ni	nickel
NL	“Not limiting” to human health for the proposed land use for vapour intrusion from petroleum hydrocarbons
OCP	organochlorine pesticides
OPP	organophosphorus pesticides
PAH	polycyclic aromatic hydrocarbons
Pb	lead
PCB	polychlorinated biphenyls
PQL	practical quantitation limit
TPH	total petroleum hydrocarbons
TRH	total recoverable hydrocarbons, including total petroleum hydrocarbons (TPH)
VOC	volatile organic compounds
Zn	zinc

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Table F2: Summary of Laboratory Results for Analysis of Asbestos in Soil

Sample	Soil Type	Date Sampled	Asbestos 40 g Sample		Asbestos (500 ml Samples)				
			Asbestos ID in soil	Trace Analysis	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos#1	Asbestos ID in soil <0.1g/kg*	FA and AF Estimation*#2
					Total				
					-	-	g/kg	-	%(w/w)
Soil Assessment Criteria (SAC) - NEPM (as amended 2013) (refer to report body for details)									
Commercial									
HIL D									0.001
Laboratory Results									
Sample Location	**Depth**								
1	0-0.1	Fill	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	<0.001
1	1.7	Natural	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	-	-	-	-	-
2	0.5	Fill	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	<0.001
2	1.8	Fill	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	<0.001
3A	0.1-0.2	Fill	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	<0.001
3A	0.4-0.5	Fill	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	-	-	-	-	-
4	0-0.1	Fill	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	<0.001
4	1.5	Natural	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	-	-	-	-	-
5	0-0.1	Fill	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	<0.001
5	0.5	Fill	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	-	-	-	-	-
6	0.1	Fill	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	<0.001
6	0.5	Fill	25-Jul-18	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	-	-	-	-	-

Table F3: Summary of Laboratory Results for Waste Classification

Sample		Soil Type	Date Sampled	Heavy Metals										PAH			TRH/TPH		BTEX				VOC [b]	phenol	PCB	OCP [b]	OPP [b]	Asbestos [j]
				As	Cd	Cr [c]	Cu	Pb		Hg	Ni		Zn	total [b]	BaP		C_6 - C_9	C_{10} - C_{36} [d]	Benzene	Toluene	Ethylbenzene	xylene						
				Total	Total	Total	Total	Total	TCLP	Total	Total	TCLP	Total	Total	Total	TCLP	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
Waste Classification Thresholds (EPA, 2014)																												
General Solid		CT1		100	20	100		100		4	40			200	0.8		650	10,000	10	288	600	1,000	- [e]	288	<50	<50 [f]	250 [g]	
		SCC1/TCLP1						1,500	5		1,050	2				0.04												
Published Background Ranges																												
NEPC (1999)				1-50	1	5-1000	2-100	2-200		0.03	5-500		10-300															
ANZECC (1992)				0.2-30	0.04-2	0.5-110	1-190	<2-200		0.001-0.1	2-400		2-180	0.95-5					0.05 - 1	0.1 - 1				0.03 – 0.5	0.02 – 0.1	<0.001 - <0.97		
ANZECC (2000)				1-53	0.016-0.78	2.5-673	0.4-412	2-81			1-517		1-263															
Laboratory Results																												
Sample Location		Depth																										
1		0-0.1	Fill	25-Jul-18	<4	<0.4	7	23	35	-	<0.1	5	-	80	1.55	0.2	-	<25	<250	<0.2	<0.5	<1	<1	<1	<5	<0.1	<0.1	<0.1	NAD
BD1/20180725	a		Fill	25-Jul-18	<5	<1	4	13	28	-	<0.1	2	-	71	<7.5	<0.5	-	<10	<50	<0.2	<0.5	<0.5	<0.5	-	-	-	-	-	-
1		1.7	Natural	25-Jul-18	<4	<0.4	2	1	2	-	<0.1	<1	-	5	<1.35	<0.05	-	<25	<250	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
2		0.5	Fill	25-Jul-18	<4	<0.4	8	47	6	-	<0.1	37	-	32	1.125	<0.05	-	<25	<250	<0.2	<0.5	<1	<1	<1	<5	<0.1	<0.1	<0.1	NAD
2		1.8	Fill	25-Jul-18	<4	<0.4	<1	<1	<1	-	<0.1	<1	-	<1	<1.35	<0.05	-	<25	<250	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
3A		0.1-0.2	Fill	25-Jul-18	<4	<0.4	15	81	67	-	0.4	11	-	150	14.7	1.4	<0.0001	<25	175	<0.2	<0.5	<1	<1	<1	<5	<0.1	0.1	<0.1	NAD
3A		0.4-0.5	Fill	25-Jul-18	<4	<0.4	6	37	100	-	0.3	10	-	120	3.4	0.4	-	<25	<250	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
4		0-0.1	Fill	25-Jul-18	<4	<0.4	6	16	14	-	0.1	14	-	33	0.96	0.06	-	<25	<250	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
BD4/20180725	a		Fill	25-Jul-18	<4	<0.4	7	20	24	-	0.2	12	-	61	9.95	1.1	<0.001	<25	215	<0.2	<0.5	<1	<1	-	-	-	-	-	-
4		1.5	Natural	25-Jul-18	<4	<0.4	<1	<1	<1	-	<0.1	<1	-	<1	<1.35	<0.05	-	<25	<250	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
5		0-0.1	Fill	25-Jul-18	<4	<0.4	6	53	20	-	<0.1	6	-	31	<1.35	<0.05	-	<25	<250	<0.2	<0.5	<1	<1	<1	<5	<0.1	<0.1	<0.1	NAD
BD2/20180725	a		Fill	25-Jul-18	<4	<0.4	7	70	16	-	<0.1	5	-	30	0.725	<0.05	-	<25	985	<0.2	<0.5	<1	<1	-	-	-	-	-	-
5		0.5	Fill	25-Jul-18	<4	<0.4	6	35	53	-	<0.1	5	-	36	<1.35	<0.05	-	<25	735	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD
6		0.1	Fill	25-Jul-18	5	<0.4	12	42	55	-	0.3	55	<0.02	68	<1.35	<0.05	-	<25	<250	<0.2	<0.5	<1	<1	<1	<5	<0.1	<0.1	<0.1	NAD
6		0.5	Fill	25-Jul-18	5	<0.4	5	61	230	0.08	0.9	10	-	110	15.75	2.5	<0.001	<25	<250	<0.2	<0.5	<1	<1	-	<5	<0.1	<0.1	<0.1	NAD

Notes

a	Replicate sample of sample listed directly above
b	Where results of one or more component compound are above PQL sum of all results above PQL given, when all results are below PQL results quoted as <PQL of majority of individual analytes
c	Analysis result for total Cr, SAC and waste classification guidelines for Cr(VI), background ranges for Cr(III)
d	Where results of one or more component compound are above PQL sum of all results above PQL given, when all results are below PQL results quoted as less than the sum of PQLs of the individual analytes
e	Various, not listed here as all results less than PQL
f	Guideline for scheduled chemicals
g	Guideline for moderately harmful pesticides
h	Various available, not listed as not detected above PQL
i	Analysis result for TRH, guidelines for TPH
j	Refer to Table F2, Appendix F for further information

Guidelines

EPA, 2014	NSW EPA (2014) *Waste Classification Guidelines*
NEPC (1999)	National Environment Protection Council (NEPC) *National Environment Protection (Assessment of Site Contamination) Measure* 1999 (as amended 2013).
	NEPC (1999) *National Environment Protection Measure (Assessment of Site Contamination)* Schedule B1, Table 5-A, Background Ranges
ANZECC (1992)	ANZECC/NHMRC (1992) *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites* , Environmental Soil Quality Guidelines Background A [ANZECC A];
ANZECC (2000)	ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* , Volume 3, Table 9.2.16 Datasets used to derive suggested upper background values for uncontaminated Australian soils

Acronyms

As	arsenic	PQL	practical quantitation limit
BaP	benzo(a)pyrene	TCLP	toxicity characteristic leaching procedure
BTEX	benzene, toluene, ethyl benzene, xylenes	TPH	total petroleum hydrocarbons
Cd	cadmium	TRH	total recoverable hydrocarbons, including TPH
Cr	chromium (total)	VOC	volatile organic compounds
Cu	copper	Zn	zinc
Hg	mercury		
NAD	no asbestos detected at the limit of reporting		
Ni	nickel		
OCP	organochlorine pesticides		
OPP	organophosphorus pesticides		
PAH	polycyclic aromatic hydrocarbons		
Pb	lead		
PCB	polychlorinated biphenyls		

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.118/09/2018 1:12:57 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaP

General Statistics

Total Number of Observations	10	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	5
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.2	Minimum Non-Detect	0.05
Maximum Detect	2.5	Maximum Non-Detect	0.05
Variance Detects	0.837	Percent Non-Detects	50%
Mean Detects	1.12	SD Detects	0.915
Median Detects	1.1	CV Detects	0.817
Skewness Detects	0.815	Kurtosis Detects	0.24
Mean of Logged Detects	-0.236	SD of Logged Detects	1.014

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.184	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.585	KM Standard Error of Mean	0.279
KM SD	0.788	95% KM (BCA) UCL	1.04
95% KM (t) UCL	1.096	95% KM (Percentile Bootstrap) UCL	1.035
95% KM (z) UCL	1.043	95% KM Bootstrap t UCL	1.104
90% KM Chebyshev UCL	1.421	95% KM Chebyshev UCL	1.799
97.5% KM Chebyshev UCL	2.325	99% KM Chebyshev UCL	3.357

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.229	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.686	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.197	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.361	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.579	k star (bias corrected MLE)	0.765
Theta hat (MLE)	0.709	Theta star (bias corrected MLE)	1.464
nu hat (MLE)	15.79	nu star (bias corrected)	7.65
Mean (detects)	1.12		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	0.01				Mean		0.565
59					Maximum	2.5				Median		0.105
60					SD	0.845				CV		1.496
61					k hat (MLE)	0.362				k star (bias corrected MLE)		0.32
62					Theta hat (MLE)	1.562				Theta star (bias corrected MLE)		1.767
63					nu hat (MLE)	7.233				nu star (bias corrected)		6.397
64					Adjusted Level of Significance (β)	0.0267						
65					Approximate Chi Square Value (6.40, α)	1.846				Adjusted Chi Square Value (6.40, β)		1.453
66					95% Gamma Approximate UCL (use when n>=50)	1.958				95% Gamma Adjusted UCL (use when n<50)		2.487
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	0.585				SD (KM)		0.788
70					Variance (KM)	0.621				SE of Mean (KM)		0.279
71					k hat (KM)	0.551				k star (KM)		0.452
72					nu hat (KM)	11.02				nu star (KM)		9.048
73					theta hat (KM)	1.062				theta star (KM)		1.293
74					80% gamma percentile (KM)	0.955				90% gamma percentile (KM)		1.615
75					95% gamma percentile (KM)	2.328				99% gamma percentile (KM)		4.1
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (9.05, α)	3.356				Adjusted Chi Square Value (9.05, β)		2.782
79					95% Gamma Approximate KM-UCL (use when n>=50)	1.577				95% Gamma Adjusted KM-UCL (use when n<50)		1.903
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.954				**Shapiro Wilk GOF Test**		
83					5% Shapiro Wilk Critical Value	0.762				Detected Data appear Lognormal at 5% Significance Level		
84					Lilliefors Test Statistic	0.228				**Lilliefors GOF Test**		
85					5% Lilliefors Critical Value	0.343				Detected Data appear Lognormal at 5% Significance Level		
86	**Detected Data appear Lognormal at 5% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	0.585				Mean in Log Scale		-1.786
90					SD in Original Scale	0.831				SD in Log Scale		1.883
91					95% t UCL (assumes normality of ROS data)	1.067				95% Percentile Bootstrap UCL		1
92					95% BCA Bootstrap UCL	1.142				95% Bootstrap t UCL		1.512
93					95% H-UCL (Log ROS)	24.49						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	-1.616				KM Geo Mean		0.199
97					KM SD (logged)	1.522				95% Critical H Value (KM-Log)		4.258
98					KM Standard Error of Mean (logged)	0.538				95% H-UCL (KM -Log)		5.487
99					KM SD (logged)	1.522				95% Critical H Value (KM-Log)		4.258
100					KM Standard Error of Mean (logged)	0.538						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**									**DL/2 Log-Transformed**		
104					Mean in Original Scale	0.573				Mean in Log Scale		-1.962
105					SD in Original Scale	0.84				SD in Log Scale		1.942
106					95% t UCL (Assumes normality)	1.059				95% H-Stat UCL		27.75
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Normal Distributed at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
111												
112	**Suggested UCL to Use**											
113					95% KM (t) UCL	1.096						
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												

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CERTIFICATE OF ANALYSIS 197098

Client Details

Client	Douglas Partners Pty Ltd
Attention	Kurt Plambeck
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86457.01, Kensington**
Number of Samples	23 Soil
Date samples received	26/07/2018
Date completed instructions received	30/07/2018

Analysis Details

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

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

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

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

Report Details

Date results requested by	06/08/2018
Date of Issue	06/08/2018

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VOCs in soil					
Our Reference		197098-1	197098-6	197098-10	197098-14
Your Reference	UNITS	1/0-0.1	2/0.5	5/0-0.1	6/0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	02/08/2018	01/08/2018	01/08/2018	01/08/2018
Dichlorodifluoromethane	mg/kg	<1	<1	<1	<1
Chloromethane	mg/kg	<1	<1	<1	<1
Vinyl Chloride	mg/kg	<1	<1	<1	<1
Bromomethane	mg/kg	<1	<1	<1	<1
Chloroethane	mg/kg	<1	<1	<1	<1
Trichlorofluoromethane	mg/kg	<1	<1	<1	<1
1,1-Dichloroethene	mg/kg	<1	<1	<1	<1
trans-1,2-dichloroethene	mg/kg	<1	<1	<1	<1
1,1-dichloroethane	mg/kg	<1	<1	<1	<1
cis-1,2-dichloroethene	mg/kg	<1	<1	<1	<1
bromochloromethane	mg/kg	<1	<1	<1	<1
chloroform	mg/kg	<1	<1	<1	<1
2,2-dichloropropane	mg/kg	<1	<1	<1	<1
1,2-dichloroethane	mg/kg	<1	<1	<1	<1
1,1,1-trichloroethane	mg/kg	<1	<1	<1	<1
1,1-dichloropropene	mg/kg	<1	<1	<1	<1
Cyclohexane	mg/kg	<1	<1	<1	<1
carbon tetrachloride	mg/kg	<1	<1	<1	<1
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
dibromomethane	mg/kg	<1	<1	<1	<1
1,2-dichloropropane	mg/kg	<1	<1	<1	<1
trichloroethene	mg/kg	<1	<1	<1	<1
bromodichloromethane	mg/kg	<1	<1	<1	<1
trans-1,3-dichloropropene	mg/kg	<1	<1	<1	<1
cis-1,3-dichloropropene	mg/kg	<1	<1	<1	<1
1,1,2-trichloroethane	mg/kg	<1	<1	<1	<1
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1	<1	<1	<1
dibromochloromethane	mg/kg	<1	<1	<1	<1
1,2-dibromoethane	mg/kg	<1	<1	<1	<1
tetrachloroethene	mg/kg	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	mg/kg	<1	<1	<1	<1
chlorobenzene	mg/kg	<1	<1	<1	<1
Ethylbenzene	mg/kg	<1	<1	<1	<1
bromoform	mg/kg	<1	<1	<1	<1

VOCs in soil					
Our Reference		197098-1	197098-6	197098-10	197098-14
Your Reference	UNITS	1/0-0.1	2/0.5	5/0-0.1	6/0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil
m+p-xylene	mg/kg	<2	<2	<2	<2
styrene	mg/kg	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	mg/kg	<1	<1	<1	<1
o-Xylene	mg/kg	<1	<1	<1	<1
1,2,3-trichloropropane	mg/kg	<1	<1	<1	<1
isopropylbenzene	mg/kg	<1	<1	<1	<1
bromobenzene	mg/kg	<1	<1	<1	<1
n-propyl benzene	mg/kg	<1	<1	<1	<1
2-chlorotoluene	mg/kg	<1	<1	<1	<1
4-chlorotoluene	mg/kg	<1	<1	<1	<1
1,3,5-trimethyl benzene	mg/kg	<1	<1	<1	<1
tert-butyl benzene	mg/kg	<1	<1	<1	<1
1,2,4-trimethyl benzene	mg/kg	<1	<1	<1	<1
1,3-dichlorobenzene	mg/kg	<1	<1	<1	<1
sec-butyl benzene	mg/kg	<1	<1	<1	<1
1,4-dichlorobenzene	mg/kg	<1	<1	<1	<1
4-isopropyl toluene	mg/kg	<1	<1	<1	<1
1,2-dichlorobenzene	mg/kg	<1	<1	<1	<1
n-butyl benzene	mg/kg	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	mg/kg	<1	<1	<1	<1
1,2,4-trichlorobenzene	mg/kg	<1	<1	<1	<1
hexachlorobutadiene	mg/kg	<1	<1	<1	<1
1,2,3-trichlorobenzene	mg/kg	<1	<1	<1	<1
Surrogate Dibromofluorometha	%	115	114	115	118
Surrogate aaa-Trifluorotoluene	%	101	85	88	88
Surrogate Toluene-d_8	%	102	105	104	105
Surrogate 4-Bromofluorobenzene	%	84	90	89	88

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		197098-1	197098-4	197098-6	197098-8	197098-10
Your Reference	UNITS	1/0-0.1	1/1.7	2/0.5	2/1.8	5/0-0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	101	105	85	80	88

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		197098-11	197098-14	197098-15	197098-20	197098-22
Your Reference	UNITS	5/0.5	6/0.1	6/0.5	BD2/20180725	Spike
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	[NA]
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	99%
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	84%
Ethylbenzene	mg/kg	<1	<1	<1	<1	97%
m+p-xylene	mg/kg	<2	<2	<2	<2	95%
o-Xylene	mg/kg	<1	<1	<1	<1	95%
naphthalene	mg/kg	<1	<1	<1	<1	[NA]
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	[NA]
Surrogate aaa-Trifluorotoluene	%	100	88	81	107	89%

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		197098-23
Your Reference	UNITS	Blank
Date Sampled		25/07/2018
Type of sample		Soil
Date extracted	-	31/07/2018
Date analysed	-	01/08/2018
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	90

svTRH (C10-C40) in Soil						
Our Reference		197098-1	197098-4	197098-6	197098-8	197098-10
Your Reference	UNITS	1/0-0.1	1/1.7	2/0.5	2/1.8	5/0-0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	150
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	560
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	540
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	670
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	1,200
Surrogate o-Terphenyl	%	84	84	82	85	89

svTRH (C10-C40) in Soil					
Our Reference		197098-11	197098-14	197098-15	197098-20
Your Reference	UNITS	5/0.5	6/0.1	6/0.5	BD2/20180725
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	200
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	760
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	730
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	890
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	1,600
Surrogate o-Terphenyl	%	85	84	82	90

PAHs in Soil						
Our Reference		197098-1	197098-4	197098-6	197098-8	197098-10
Your Reference	UNITS	1/0-0.1	1/1.7	2/0.5	2/1.8	5/0-0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	0.3	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.3	<0.1	0.2	<0.1	<0.1
Pyrene	mg/kg	0.3	<0.1	0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.3	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.2	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	1.5	<0.05	0.60	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	87	93	89	96	94

PAHs in Soil					
Our Reference		197098-11	197098-14	197098-15	197098-20
Your Reference	UNITS	5/0.5	6/0.1	6/0.5	BD2/20180725
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.2	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.8	<0.1
Anthracene	mg/kg	<0.1	<0.1	0.2	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	2.6	<0.1
Pyrene	mg/kg	<0.1	<0.1	2.8	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	1.9	0.1
Chrysene	mg/kg	<0.1	<0.1	1.8	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	3.8	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	2.5	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	1.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.3	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	1.4	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	19	0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	3.6	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	3.6	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	3.6	<0.5
Surrogate p-Terphenyl-d14	%	97	93	91	98

Organochlorine Pesticides in soil						
Our Reference		197098-1	197098-4	197098-6	197098-8	197098-10
Your Reference	UNITS	1/0-0.1	1/1.7	2/0.5	2/1.8	5/0-0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	106	109	107	110	107

Organochlorine Pesticides in soil				
Our Reference		197098-11	197098-14	197098-15
Your Reference	UNITS	5/0.5	6/0.1	6/0.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	107	107	106

Organophosphorus Pesticides						
Our Reference		197098-1	197098-4	197098-6	197098-8	197098-10
Your Reference	UNITS	1/0-0.1	1/1.7	2/0.5	2/1.8	5/0-0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	106	109	107	110	107

Organophosphorus Pesticides				
Our Reference		197098-11	197098-14	197098-15
Your Reference	UNITS	5/0.5	6/0.1	6/0.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	107	107	106

PCBs in Soil						
Our Reference		197098-1	197098-4	197098-6	197098-8	197098-10
Your Reference	UNITS	1/0-0.1	1/1.7	2/0.5	2/1.8	5/0-0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	106	109	107	110	107

PCBs in Soil				
Our Reference		197098-11	197098-14	197098-15
Your Reference	UNITS	5/0.5	6/0.1	6/0.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil
Date extracted	-	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	107	107	106

Acid Extractable metals in soil						
Our Reference		197098-1	197098-4	197098-6	197098-8	197098-10
Your Reference	UNITS	1/0-0.1	1/1.7	2/0.5	2/1.8	5/0-0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	2	8	<1	6
Copper	mg/kg	23	1	47	<1	53
Lead	mg/kg	35	2	6	<1	20
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	<1	37	<1	6
Zinc	mg/kg	80	5	32	<1	31

Acid Extractable metals in soil					
Our Reference		197098-11	197098-14	197098-15	197098-20
Your Reference	UNITS	5/0.5	6/0.1	6/0.5	BD2/20180725
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Arsenic	mg/kg	<4	5	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	12	5	7
Copper	mg/kg	35	42	61	70
Lead	mg/kg	53	55	230	16
Mercury	mg/kg	<0.1	0.3	0.9	<0.1
Nickel	mg/kg	5	55	10	5
Zinc	mg/kg	36	68	110	30

Misc Soil - Inorg						
Our Reference		197098-1	197098-4	197098-6	197098-8	197098-10
Your Reference	UNITS	1/0-0.1	1/1.7	2/0.5	2/1.8	5/0-0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg				
Our Reference		197098-11	197098-14	197098-15
Your Reference	UNITS	5/0.5	6/0.1	6/0.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil
Date prepared	-	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5

Moisture						
Our Reference		197098-1	197098-4	197098-6	197098-8	197098-10
Your Reference	UNITS	1/0-0.1	1/1.7	2/0.5	2/1.8	5/0-0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Moisture	%	7.7	5.6	15	2.7	4.2

Moisture					
Our Reference		197098-11	197098-14	197098-15	197098-20
Your Reference	UNITS	5/0.5	6/0.1	6/0.5	BD2/20180725
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Moisture	%	6.1	5.6	14	3.7

Asbestos ID - soils				
Our Reference		197098-4	197098-11	197098-15
Your Reference	UNITS	1/1.7	5/0.5	6/0.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil
Date analysed	-	02/08/2018	02/08/2018	02/08/2018
Sample mass tested	g	Approx. 40g	Approx. 40g	Approx. 35g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils NEPM - ASB-001						
Our Reference		197098-1	197098-6	197098-8	197098-10	197098-14
Your Reference	UNITS	1/0-0.1	2/0.5	2/1.8	5/0-0.1	6/0.1
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018
Sample mass tested	g	619.62	550.92	894.06	898.24	275.17
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Beige sandy soil	Brown fine-grained soil & rocks	Beige coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Misc Inorg - Soil				
Our Reference		197098-4	197098-6	197098-15
Your Reference	UNITS	1/1.7	2/0.5	6/0.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil
Date prepared	-	01/08/2018	01/08/2018	01/08/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018
pH 1:5 soil:water	pH Units	8.9	7.2	9.4

CEC				
Our Reference		197098-4	197098-6	197098-15
Your Reference	UNITS	1/1.7	2/0.5	6/0.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil
Date prepared	-	01/08/2018	01/08/2018	01/08/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018
Exchangeable Ca	meq/100g	4.5	14	22
Exchangeable K	meq/100g	<0.1	0.2	0.3
Exchangeable Mg	meq/100g	0.24	2.7	2.0
Exchangeable Na	meq/100g	<0.1	0.18	0.55
Cation Exchange Capacity	meq/100g	4.8	17	25

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.

Method ID	Methodology Summary
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: VOCs in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	197098-6
Date extracted	-			01/08/2018	1	31/07/2018	31/07/2018		01/08/2018	31/07/2018
Date analysed	-			02/08/2018	1	02/08/2018	02/08/2018		02/08/2018	01/08/2018
Dichlorodifluoromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Chloromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Vinyl Chloride	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Bromomethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Chloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Trichlorofluoromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,1-Dichloroethene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
trans-1,2-dichloroethene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	101	134
cis-1,2-dichloroethene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
bromochloromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
chloroform	mg/kg	1	Org-014	<1	1	<1	<1	0	131	94
2,2-dichloropropane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	100	101
1,1,1-trichloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	100	106
1,1-dichloropropene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
carbon tetrachloride	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-014	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
dibromomethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
trichloroethene	mg/kg	1	Org-014	<1	1	<1	<1	0	93	75
bromodichloromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	99	101
trans-1,3-dichloropropene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-014	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,3-dichloropropane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
dibromochloromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	106	93
1,2-dibromoethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
tetrachloroethene	mg/kg	1	Org-014	<1	1	<1	<1	0	92	80
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
chlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
bromoform	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-014	<2	1	<2	<2	0	[NT]	[NT]
styrene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	197098-6
1,2,3-trichloropropane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
isopropylbenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
bromobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
tert-butyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
sec-butyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
hexachlorobutadiene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluorometha	%		Org-014	115	1	115	120	4	111	114
Surrogate aaa-Trifluorotoluene	%		Org-014	100	1	101	96	5	93	81
Surrogate Toluene-d_8	%		Org-014	102	1	102	102	0	98	103
Surrogate 4-Bromofluorobenzene	%		Org-014	85	1	84	84	0	102	95

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	197098-6
Date extracted	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
Date analysed	-			01/08/2018	1	01/08/2018	01/08/2018		01/08/2018	01/08/2018
TRH C_6 - C_9	mg/kg	25	Org-016	<25	1	<25	<25	0	104	80
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	1	<25	<25	0	104	80
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	106	81
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	101	79
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	99	75
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	107	82
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	87	76
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	133	1	101	96	5	117	81

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	197098-6
Date extracted	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
Date analysed	-			01/08/2018	1	01/08/2018	01/08/2018		01/08/2018	01/08/2018
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	1	<50	<50	0	104	87
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	1	<100	<100	0	89	70
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	1	<100	<100	0	77	71
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	1	<50	<50	0	104	87
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	1	<100	<100	0	89	70
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	1	<100	<100	0	77	71
Surrogate o-Terphenyl	%		Org-003	85	1	84	85	1	92	82

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	197098-6
Date extracted	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
Date analysed	-			01/08/2018	1	01/08/2018	01/08/2018		01/08/2018	01/08/2018
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	102	87
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	108	86
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	0.1	<0.1	0	98	85
Anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	0.3	0.2	40	95	83
Pyrene	mg/kg	0.1	Org-012	<0.1	1	0.3	0.2	40	100	86
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	0.1	0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	0.1	0.1	0	100	80
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	0.3	0.2	40	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	0.2	0.2	0	115	70
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	0.1	0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	96	1	87	89	2	112	107

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	197098-6
Date extracted	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
Date analysed	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
HCB	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	109	108
gamma-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	92	90
Heptachlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	85	87
delta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	94	92
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	95	93
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	101	99
Dieldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	107	105
Endrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	100	101
pp-DDD	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	101	101
Endosulfan II	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	79	86
Methoxychlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	109	1	106	114	7	102	100

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	197098-6
Date extracted	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
Date analysed	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	114	114
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	88	86
Dimethoate	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	110	123
Fenitrothion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	109	101
Malathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	82	85
Parathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	103	110
Ronnel	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	132	106
Surrogate TCMX	%		Org-008	109	1	106	114	7	107	105

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	197098-6
Date extracted	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
Date analysed	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	102	102
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	109	1	106	114	7	107	105

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	197098-6
Date prepared	-			03/08/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
Date analysed	-			03/08/2018	1	31/07/2018	31/07/2018		31/07/2018	31/07/2018
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	113	86
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	104	86
Chromium	mg/kg	1	Metals-020	<1	1	7	5	33	110	90
Copper	mg/kg	1	Metals-020	<1	1	23	22	4	116	108
Lead	mg/kg	1	Metals-020	<1	1	35	33	6	107	91
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	102	96
Nickel	mg/kg	1	Metals-020	<1	1	5	3	50	111	90
Zinc	mg/kg	1	Metals-020	<1	1	80	74	8	104	79

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	197098-6
Date prepared	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	[NT]
Date analysed	-			31/07/2018	1	31/07/2018	31/07/2018		31/07/2018	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	105	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			01/08/2018	[NT]	[NT]	[NT]	[NT]	01/08/2018	[NT]
Date analysed	-			01/08/2018	[NT]	[NT]	[NT]	[NT]	01/08/2018	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			01/08/2018	6	01/08/2018	01/08/2018		01/08/2018	[NT]
Date analysed	-			01/08/2018	6	01/08/2018	01/08/2018		01/08/2018	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	6	14	15	7	105	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	6	0.2	0.2	0	114	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	6	2.7	2.8	4	109	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	6	0.18	0.19	5	103	[NT]

Result Definitions

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

Quality Control Definitions

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, sample 197098-14 was below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples 197098-4, 11, 15 were sub-sampled from bags provided by the client.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86457.01	**Suburb:** Kensington	**To:** Envirolab Services
Project Name:	UNSW Hall	**Order Number**	12 Ashley Street
Project Manager:	Kurt Pplambeck	**Sampler:**	**Attn:** Aileen
Emails:	kurt.plambeck@douglaspartners.com.au		**Phone:**
Date Required:	Standard		**Email:**

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

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH (40 actual)	Total Phenols	Asbestos 500 ml	VOC (BTEX)	Combo 8A	Combo 3A	Notes/preservation
														pH / CEC
1/0-0.1	1	25/07/18	S		X	X	X	X	X	X	X	X		
1/0.5	2	25/07/18												
1/0.9	3	25/07/18												
1/1.7	4	25/07/18			X	X	X	X	X			X		X
2/0-0.1	5	25/07/18												
2/0.5	6	25/07/18			X	X	X	X	X	X	X	X		X
2/1.0	7	25/07/18												
2/1.8	8	25/07/18			X	X	X	X	X	X		X		
2/3.0	9	25/07/18												
5/0-0.1	10	25/07/18			X	X	X	X	X	X	X	X		
5/0.5	11	25/07/18			X	X	X	X	X	X		X		
5/1.5	12	25/07/18												
5/3.0	13	25/07/18												
6/0.1	14	25/07/18			X	X	X	X	X	X	X	X		
6/0.5	15	25/07/18			X	X	X	X	X	X		X		X
PQL (S) mg/kg												ANZECC PQLs req'd for all water analytes [ ]		

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 197098

Total number of samples in container:	**Relinquished by:**	**Transported to laboratory by:**
Send Results to: Douglas Partners Pty Ltd	**Address**	**Phone:** **Fax:**
Signed:	**Received by:** JE ELS	**Date & Time:** 26/7/18 16:30

30/7/18 (COC)

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86457.01	**Suburb:**	Kensington	**To:**	Envirolab Services
Project Name:	UNSW Hall	**Order Number**			12 Ashley Street
Project Manager:	Kurt Pplambeck	**Sampler:**		**Attn:**	Aileen
Emails:	kurt.plambeck@douglaspartners.com.au			**Phone:**	
Date Required:	Standard			**Email:**	

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

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml	BTEX	Combo 8A	Combo 3A	Notes/preservation
6/0.6	16													
6/1.0	17													
6/5.7	18													
BD1/20180725	19				X		X	X					X	inter (ALS)
BD2/20180725	20				X		X	X					X	intra
BD3/20180725	21													
spike	22										X			
blank	23										X			
PQL (S) mg/kg														

ANZECC PQLs req'd for all water analytes ☐

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 197028

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

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

Signed: | Received by: | Date & Time:

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

CERTIFICATE OF ANALYSIS 197098-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Kurt Plambeck
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86457.01, Kensington**
Number of Samples	23 Soil
Date samples received	26/07/2018
Date completed instructions received	06/08/2018

Analysis Details

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

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

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

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

Report Details

Date results requested by	13/08/2018
Date of Issue	10/08/2018

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Giovanni Agosti, Group Technical Manager
Jeremy Faircloth, Organics Supervisor

Authorised By

Jacinta Hurst, Laboratory Manager

Metals in TCLP USEPA1311			
Our Reference		197098-A-14	197098-A-15
Your Reference	UNITS	6/0.1	6/0.5
Date Sampled		25/07/2018	25/07/2018
Type of sample		Soil	Soil
Date extracted	-	08/08/2018	08/08/2018
Date analysed	-	08/08/2018	08/08/2018
pH of soil for fluid# determ.	pH units	9.5	9.8
pH of soil TCLP (after HCl)	pH units	1.9	1.6
Extraction fluid used	-	1	1
pH of final Leachate	pH units	6.2	5.1
Nickel in TCLP	mg/L	<0.02	[NA]
Lead in TCLP	mg/L	[NA]	0.08

PAHs in TCLP (USEPA 1311)		
Our Reference		197098-A-15
Your Reference	UNITS	6/0.5
Date Sampled		25/07/2018
Type of sample		Soil
Date extracted	-	09/08/2018
Date analysed	-	10/08/2018
Naphthalene in TCLP	mg/L	<0.001
Acenaphthylene in TCLP	mg/L	<0.001
Acenaphthene in TCLP	mg/L	<0.001
Fluorene in TCLP	mg/L	<0.001
Phenanthrene in TCLP	mg/L	<0.001
Anthracene in TCLP	mg/L	<0.001
Fluoranthene in TCLP	mg/L	<0.001
Pyrene in TCLP	mg/L	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001
Chrysene in TCLP	mg/L	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001
Total +ve PAH's	mg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	101

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.

QUALITY CONTROL: Metals in TCLP USEPA1311					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			08/08/2018	[NT]	[NT]	[NT]	[NT]	08/08/2018	[NT]
Date analysed	-			08/08/2018	[NT]	[NT]	[NT]	[NT]	08/08/2018	[NT]
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	[NT]	[NT]	93	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			09/08/2018	[NT]	[NT]	[NT]	[NT]	09/08/2018	[NT]
Date analysed	-			10/08/2018	[NT]	[NT]	[NT]	[NT]	10/08/2018	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	86	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	92	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	86	[NT]
Anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	85	[NT]
Pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	86	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	85	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	89	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	102	[NT]	[NT]	[NT]	[NT]	88	[NT]

Result Definitions

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

Quality Control Definitions

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

PAH analysed outside of RHT

Andrew Fitzsimons

From: Nancy Zhang
Sent: Monday, 6 August 2018 6:15 PM
To: Kurt Plambeck
Cc: Samplereceipt
Subject: RE: Results for Registration 197098 86457.01, Kensington

Hi Kurt,

ELS: 197098-A
TAT: 5 days
Due: 13/8/18

No problem, is standard TAT ok?

Regards,

Nancy Zhang | Assistant Lab Manager | Envirolab Services Pty Ltd

Great Science, Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200 **F** 612 9910 6201
E nzhang@envirolab.com.au | **W** www.envirolab.com.au

From: Kurt Plambeck [mailto:kurt.plambeck@douglaspartners.com.au]
Sent: Monday, 6 August 2018 6:13 PM
To: Nancy Zhang <NZhang@envirolab.com.au>
Subject: RE: Results for Registration 197098 86457.01, Kensington

Nancy,

15 14

Can u please run 6/0.5 tclp pah and lead and 6/0.1 tclp ni.

Regards

Sent from my Windows 10 device

From: Nancy Zhang
Sent: Monday, 6 August 2018 6:01 PM
To: Kurt Plambeck
Subject: Results for Registration 197098 86457.01, Kensington

Please refer to attached for:

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

CERTIFICATE OF ANALYSIS 197270

Client Details

Client	Douglas Partners Pty Ltd
Attention	Kurt Plambeck
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86457.01, Kensington**
Number of Samples	8 Soil
Date samples received	30/07/2018
Date completed instructions received	30/07/2018

Analysis Details

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

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

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

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

Report Details

Date results requested by	06/08/2018
Date of Issue	06/08/2018

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

Results Approved By
Giovanni Agosti, Group Technical Manager
Jeremy Faircloth, Organics Supervisor
Lucy Zhu, Asbsestos Analyst
Nick Sarlamis, Inorganics Supervisor
Steven Luong, Senior Chemist

Authorised By

Jacinta Hurst, Laboratory Manager

VOCs in soil		
Our Reference		197270-2
Your Reference	UNITS	3A/0.1-0.2
Date Sampled		25/07/2018
Type of sample		Soil
Date extracted	-	01/08/2018
Date analysed	-	02/08/2018
Dichlorodifluoromethane	mg/kg	<1
Chloromethane	mg/kg	<1
Vinyl Chloride	mg/kg	<1
Bromomethane	mg/kg	<1
Chloroethane	mg/kg	<1
Trichlorofluoromethane	mg/kg	<1
1,1-Dichloroethene	mg/kg	<1
trans-1,2-dichloroethene	mg/kg	<1
1,1-dichloroethane	mg/kg	<1
cis-1,2-dichloroethene	mg/kg	<1
bromochloromethane	mg/kg	<1
chloroform	mg/kg	<1
2,2-dichloropropane	mg/kg	<1
1,2-dichloroethane	mg/kg	<1
1,1,1-trichloroethane	mg/kg	<1
1,1-dichloropropene	mg/kg	<1
Cyclohexane	mg/kg	<1
carbon tetrachloride	mg/kg	<1
Benzene	mg/kg	<0.2
dibromomethane	mg/kg	<1
1,2-dichloropropane	mg/kg	<1
trichloroethene	mg/kg	<1
bromodichloromethane	mg/kg	<1
trans-1,3-dichloropropene	mg/kg	<1
cis-1,3-dichloropropene	mg/kg	<1
1,1,2-trichloroethane	mg/kg	<1
Toluene	mg/kg	<0.5
1,3-dichloropropane	mg/kg	<1
dibromochloromethane	mg/kg	<1
1,2-dibromoethane	mg/kg	<1
tetrachloroethene	mg/kg	<1
1,1,1,2-tetrachloroethane	mg/kg	<1
chlorobenzene	mg/kg	<1
Ethylbenzene	mg/kg	<1
bromoform	mg/kg	<1

VOCs in soil		
Our Reference		197270-2
Your Reference	UNITS	3A/0.1-0.2
Date Sampled		25/07/2018
Type of sample		Soil
m+p-xylene	mg/kg	<2
styrene	mg/kg	<1
1,1,2,2-tetrachloroethane	mg/kg	<1
o-Xylene	mg/kg	<1
1,2,3-trichloropropane	mg/kg	<1
isopropylbenzene	mg/kg	<1
bromobenzene	mg/kg	<1
n-propyl benzene	mg/kg	<1
2-chlorotoluene	mg/kg	<1
4-chlorotoluene	mg/kg	<1
1,3,5-trimethyl benzene	mg/kg	<1
tert-butyl benzene	mg/kg	<1
1,2,4-trimethyl benzene	mg/kg	<1
1,3-dichlorobenzene	mg/kg	<1
sec-butyl benzene	mg/kg	<1
1,4-dichlorobenzene	mg/kg	<1
4-isopropyl toluene	mg/kg	<1
1,2-dichlorobenzene	mg/kg	<1
n-butyl benzene	mg/kg	<1
1,2-dibromo-3-chloropropane	mg/kg	<1
1,2,4-trichlorobenzene	mg/kg	<1
hexachlorobutadiene	mg/kg	<1
1,2,3-trichlorobenzene	mg/kg	<1
Surrogate Dibromofluorometha	%	111
Surrogate aaa-Trifluorotoluene	%	87
Surrogate Toluene-d_8	%	102
Surrogate 4-Bromofluorobenzene	%	87

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		197270-2	197270-3	197270-4	197270-6	197270-7
Your Reference	UNITS	3A/0.1-0.2	3A/0.4-0.5	4/0-0.1	4/1.5	BD4/20180725
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Date analysed	-	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	87	103	101	103	98

svTRH (C10-C40) in Soil						
Our Reference		197270-2	197270-3	197270-4	197270-6	197270-7
Your Reference	UNITS	3A/0.1-0.2	3A/0.4-0.5	4/0-0.1	4/1.5	BD4/20180725
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Date analysed	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	100	<100	<100	<100	140
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	180	<100	<100	<100	150
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	130
Total +ve TRH (>C10-C40)	mg/kg	180	<50	<50	<50	280
Surrogate o-Terphenyl	%	87	87	84	86	86

PAHs in Soil						
Our Reference		197270-2	197270-3	197270-4	197270-6	197270-7
Your Reference	UNITS	3A/0.1-0.2	3A/0.4-0.5	4/0-0.1	4/1.5	BD4/20180725
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Date analysed	-	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.2	<0.1	<0.1	<0.1	0.2
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	2.2	0.3	0.1	<0.1	0.6
Anthracene	mg/kg	0.5	<0.1	<0.1	<0.1	0.2
Fluoranthene	mg/kg	3.1	0.6	0.2	<0.1	2.2
Pyrene	mg/kg	2.9	0.6	0.1	<0.1	2.3
Benzo(a)anthracene	mg/kg	1.5	0.4	<0.1	<0.1	1.2
Chrysene	mg/kg	1.3	0.4	<0.1	<0.1	1.0
Benzo(b,j+k)fluoranthene	mg/kg	2.0	0.6	<0.2	<0.2	2
Benzo(a)pyrene	mg/kg	1.4	0.4	0.06	<0.05	1.1
Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	0.2	<0.1	<0.1	0.4
Dibenzo(a,h)anthracene	mg/kg	0.2	<0.1	<0.1	<0.1	0.1
Benzo(g,h,i)perylene	mg/kg	0.6	0.2	<0.1	<0.1	0.5
Total +ve PAH's	mg/kg	17	3.8	0.4	<0.05	11
Benzo(a)pyrene TEQ calc (zero)	mg/kg	1.9	0.5	<0.5	<0.5	1.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	1.9	0.6	<0.5	<0.5	1.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	1.9	0.6	<0.5	<0.5	1.5
Surrogate p-Terphenyl-d14	%	91	99	93	99	99

Organophosphorus Pesticides					
Our Reference		197270-2	197270-3	197270-4	197270-6
Your Reference	UNITS	3A/0.1-0.2	3A/0.4-0.5	4/0-0.1	4/1.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Date analysed	-	02/08/2018	02/08/2018	02/08/2018	02/08/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	101	97	102

Organochlorine Pesticides in soil					
Our Reference		197270-2	197270-3	197270-4	197270-6
Your Reference	UNITS	3A/0.1-0.2	3A/0.4-0.5	4/0-0.1	4/1.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Date analysed	-	02/08/2018	02/08/2018	02/08/2018	02/08/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	101	97	102

PCBs in Soil					
Our Reference		197270-2	197270-3	197270-4	197270-6
Your Reference	UNITS	3A/0.1-0.2	3A/0.4-0.5	4/0-0.1	4/1.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Date analysed	-	02/08/2018	02/08/2018	02/08/2018	02/08/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	103	101	97	102

Acid Extractable metals in soil						
Our Reference		197270-2	197270-3	197270-4	197270-6	197270-7
Your Reference	UNITS	3A/0.1-0.2	3A/0.4-0.5	4/0-0.1	4/1.5	BD4/20180725
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Date analysed	-	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	15	6	6	<1	7
Copper	mg/kg	81	37	16	<1	20
Lead	mg/kg	67	100	14	<1	24
Mercury	mg/kg	0.4	0.3	0.1	<0.1	0.2
Nickel	mg/kg	11	10	14	<1	12
Zinc	mg/kg	150	120	33	<1	61

Misc Soil - Inorg					
Our Reference		197270-2	197270-3	197270-4	197270-6
Your Reference	UNITS	3A/0.1-0.2	3A/0.4-0.5	4/0-0.1	4/1.5
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Date analysed	-	31/07/2018	31/07/2018	31/07/2018	31/07/2018
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5

Moisture						
Our Reference		197270-2	197270-3	197270-4	197270-6	197270-7
Your Reference	UNITS	3A/0.1-0.2	3A/0.4-0.5	4/0-0.1	4/1.5	BD4/20180725
Date Sampled		25/07/2018	25/07/2018	25/07/2018	25/07/2018	25/07/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018
Date analysed	-	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018
Moisture	%	11	6.6	9.8	3.2	8.5

Asbestos ID - soils			
Our Reference		197270-3	197270-6
Your Reference	UNITS	3A/0.4-0.5	4/1.5
Date Sampled		25/07/2018	25/07/2018
Type of sample		Soil	Soil
Date analysed	-	02/08/2018	02/08/2018
Sample mass tested	g	Approx. 35g	Approx. 30g
Sample Description	-	Brown sandy soil & rocks	Beige sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected

Asbestos ID - soils NEPM - ASB-001			
Our Reference		197270-2	197270-4
Your Reference	UNITS	3A/0.1-0.2	4/0-0.1
Date Sampled		25/07/2018	25/07/2018
Type of sample		Soil	Soil
Date analysed	-	02/08/2018	02/08/2018
Sample mass tested	g	467.25	678.97
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–
FA and AF Estimation*	g	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.

Method ID	Methodology Summary
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: VOCs in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			01/08/2018	2	01/08/2018	01/08/2018		01/08/2018	[NT]
Date analysed	-			02/08/2018	2	02/08/2018	02/08/2018		02/08/2018	[NT]
Dichlorodifluoromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Chloromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Vinyl Chloride	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Bromomethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Chloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Trichlorofluoromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,1-Dichloroethene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
trans-1,2-dichloroethene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	98	[NT]
cis-1,2-dichloroethene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
bromochloromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
chloroform	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
2,2-dichloropropane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	98	[NT]
1,1,1-trichloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	98	[NT]
1,1-dichloropropene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Cyclohexane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
carbon tetrachloride	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-014	<0.2	2	<0.2	<0.2	0	[NT]	[NT]
dibromomethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
trichloroethene	mg/kg	1	Org-014	<1	2	<1	<1	0	92	[NT]
bromodichloromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
trans-1,3-dichloropropene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-014	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
1,3-dichloropropane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
dibromochloromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	106	[NT]
1,2-dibromoethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
tetrachloroethene	mg/kg	1	Org-014	<1	2	<1	<1	0	92	[NT]
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
chlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
bromoform	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-014	<2	2	<2	<2	0	[NT]	[NT]
styrene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
1,2,3-trichloropropane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
isopropylbenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
bromobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
n-propyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
2-chlorotoluene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
4-chlorotoluene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
tert-butyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
sec-butyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
n-butyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
hexachlorobutadiene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluorometha	%		Org-014	111	2	111	112	1	106	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-014	95	2	87	90	3	96	[NT]
Surrogate Toluene-d_8	%		Org-014	101	2	102	102	0	101	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-014	87	2	87	87	0	100	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			01/08/2018	2	01/08/2018	01/08/2018		01/08/2018	[NT]
Date analysed	-			02/08/2018	2	02/08/2018	02/08/2018		02/08/2018	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	2	<25	<25	0	94	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	2	<25	<25	0	94	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	2	<0.2	<0.2	0	93	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	2	<0.5	<0.5	0	95	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	2	<1	<1	0	90	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	2	<2	<2	0	95	[NT]
o-Xylene	mg/kg	1	Org-016	<1	2	<1	<1	0	93	[NT]
naphthalene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	113	2	87	90	3	111	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			01/08/2018	2	01/08/2018	01/08/2018		01/08/2018	[NT]
Date analysed	-			01/08/2018	2	01/08/2018	01/08/2018		01/08/2018	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	2	<50	<50	0	102	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	2	<100	<100	0	81	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	2	100	<100	0	77	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	2	<50	<50	0	102	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	2	180	120	40	81	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	2	<100	<100	0	77	[NT]
Surrogate o-Terphenyl	%		Org-003	88	2	87	86	1	92	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			01/08/2018	2	01/08/2018	01/08/2018		01/08/2018	[NT]
Date analysed	-			06/08/2018	2	02/08/2018	02/08/2018		02/08/2018	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	2	<0.1	<0.1	0	107	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	2	0.2	<0.1	67	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	2	0.2	<0.1	67	113	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	2	2.2	0.5	126	103	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	2	0.5	<0.1	133	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	2	3.1	0.3	165	103	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	2	2.9	0.3	162	108	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	2	1.5	0.2	153	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	2	1.3	0.2	147	103	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	2	2.0	0.3	148	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	2	1.4	0.1	173	107	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	2	0.5	<0.1	133	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	2	0.2	<0.1	67	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	2	0.6	<0.1	143	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	96	2	91	93	2	120	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	7	01/08/2018	01/08/2018		[NT]	[NT]
Date analysed	-			[NT]	7	02/08/2018	06/08/2018		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	7	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	7	0.2	<0.1	67	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	7	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	7	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	7	0.6	<0.1	143	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	7	0.2	<0.1	67	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	7	2.2	0.3	152	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	7	2.3	0.4	141	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	7	1.2	0.2	143	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	7	1.0	0.2	133	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	7	2	0.3	148	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	7	1.1	0.2	138	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	7	0.4	<0.1	120	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	7	0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	7	0.5	0.1	133	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	7	99	94	5	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			01/08/2018	2	01/08/2018	01/08/2018		01/08/2018	[NT]
Date analysed	-			02/08/2018	2	02/08/2018	02/08/2018		02/08/2018	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	95	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	94	[NT]
Dimethoate	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	100	[NT]
Fenitrothion	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	102	[NT]
Malathion	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	80	[NT]
Parathion	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	109	[NT]
Ronnel	mg/kg	0.1	Org-008	<0.1	2	<0.1	<0.1	0	106	[NT]
Surrogate TCMX	%		Org-008	105	2	103	100	3	102	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			01/08/2018	2	01/08/2018	01/08/2018		01/08/2018	[NT]
Date analysed	-			02/08/2018	2	02/08/2018	02/08/2018		02/08/2018	[NT]
HCB	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	106	[NT]
gamma-BHC	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	92	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	90	[NT]
delta-BHC	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	90	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	92	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	98	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	2	0.1	<0.1	0	104	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	99	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	90	[NT]
Endosulfan II	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	92	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	105	2	103	100	3	99	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			01/08/2018	2	01/08/2018	01/08/2018		01/08/2018	[NT]
Date analysed	-			02/08/2018	2	02/08/2018	02/08/2018		02/08/2018	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	2	<0.1	<0.1	0	102	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	105	2	103	100	3	102	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			01/08/2018	2	01/08/2018	01/08/2018		01/08/2018	[NT]
Date analysed	-			02/08/2018	2	02/08/2018	02/08/2018		02/08/2018	[NT]
Arsenic	mg/kg	4	Metals-020	<4	2	<4	<4	0	107	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	2	<0.4	<0.4	0	106	[NT]
Chromium	mg/kg	1	Metals-020	<1	2	15	16	6	106	[NT]
Copper	mg/kg	1	Metals-020	<1	2	81	85	5	108	[NT]
Lead	mg/kg	1	Metals-020	<1	2	67	65	3	106	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	2	0.4	0.4	0	126	[NT]
Nickel	mg/kg	1	Metals-020	<1	2	11	12	9	101	[NT]
Zinc	mg/kg	1	Metals-020	<1	2	150	140	7	102	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			31/07/2018	[NT]	[NT]	[NT]	[NT]	31/07/2018	[NT]
Date analysed	-			31/07/2018	[NT]	[NT]	[NT]	[NT]	31/07/2018	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	105	[NT]

Result Definitions

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

Quality Control Definitions

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, sample 197270-2 was below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

PAHs in Soil - The RPD for duplicate results is accepted due to the non homogenous nature of the sample/s.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86457.01	**Suburb:**	Kensington	**To:**	Envirolab Services
Project Name:	UNSW Hall	**Order Number**			12 Ashley Street
Project Manager:	Kurt Pplambeck	**Sampler:**		**Attn:**	Aileen
Emails:	kurt.plambeck@douglaspartners.com.au			**Phone:**	
Date Required:	Standard			**Email:**	

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

Sample ID	Lab ID	Date Sampled	Sample Type: S - soil, W - water	Container Type: G - glass, P - plastic	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH 4oasb.	Total Phenols	Asbestos 500 ml	~~BTEX~~ VOC	Combo 8A	Combo 3A	Notes/preservation
3/0-0.1	1	25/07/18												
3A/0.1-0.2	2	25/07/18			X	X	X	X	X	X	X	X		
3A/0.4-0.5	3	25/07/18			X	X	X	X	X	~~X~~		X		
4/0-0.1	4	25/07/18			X	X	X	X	X	X		X		
4/0.5	5	25/07/18												
4/1.5	6	25/07/18										X		
BD4/20180725	7	25/07/18			X		X	X					X	nitra
BD5/20180725	8	25/07/18		—										
PQL (S) mg/kg												ANZECC PQLs req'd for all water analytes ☐		

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

~~Job No:~~ 197270
Date Received: 30·07·18
~~Time Received:~~ 15.17
Received By: TD
Temp: Cool/Ambient
Cooling: Ice/icepack
Security: Intact/Broken/None

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	**Relinquished by:**	**Transported to laboratory by:**
Send Results to: Douglas Partners Pty Ltd	**Address**	**Phone:** **Fax:**
Signed:	**Received by:** Tanya Doherty	**Date & Time:** 30·07·18 15:17

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

CERTIFICATE OF ANALYSIS 197270-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Kurt Plambeck
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86457.01, Kensington**
Number of Samples	8 Soil
Date samples received	30/07/2018
Date completed instructions received	06/08/2018

Analysis Details

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

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

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

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

Report Details

Date results requested by	13/08/2018
Date of Issue	10/08/2018

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Jeremy Faircloth, Organics Supervisor

Authorised By

Jacinta Hurst, Laboratory Manager

PAHs in TCLP (USEPA 1311)			
Our Reference		197270-A-2	197270-A-7
Your Reference	UNITS	3A/0.1-0.2	BD4/20180725
Date Sampled		25/07/2018	25/07/2018
Type of sample		Soil	Soil
pH of soil for fluid# determ.	pH units	6.7	7.6
pH of soil TCLP (after HCl)	pH units	1.6	1.5
Extraction fluid used	-	1	1
pH of final Leachate	pH units	5.0	5.0
Date extracted	-	09/08/2018	09/08/2018
Date analysed	-	10/08/2018	10/08/2018
Naphthalene in TCLP	mg/L	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	99	104

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			09/08/2018	[NT]	[NT]	[NT]	[NT]	09/08/2018	[NT]
Date analysed	-			10/08/2018	[NT]	[NT]	[NT]	[NT]	10/08/2018	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	86	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	92	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	86	[NT]
Anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	85	[NT]
Pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	86	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	85	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	89	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	102	[NT]	[NT]	[NT]	[NT]	88	[NT]

Result Definitions

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

Quality Control Definitions

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

analysed outside of RHT

Andrew Fitzsimons

From: Nancy Zhang
Sent: Monday, 6 August 2018 6:06 PM
To: Kurt Plambeck
Cc: Samplereceipt
Subject: RE: Results for Registration 197270 86457.01, Kensington

Follow Up Flag: Follow up
Flag Status: Flagged

ELS: 197270-A
TAT: 5 days
Due: 13/8/18

Hi Kurt,

Sure, will do.

Regards,

Nancy Zhang | Assistant Lab Manager | Envirolab Services Pty Ltd

Great Science, Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200 **F** 612 9910 6201
E nzhang@envirolab.com.au | **W** www.envirolab.com.au

From: Kurt Plambeck [mailto:kurt.plambeck@douglaspartners.com.au]
Sent: Monday, 6 August 2018 4:44 PM
To: Nancy Zhang <NZhang@envirolab.com.au>
Subject: RE: Results for Registration 197270 86457.01, Kensington

Nancy, 2 7

Can you please run TCLP (PAH) on sample 3A/0.1-0.2 and BD4/20180725

Cheers

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1822282**	Page	: 1 of 6
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR KURT PLAMBECK	Contact	: Shirley LeCornu
Address	: PO BOX 472 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 1685	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 98090666	Telephone	: +61-3-8549 9630
Project	: 86457.01 UNSW Hall	Date Samples Received	: 30-Jul-2018 15:50
Order number	:	Date Analysis Commenced	: 31-Jul-2018
C-O-C number	: ----	Issue Date	: 02-Aug-2018 20:19
Sampler	: ----		
Site	: ----		
Quote number	: EN/222/18		
No. of samples received	: 1		
No. of samples analysed	: 1		

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
- Surrogate Control Limits

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*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BD1/20180725	----	----	----	----
			Client sampling date / time	25-Jul-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1822282-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**5.7**	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**4**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**13**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**28**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**2**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**71**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BD1/20180725	----	----	----	----
				Client sampling date / time	25-Jul-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1822282-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**86.2**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**85.8**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**76.4**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**90.4**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**95.5**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**85.6**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**109**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**112**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BD1/20180725	----	----	----	----
				Client sampling date / time	25-Jul-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1822282-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**98.7**	**----**	**----**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1822282**	Page	: 1 of 7
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR KURT PLAMBECK	Contact	: Shirley LeCornu
Address	: PO BOX 472 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 1685	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 98090666	Telephone	: +61-3-8549 9630
Project	: 86457.01 UNSW Hall	Date Samples Received	: 30-Jul-2018
Order number	:	Date Analysis Commenced	: 31-Jul-2018
C-O-C number	: ----	Issue Date	: 02-Aug-2018
Sampler	: ----		
Site	: ----		
Quote number	: EN/222/18		
No. of samples received	: 1		
No. of samples analysed	: 1		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1840395)									
ES1822307-001	Anonymous	EA055: Moisture Content	----	0.1	%	14.9	15.7	5.30	0% - 50%
ES1822307-012	Anonymous	EA055: Moisture Content	----	0.1	%	9.5	8.8	8.19	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1844888)									
ES1821108-022	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	7	5	31.9	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	13	10	27.3	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	9	6	32.7	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	10	8	21.4	No Limit
ES1822344-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	208	203	2.35	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	107	128	18.1	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	5	45.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	92	76	19.2	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	185	152	19.9	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	127	109	14.8	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1844889)									
ES1821108-022	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1822344-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1839418)									
ES1822212-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1839418) - continued									
ES1822212-001	Anonymous	EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1822292-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1839405)									
ES1822222-005	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1839419)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1839419) - continued									
ES1822212-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	78700	74000	6.26	0% - 20%
		EP071: C29 - C36 Fraction	----	100	mg/kg	6420	7210	11.6	0% - 20%
		EP071: C10 - C14 Fraction	----	50	mg/kg	740	740	0.00	0% - 50%
ES1822292-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1839405)									
ES1822222-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1839419)									
ES1822212-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	79000	76900	2.69	0% - 20%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	2430	2370	2.55	0% - 20%
		EP071: >C10 - C16 Fraction	----	50	mg/kg	3780	3860	1.92	0% - 20%
ES1822292-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 1839405)									
ES1822222-005	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1844888)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	102	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	102	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	98.0	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	106	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	106	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	106	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	112	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1844889)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	81.3	70	105
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1839418)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	95.5	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	96.6	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	92.7	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	96.6	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	94.9	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	91.1	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	93.4	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	91.3	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	88.3	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	89.7	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	88.7	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	97.2	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	91.1	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	91.7	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	92.5	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	88.8	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1839405)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	93.3	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1839419)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	108	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	107	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	94.5	71	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1839405)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1839405) - continued								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	98.4	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1839419)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	98.6	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	93.7	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	85.1	63	131
EP080: BTEXN (QCLot: 1839405)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	91.0	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	92.2	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	87.9	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	94.6	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	93.9	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	92.3	63	119

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 1844888)							
ES1821108-022	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	94.3	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	103	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	102	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	102	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	101	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	103	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	107	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1844889)							
ES1821108-022	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	90.3	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1839418)							
ES1822292-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	86.0	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	99.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1839405)							
ES1822222-005	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	92.9	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1839419)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1839419) - continued							
ES1822292-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	88.4	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	103	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	112	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1839405)							
ES1822222-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	92.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1839419)							
ES1822292-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	89.4	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	107	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	115	52	132
EP080: BTEXN (QCLot: 1839405)							
ES1822222-005	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	78.4	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	82.7	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	83.0	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	83.2	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	85.9	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	80.9	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1822282**	Page	: 1 of 4
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR KURT PLAMBECK	Telephone	: +61-3-8549 9630
Project	: 86457.01 UNSW Hall	Date Samples Received	: 30-Jul-2018
Site	: ----	Issue Date	: 02-Aug-2018
Sampler	: ----	No. of samples received	: 1
Order number	:	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
BD1/20180725	**25-Jul-2018**	**----**	----	----	**31-Jul-2018**	08-Aug-2018	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
BD1/20180725	**25-Jul-2018**	**01-Aug-2018**	21-Jan-2019	✓	**01-Aug-2018**	21-Jan-2019	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
BD1/20180725	**25-Jul-2018**	**01-Aug-2018**	22-Aug-2018	✓	**02-Aug-2018**	22-Aug-2018	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BD1/20180725	**25-Jul-2018**	**31-Jul-2018**	08-Aug-2018	✓	**31-Jul-2018**	09-Sep-2018	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
BD1/20180725	**25-Jul-2018**	**31-Jul-2018**	08-Aug-2018	✓	**01-Aug-2018**	09-Sep-2018	✓
Soil Glass Jar - Unpreserved (EP080)							
BD1/20180725	**25-Jul-2018**	**31-Jul-2018**	08-Aug-2018	✓	**31-Jul-2018**	08-Aug-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071)							
BD1/20180725	**25-Jul-2018**	**31-Jul-2018**	08-Aug-2018	✓	**01-Aug-2018**	09-Sep-2018	✓
Soil Glass Jar - Unpreserved (EP080)							
BD1/20180725	**25-Jul-2018**	**31-Jul-2018**	08-Aug-2018	✓	**31-Jul-2018**	08-Aug-2018	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
BD1/20180725	**25-Jul-2018**	**31-Jul-2018**	08-Aug-2018	✓	**31-Jul-2018**	08-Aug-2018	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

3·8·18

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86457.01	**Suburb:** Kensington	**To:** Envirolab Services
Project Name:	UNSW Hall	**Order Number**	12 Ashley Street
Project Manager:	Kurt Pplambeck	**Sampler:**	**Attn:** Aileen
Emails:	kurt.plambeck@douglaspartners.com.au		**Phone:**
Date Required:	Standard		**Email:**

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

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml	BTEX	Combo 8A	Combo 3A	Notes/preservation
6/0.6	16													
6/1.0	17													
6/5.7	18													
BD1/20180725	19				X		X	X					X	inter (ALS)
BD2/20180725	20				X		X	X					X	intra
BD3/20180725	21													
spike	22										X			
blank	23										X			
PQL (S) mg/kg												ANZECC		Analytes ☐

Environmental Division
Sydney
Work Order Reference
ES1822282
Telephone : +61-2-8784 8555

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 197098

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

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

Signed: **Received by:** ANDREW **Date & Time:** 30/7/18 3:50 PM

Relin: ES MING YAN To.
30/7/18 12:45

Appendix G

Quality Assurance / Quality Control Report

DATA QUALITY ASSESSMENT

Q1. Data Quality Objectives

The contamination assessment was prepared with reference to the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC, 2013). The DQO process is outlined as follows:

- Stating the Problem;
- Identifying the Decision;
- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors; and
- Optimising the Design for Obtaining Data.

The DQOs have been addressed within the report as shown in Table Q1.

Table Q1: Data Quality Objectives

Data Quality Objective	Report Section where Addressed
State the Problem	S1 Introduction
Identify the Decision	S1 Introduction (objective) S13 Analysis and Discussion of Results S14 Conclusion and Recommendations
Identify Inputs to the Decision	S1 Introduction S2 Scope of Works S3 Site Identification S10 Site Assessment Criteria S12 Results Summary
Define the Boundary of the Assessment	S3 Site Identification Drawing 1 - Appendix B
Develop a Decision Rule	S10 Site Assessment Criteria
Specify Acceptable Limits on Decision Errors	S9 Fieldwork S10 Site Assessment Criteria QA/QC Procedures and Results – Sections Q2, Q3
Optimise the Design for Obtaining Data	S2 Scope of Works S9 Fieldwork QA/QC Procedures and Results – Sections Q2, Q3

Q2. FIELD AND LABORATORY QUALITY CONTROL

The field and laboratory quality control (QC) procedures and results are summarised in Tables Q2 and Q3. Reference should be made to the fieldwork and analysis procedures in Section 9 and the laboratory results certificates in Appendix F for further details.

Table Q2: Field QC

Item	Frequency	Acceptance Criteria	Achievement
Intra-laboratory replicates	5% primary samples	RPD <30% inorganics), <50% (organics)	yes[1]
Inter-laboratory replicates	5% primary samples	RPD <30% inorganics), <50% (organics)	yes[2]
Trip Spikes	1 per field batch	60-140% recovery	Yes[3]
Trip Blanks	1 per field batch	<PQL/LOR	Yes[4]

NOTES:
1 qualitative assessment of RPD results overall; refer Section Q2.1
2 qualitative assessment of RPD results overall; refer Section Q2.2
3. Trip spike results between for BTEX 84% and 99%
4. Trip blank results for BTEX <PQL

Table Q3: Laboratory QC

Item	Frequency	Acceptance Criteria	Achievement
Analytical laboratories used		NATA accreditation	yes
Holding times		In accordance with NEPC (2013) which references various Australian and international standards	yes
Laboratory / Reagant Blanks	1 per lab batch	<PQL	yes
Laboratory duplicates	10% primary samples	Laboratory specific [1]	
Matrix Spikes	1 per lab batch	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	yes
Surrogate Spikes	organics by GC	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	yes
Control Samples	1 per lab batch	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	yes

In summary, the QC data is considered to be of sufficient quality to be acceptable for the assessment.

Q2.1 Laboratory Replicates

Intra-laboratory replicates were analysed as an internal check of the reproducibility within the primary laboratory ELS and as a measure of consistency of sampling techniques. The comparative results of analysis between original and intra-laboratory replicate samples are summarised in Table Q4.

Note that, where both samples are below LOR/PQL the difference and RPD has been given as zero. Where one sample is reported below LOR/PQL, but a concentration is reported for the other, the LOR/PQL value has been used for calculation of the RPD for the less than LOR/PQL sample.

Table Q4: Relative Percentage Difference Results- Intralab

ChemName	5/0-0.1	BD2/20180725	RPD	4/0-0.1	BD4/20180725	RPD
Arsenic	<4.0	<4.0	0	<4.0	<4.0	0
Cadmium	<0.4	<0.4	0	<0.4	<0.4	0
Chromium (III+VI)	6.0	7.0	15	6.0	7.0	15
Copper	53.0	70.0	28	16.0	20.0	22
Lead	20.0	16.0	22	**14.0**	**24.0**	**53**
Mercury	<0.1	<0.1	0	0.1	0.2	67
Nickel	6.0	5.0	18	14.0	12.0	15
Zinc	31.0	30.0	3	**33.0**	**61.0**	**60**
C10-C16	<50.0	<50.0	0	<50.0	<50.0	0
C16-C34	540.0	730.0	30	<100.0	150.0	40
C34-C40	670.0	890.0	28	<100.0	130.0	26
F2-NAPHTHALENE	<50.0	<50.0	0	<50.0	<50.0	0
C6 - C9	<25.0	<25.0	0	<25.0	<25.0	0
C10 - C14	<50.0	<50.0	0	<50.0	<50.0	0
C15 - C28	150.0	200.0	29	<100.0	<100.0	0
C29-C36	560.0	760.0	30	<100.0	140.0	33
C10 - C40 (Sum of total)	1200.0	1600.0	29	**<50.0**	**280.0**	**139**
C6-C10 less BTEX (F1)	<25.0	<25.0	0	<25.0	<25.0	0
C6-C10	<25.0	<25.0	0	<25.0	<25.0	0
Benzene	<0.2	<0.2	0	<0.2	<0.2	0
Ethylbenzene	<1.0	<1.0	0	<1.0	<1.0	0
Toluene	<0.5	<0.5	0	<0.5	<0.5	0
Xylene (m & p)	<2.0	<2.0	0	<2.0	<2.0	0
Xylene (o)	<1.0	<1.0	0	<1.0	<1.0	0
Xylene Total	<1.0	<1.0	0	<1.0	<1.0	0
Acenaphthene	<0.1	<0.1	0	<0.1	<0.1	0
Acenaphthylene	<0.1	<0.1	0	<0.1	0.2	**67**
Anthracene	<0.1	<0.1	0	<0.1	0.2	**67**
Benz(a)anthracene	<0.1	0.1	0	**<0.1**	**1.2**	**169**
Benzo(a) pyrene	<0.05	<0.05	0	**0.06**	**1.1**	**179**
Benzo(g,h,i)perylene	<0.1	<0.1	0	**<0.1**	**0.5**	**133**
Chrysene	<0.1	<0.1	0	**<0.1**	**1.0**	**164**
Dibenz(a,h)anthracene	<0.1	<0.1	0	<0.1	0.1	0
Fluoranthene	<0.1	<0.1	0	**0.2**	**2.2**	**167**
Fluorene	<0.1	<0.1	0	<0.1	<0.1	0
Indeno(1,2,3-c,d)pyrene	<0.1	<0.1	0	**<0.1**	**0.4**	**120**
Naphthalene	<1.0	<1.0	0	<1.0	<1.0	0
Naphthalene	<0.1	<0.1	0	<0.1	<0.1	0
Phenanthrene	<0.1	<0.1	0	**0.1**	**0.6**	**143**
Pyrene	<0.1	<0.1	0	**0.1**	**2.3**	**183**

The calculated RPD values were within the acceptable range of ± 30 for inorganic analytes and ± 50% for organics with the with the exception of those shaded. However, this is not considered to be significant because: The number of replicate pairs being collected from fill soils which were heterogeneous in nature;

- Soil replicates, rather than homogenised soil duplicates, were used to minimise the risk of possible volatile loss, hence greater variability can be expected;
- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the DQIs.

Overall, the intra-laboratory replicate comparisons indicate that the sampling techniques were generally consistent and repeatable.

Q2.1.1 Inter-Laboratory Analysis

Inter-laboratory replicates were conducted as a check of the reproducibility of results between the primary laboratory ELS and the secondary laboratory ALS and as a measure of consistency of sampling techniques.

The comparative results of analysis between original and inter-laboratory replicate samples are summarised in Table Q5.

Note that, where both samples are below LOR/PQL the difference and RPD has been given as zero. Where one sample is reported below LOR/PQL, but a concentration is reported for the other, the LOR/PQL value has been used for calculation of the RPD for the less than LOR/PQL sample.

Table Q5: Relative Percentage Difference Results

	1/0.1	BD1/20180725	Difference	RPD
As	<4	<5	0	0
Cd	<0.4	<1	0	0
Cr	7	4	3	55
Cu	23	13	10	56
Pb	35	28	7	22
Hg	<0.1	<0.1	0	0
Ni	5	2	3	86
Zn	80	71	9	12
total [b]	1.55	<7.5	0	0
BaP TEQ	<0.5	0.6	0	0
BaP	0.2	<0.5	0	0
Naphthalene	<0.1	<0.5	0	0
C_6 - C_9	<25	<10	0	0

	1/0.1	BD1/20180725	Difference	RPD
C6-C10	<25	<10	0	0
>C10-C16	<50	<50	0	0
F1 - C6 – C10 less BTEX	<25	<10	0	0
F2 - >C10-C16 less naphthalene	<50	<50	0	0
>C16-C34	<100	<100	0	0
>C34-C40	<100	<100	0	0
Benzene	<0.2	<0.2	0	0
Toluene	<0.5	<0.5	0	0
Ethylbenzene	<1	<0.5	0	0
xylene	<1	<0.5	0	0

The calculated RPD values were within the acceptable range of ± 30 for inorganic analytes and ± 50% for organics with the exception of those shaded. However, this is not considered to be significant because: The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred. High RPD values reflect the small differences between two small numbers;

- The number of replicate pairs being collected from fill soils which were heterogeneous in nature;
- Soil replicates, rather than homogenised duplicates, were used to minimise the risk of volatile loss, hence greater variability can be expected;
- Most of the recorded concentrations being relatively close to the LOR/PQL. High RPD values reflect the low concentrations;
- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the DQIs.

The overall inter-laboratory replicate comparisons indicate that the sampling technique was generally consistent and repeatable and the two laboratory sampling handling and analytical methods are comparable.

Q3. Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs):

- Completeness – a measure of the amount of usable data from a data collection activity;

- Comparability – the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness – the confidence (qualitative) of data representativeness of media present on-site;
- Precision – a measure of variability or reproducibility of data; and
- Accuracy – a measure of closeness of the data to the 'true' value.

The DQIs were assessed as outlined in the following Table Q6.

Table Q6: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Planned systematic and selected target locations sampled; Preparation of field logs, sample location plan and chain of custody (COC) records; Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody; Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM); Completion of COC documentation; NATA endorsed laboratory certificates provided by the laboratory; Satisfactory frequency and results for field and laboratory QC samples as discussed in Section Q2.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project; Works undertaken by appropriately experienced and trained DP environmental scientist / engineer; Use of NATA registered laboratories, with test methods the same or similar between laboratories; Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled; Spatial distribution of sample locations; Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs; Samples were extracted and analysed within holding times; Samples were analysed in accordance with the analysis request.

Data Quality Indicator	Method(s) of Achievement
Precision	Acceptable RPD between original samples and replicates; Satisfactory results for all other field and laboratory QC samples.
Accuracy	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been complied with. As such, it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.