

CERTIFICATE OF ANALYSIS

112191-A

Client:

CH2MHILL
PO Box 5392
Chatswood
NSW 1515

Attention: Susan Barnes

Sample log in details:

Your Reference:	490810, St George Hospital
No. of samples:	Additional Testing on 1 Soil
Date samples received / completed instructions received	26/06/14 / 01/07/14

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: / Issue Date:	2/07/14 / 2/07/14
Date of Preliminary Report:	Not Issued

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

Results Approved By:



Jacinta Hurst
Laboratory Manager

Metals in TCLP USEPA1311		
Our Reference:	UNITS	112191-A-2
Your Reference	-----	BH406
Depth	-----	0.4-0.5
Date Sampled		25/06/2014
Type of sample		Soil
Date extracted	-	02/07/2014
Date analysed	-	02/07/2014
pH of soil for fluid# determ.	pH units	8.2
pH of soil for fluid # determ. (acid)	pH units	1.4
Extraction fluid used	-	1
pH of final Leachate	pH units	5.1
Lead in TCLP	mg/L	0.2

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 490810, St George Hospital

QUALITYCONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			02/07/2 014	[NT]	[NT]	LCS-W1	02/07/2014
Date analysed	-			02/07/2 014	[NT]	[NT]	LCS-W1	02/07/2014
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	100%
QUALITYCONTROL Metals in TCLP USEPA1311	UNITS	Dup. Sm#		Duplicate Base + Duplicate + %RPD		Spike Sm#	Spike % Recovery	
Date extracted	-	[NT]		[NT]		112191-A-2	02/07/2014	
Date analysed	-	[NT]		[NT]		112191-A-2	02/07/2014	
Lead in TCLP	mg/L	[NT]		[NT]		112191-A-2	98%	

Report Comments:

Asbestos ID was analysed by Approved Identifier:
Asbestos ID was authorised by Approved Signatory:

Matt Mansfield
Not applicable for this job

INS: Insufficient sample for this test
NA: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

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.

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 and 10-140% for SVOC 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.

Aileen Hie

From: Tracey.Main@ch2m.com
Sent: Tuesday, 1 July 2014 1:40 PM
To: Aileen Hie
Subject: TCLP Request - 490810 St George Hospital

Hi Aileen

Would you please arrange to schedule a TCLP test for the following samples? For turnaround time we need the results as soon as possible.

Sample Code	Sample ID	Analyte	Sampled Date
112191-2	BH406_0.4-0.5	Lead	25/06/2014
111995-3	BH502_0.23	Benzo(a) pyrene	21/06/2014
111995-14	BH507_0.2	Nickel	21/06/2014
111995-18	BH509_0.25	Lead	21/06/2014

If you have any question please do not hesitate to contact me on (02) 9950 0285

Regards

Tracey Main
Graduate Environmental Engineer, Environment & Nuclear

CH2M HILL
Level 7, 9 Help Street,
Chatswood, NSW 2067, Australia
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Direct +61 2 9950 0285
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* EnviroLab Ref: 111995A

Due: 2/7/14

1 day T/A.

CERTIFICATE OF ANALYSIS

111995-A

Client:

CH2MHILL
PO Box 5392
Chatswood
NSW 1515

Attention: Tracey Main, Susan Barnes

Sample log in details:

Your Reference:	490810, St George Hospital
No. of samples:	Additional Testing on 3 Soils
Date samples received / completed instructions received	23/06/2014 / 01/07/14

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: / Issue Date:	2/07/14 / 2/07/14
Date of Preliminary Report:	Not Issued

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Results Approved By:



Jacinta Hurst
Laboratory Manager

Metals in TCLP USEPA 1311		111995-A-3	111995-A-14	111995-A-18
Our Reference:	UNITS			
Your Reference	-----	BH502	BH507	BH509
Depth	-----	0.23	0.2	0.25
Date Sampled		21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil
Date extracted	-	02/07/2014	02/07/2014	02/07/2014
Date analysed	-	[NA]	02/07/2014	02/07/2014
pH of soil for fluid# determ.	pH units	9.6	7.8	8.9
pH of soil for fluid # determ. (acid)	pH units	1.5	1.5	1.5
Extraction fluid used	-	1	1	1
pH of final Leachate	pH units	5.0	4.9	4.9
Lead in TCLP	mg/L	[NA]	[NA]	0.2
Nickel in TCLP	mg/L	[NA]	0.1	[NA]

PAHs in TCLP (USEPA 1311)	UNITS	111995-A-3
Our Reference:	-----	BH502
Your Reference	-----	0.23
Depth		21/06/2014
Date Sampled		Soil
Type of sample		
Date extracted	-	02/07/2014
Date analysed	-	02/07/2014
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(b+k)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 <i>p</i> -Terphenyl-d14	%	105

MethodID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	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.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

Client Reference: 490810, St George Hospital

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Metals in TCLP USEPA1311						Base II Duplicate II %RPD		
Date extracted	-			02/07/2014	111995-A-14	02/07/2014 02/07/2014	LCS-W1	02/07/2014
Date analysed	-			02/07/2014	111995-A-14	02/07/2014 02/07/2014	LCS-W1	02/07/2014
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	[NR]	[NR]
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	111995-A-14	0.1 0.1 RPD: 0	LCS-W1	100%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in TCLP (USEPA 1311)						Base II Duplicate II %RPD		
Date extracted	-			02/07/2014	[NT]	[NT]	LCS-W1	02/07/2014
Date analysed	-			02/07/2014	[NT]	[NT]	LCS-W1	02/07/2014
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	97%
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	101%
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	100%
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	97%
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	98%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	94%
Benzo(b+k)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	111%
Indeno(1,2,3-c,d)pyrene -TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	73	[NT]	[NT]	LCS-W1	107%

Report Comments:

Asbestos ID was analysed by Approved Identifier: Not applicable for this job
Asbestos ID was authorised by Approved Signatory: Not applicable for this job

INS: Insufficient sample for this test
NA: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

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.

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 and 10-140% for SVOC 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.



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

SAMPLE RECEIPT ADVICE

Client:

CH2MHILL
PO Box 5392
Chatswood NSW 1515

ph: 02 9950 0200
Fax: 02 9950 0600

Attention: Tracey Main, Susan Barnes

Sample log in details:

Your reference:	490810, St George Hospital
Envirolab Reference:	112022
Date received:	24/06/2014
Date results expected to be reported:	26/06/14

Samples received in appropriate condition for analysis:	YES
No. of samples provided	3 Materials
Turnaround time requested:	48hr
Temperature on receipt (°C)	NA
Cooling Method:	Not applicable
Sampling Date Provided:	

Comments:

If there is sufficient sample after testing, samples will be held for the following time frames from date of receipt of samples:
Water samples - 1 month
Soil and other solid samples - 2 months
Samples collected in canisters - 1 week. Canisters will then be cleaned.
All other samples are not retained after analysis
If you require samples to be retained for longer periods then retention fees will apply as per our pricelist.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

CERTIFICATE OF ANALYSIS 112022

Client:

CH2MHILL
PO Box 5392
Chatswood
NSW 1515

Attention: Tracey Main, Susan Barnes

Sample log in details:

Your Reference:	<u>490810, St George Hospital</u>
No. of samples:	3 Materials
Date samples received:	24/06/2014
Date completed instructions received:	24/06/2014

Analysis Details:

Please refer to the following pages for results and methodology summary.

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

Note, even after disintegration it can be difficult to detect the presence of asbestos in some asbestos containing bulk materials using PLM and dispersion staining. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.

Report Details:

Date results requested by:	26/06/14
Date of Preliminary Report:	Not Issued
Issue Date:	25/06/14

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Tests not covered by NATA are denoted with *.

Results Approved By:

Asbestos was analysed by Approved Identifier:	Paul Ching
Asbestos was authorised by Approved Signatory:	Paul Ching



Paul Ching
Approved Signatory

Envirolab Ref:	Sample ID:	Date analysed	Mass / Dimension of Sample	Sample Description	Asbestos ID in materials
-	-	-	-	-	-
112022-1	BH501-0.7	25/06/2014	60x50x2mm	Grey flexible vinyl material	No asbestos detected
112022-2	PACM1	25/06/2014	135x55x7mm	Assorted fibre cement material	Chrysotile asbestos detected Amosite asbestos detected
112022-3	PACM2	25/06/2014	90x60x17mm	Beige compressed fibre cement material	Chrysotile asbestos detected



MethodID	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.



Job: SB 128955

1-2

3

Soil 1

Wet

Matrix

250 JAR

125 JAR

BAG

1L UP P

500 UP P

250 ZnAcetate P

100 250 / 500 NaOH BP

1

125 / 250 UP P

125 / 250 Metal Total*

125 / 250 Metal Filtered*

1

125 HCl P

100 1L UP AG

1

500 / 1L H₂SO₄ AG

125 / 250 H₂SO₄ P

100 / 200 UP AG

40 NaThio GV

250 UP OPAQUE P

500 NaThio STERILE P

200 NaThio STERILE P

2

240ml HCl Vial

Storage Location

Bottles Supplied By

Comment

S396 BAWRS

W182

Filed

Cooling Method

Ice

Temp

7.6

Good Order

Y / N

Clearly Labelled

Y / N

Correct Pres.

Y / N

No Head-space

Y / N / NA

Sufficient Vol

Y / N

Doc Date

28/06

Doc Type

COC

Complete Docs

Y / N

Requested TAT



SAMPLE RECEIPT ADVICE

SE128955

CLIENT DETAILS

Contact Susan Barnes
Client CH2M HILL AUSTRALIA PTY LTD
Address Level 7
9 Help Street
NSW 2067

Telephone 02 9950 0200 / 03 9856 4843
Facsimile 02 9950 0600
Email susan.barnes@ch2m.com.au

Project **490810 - St George Hospital**
Order Number **ENVI - 2KNPDF**
Samples 3

LABORATORY DETAILS

Manager Huong Crawford
Laboratory SGS Alexandria Environmental
Address Unit 16, 33 Maddox St
Alexandria NSW 2015

Telephone +61 2 8594 0400
Facsimile +61 2 8594 0499
Email au.environmental.sydney@sgs.com

Samples Received Mon 23/6/2014
Report Due Tue 1/7/2014
SGS Reference **SE128955**

SUBMISSION DETAILS

This is to confirm that 3 samples were received on Monday 23/6/2014. Results are expected to be ready by Tuesday 1/7/2014. Please quote SGS reference SE128955 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	2 Soils & 1 Water	Type of documentation received	COC
Date documentation received	23/6/2014	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	7.6°C
Sample container provider	Other Lab	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice	Samples clearly labelled	Yes
Complete documentation received	Yes	Number of eskies/boxes received	

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

Samples received at SGS on 24/6/14@4.40pm. Samples were not registered until the next working day.
A separate portion was not supplied for Asbestos analysis. A sub-sample will be used from the jar provided.

To the extent not inconsistent with the other provisions of this document and unless specifically agreed otherwise in writing by SGS, all SGS services are rendered in accordance with the applicable SGS General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions/General-Conditions-of-Services-English.aspx> as at the date of this document. Attention is drawn to the limitations of liability and to the clauses of indemnification.

CLIENT DETAILS

Client **CH2M HILL AUSTRALIA PTY LTD**

Project **490810 - St George Hospital**

SUMMARY OF ANALYSIS

No.	Sample ID	PAH (Polynuclear Aromatic Hydrocarbons) in	PCBs in Soil	pH in soil (1:5)	Total Cyanide in soil by Discrete Analyser	Total Recoverable Metals in Soil by ICPOES from	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	QC301	25	11	1	3	8	9	12	8
002	QC302	25	11	1	3	8	9	12	8

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document. The numbers shown in the table indicate the number of results requested in each package. Please indicate as soon as possible should your request differ from these details. Testing as per this table shall commence immediately unless the client intervenes with a correction.

CLIENT DETAILS

Client **CH2M HILL AUSTRALIA PTY LTD**

Project **490810 - St George Hospital**

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content	PAH (Polynuclear Aromatic Hydrocarbons) in	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	QC301	2	1	1	-	-	-	-
002	QC302	2	1	1	-	-	-	-
003	QC102	-	-	-	22	9	12	8

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document. The numbers shown in the table indicate the number of results requested in each package. Please indicate as soon as possible should your request differ from these details. Testing as per this table shall commence immediately unless the client intervenes with a correction.



SAMPLE RECEIPT ADVICE

SE128955

CLIENT DETAILS

Client CH2M HILL AUSTRALIA PTY LTD

Project 490810 - St George Hospital

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	Total Cyanide in water by Discrete Analyser	Trace Metals (Dissolved) in Water by ICPMS
003	QC102	1	1	8

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document. The numbers shown in the table indicate the number of results requested in each package. Please indicate as soon as possible should your request differ from these details. Testing as per this table shall commence immediately unless the client intervenes with a correction.

CLIENT DETAILS

Contact **Susan Barnes**
 Client **CH2M HILL AUSTRALIA PTY LTD**
 Address **Level 7
 9 Help Street
 NSW 2067**

Telephone **02 9950 0200 / 03 9856 4843**
 Facsimile **02 9950 0600**
 Email **susan.barnes@ch2m.com.au**

Project **490810 - St George Hospital**
 Order Number **ENVI - 2KNPDF**
 Samples **3**

LABORATORY DETAILS

Manager **Huong Crawford**
 Laboratory **SGS Alexandria Environmental**
 Address **Unit 16, 33 Maddox St
 Alexandria NSW 2015**

Telephone **+61 2 8594 0400**
 Facsimile **+61 2 8594 0499**
 Email **au.environmental.sydney@sgs.com**

SGS Reference **SE128955 R0**
 Report Number **0000086063**
 Date Reported **01 Jul 2014**
 Date Received **23 Jun 2014**

COMMENTS

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

No respirable fibres detected in all samples using trace analysis technique.

Asbestos analysed by Approved Identifier Ravee Sivasubramaniam.

SIGNATORIES



Andy Sutton
Senior Organic Chemist



Dong Liang
Metals/Inorganics Team Leader



Huong Crawford
Production Manager



Jaimie Cheung
Metals Chemist



Kamrul Ahsan
Senior Chemist



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Organic Section Head

	Sample Number	SE128955.001	SE128955.002	SE128955.003
	Sample Matrix	Soil	Soil	Water
	Sample Date	21 Jun 2014	21 Jun 2014	21 Jun 2014
	Sample Name	QC301	QC302	QC102
Parameter	Units	LOR		

VOC's in Soil Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Benzene	mg/kg	0.1	<0.1	<0.1	-
Toluene	mg/kg	0.1	<0.1	<0.1	-
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	-
m/p-xylene	mg/kg	0.2	<0.2	<0.2	-
o-xylene	mg/kg	0.1	<0.1	<0.1	-

Polycyclic VOCs

Naphthalene	mg/kg	0.1	<0.1	<0.1	-
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Surrogates

Dibromofluoromethane (Surrogate)	%	-	110	89	-
d4-1,2-dichloroethane (Surrogate)	%	-	99	104	-
d8-toluene (Surrogate)	%	-	83	82	-
Bromofluorobenzene (Surrogate)	%	-	99	113	-

Totals

Total Xylenes*	mg/kg	0.3	<0.3	<0.3	-
Total BTEX*	mg/kg	0.6	<0.6	<0.6	-

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434/AN410

TRH C6-C10	mg/kg	25	<25	<25	-
TRH C6-C9	mg/kg	20	<20	<20	-

Surrogates

Dibromofluoromethane (Surrogate)	%	-	110	89	-
d4-1,2-dichloroethane (Surrogate)	%	-	99	104	-
d8-toluene (Surrogate)	%	-	83	82	-
Bromofluorobenzene (Surrogate)	%	-	99	113	-

VPH F Bands

Benzene (F0)	mg/kg	0.1	<0.1	<0.1	-
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	-

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

TRH C10-C14	mg/kg	20	<20	<20	-
TRH C15-C28	mg/kg	45	<45	<45	-
TRH C29-C36	mg/kg	45	<45	<45	-
TRH C37-C40	mg/kg	100	<100	<100	-
TRH C10-C36 Total	mg/kg	110	<110	<110	-
TRH C10-C40 Total	mg/kg	210	<210	<210	-

TRH F Bands

TRH >C10-C16 (F2)	mg/kg	25	<25	<25	-
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	-
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-

Parameter	Units	LOR	SE128955.001 Soil 21 Jun 2014 QC301	SE128955.002 Soil 21 Jun 2014 QC302	SE128955.003 Water 21 Jun 2014 QC102
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PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Naphthalene	mg/kg	0.1	<0.1	<0.1	-
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	-
Acenaphthene	mg/kg	0.1	<0.1	<0.1	-
Fluorene	mg/kg	0.1	<0.1	<0.1	-
Phenanthrene	mg/kg	0.1	0.1	0.2	-
Anthracene	mg/kg	0.1	<0.1	<0.1	-
Fluoranthene	mg/kg	0.1	0.3	0.3	-
Pyrene	mg/kg	0.1	0.3	0.4	-
Benzo(a)anthracene	mg/kg	0.1	0.2	0.2	-
Chrysene	mg/kg	0.1	0.1	0.2	-
Benzo(b&j)fluoranthene	mg/kg	0.1	0.2	0.2	-
Benzo(k)fluoranthene	mg/kg	0.1	0.1	0.1	-
Benzo(a)pyrene	mg/kg	0.1	0.2	0.2	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.1	0.2	-
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	-
Benzo(ghi)perylene	mg/kg	0.1	0.1	0.1	-
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	TEQ	0.2	0.2	0.3	-
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	TEQ (mg/kg)	0.3	0.3	0.4	-
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	TEQ (mg/kg)	0.2	0.3	0.3	-
Total PAH	mg/kg	0.8	1.7	2.1	-

Surrogates

d5-nitrobenzene (Surrogate)	%	-	88	92	-
2-fluorobiphenyl (Surrogate)	%	-	92	94	-
d14-p-terphenyl (Surrogate)	%	-	114	114	-

PCBs in Soil Method: AN400/AN420

Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	-
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-
Total PCBs (Arochlors)	mg/kg	1	<1	<1	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	105	117	-
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pH in soil (1:5) Method: AN101

pH	pH Units	-	8.6	6.7	-
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Total Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

Total Cyanide	mg/kg	0.5	<0.5	<0.5	-
Total Cyanide Post Chlorination	mg/kg	0.5	-	-	-
Cyanide Amenable to Chlorination	mg/kg	0.5	-	-	-

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Arsenic, As	mg/kg	3	6	6	-
Cadmium, Cd	mg/kg	0.3	0.3	<0.3	-
Chromium, Cr	mg/kg	0.3	11	8.5	-
Copper, Cu	mg/kg	0.5	37	19	-
Lead, Pb	mg/kg	1	110	87	-
Nickel, Ni	mg/kg	0.5	4.1	3.3	-

	Sample Number	SE128955.001	SE128955.002	SE128955.003
	Sample Matrix	Soil	Soil	Water
	Sample Date	21 Jun 2014	21 Jun 2014	21 Jun 2014
	Sample Name	QC301	QC302	QC102
Parameter	Units	LOR		

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320 (continued)

Zinc, Zn	mg/kg	0.5	120	110	-
Silver, Ag ⁺	mg/kg	1	<1	<1	-

Mercury in Soil Method: AN312

Mercury	mg/kg	0.01	0.14	0.12	-
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Fibre Identification in soil Method: AN602

FibreID

Asbestos Detected	No unit	-	No	No	-
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SemiQuant

Estimated Fibres	%w/w	0.01	<0.01	<0.01	-
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Moisture Content Method: AN002

% Moisture	%	0.5	10	11	-
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VOCs in Water Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Benzene	µg/L	0.5	-	-	<0.5
Toluene	µg/L	0.5	-	-	<0.5
Ethylbenzene	µg/L	0.5	-	-	<0.5
m/p-xylene	µg/L	1	-	-	<1
o-xylene	µg/L	0.5	-	-	<0.5

Polycyclic VOCs

Naphthalene	µg/L	0.5	-	-	<0.5
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Surrogates

Dibromofluoromethane (Surrogate)	%	-	-	-	108
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	111
d8-toluene (Surrogate)	%	-	-	-	100
Bromofluorobenzene (Surrogate)	%	-	-	-	86

Totals

Total Xylenes	µg/L	1.5	-	-	<1.5
Total BTEX	µg/L	3	-	-	<3

Parameter	Units	LOR	Sample Number	SE128955.001	SE128955.002	SE128955.003
			Sample Matrix	Soil	Soil	Water
			Sample Date	21 Jun 2014	21 Jun 2014	21 Jun 2014
			Sample Name	QC301	QC302	QC102

Volatile Petroleum Hydrocarbons in Water Method: AN433/AN434/AN410

TRH C6-C10	µg/L	50	-	-	<50
TRH C6-C9	µg/L	40	-	-	<40

Surrogates

Dibromofluoromethane (Surrogate)	%	-	-	-	108
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	111
d8-toluene (Surrogate)	%	-	-	-	100
Bromofluorobenzene (Surrogate)	%	-	-	-	86

VPH F Bands

Benzene (F0)	µg/L	0.5	-	-	<0.5
TRH C6-C10 minus BTEX (F1)	µg/L	50	-	-	<50

TRH (Total Recoverable Hydrocarbons) in Water Method: AN403

TRH C10-C14	µg/L	50	-	-	<50
TRH C15-C28	µg/L	200	-	-	<200
TRH C29-C36	µg/L	200	-	-	<200
TRH C37-C40	µg/L	200	-	-	<200
TRH C10-C36	µg/L	450	-	-	<450
TRH C10-C40	µg/L	650	-	-	<650

TRH F Bands

TRH >C10-C16 (F2)	µg/L	60	-	-	<60
TRH >C16-C34 (F3)	µg/L	500	-	-	<500
TRH >C34-C40 (F4)	µg/L	500	-	-	<500

PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: AN420

Naphthalene	µg/L	0.1	-	-	<0.1
2-methylnaphthalene	µg/L	0.1	-	-	<0.1
1-methylnaphthalene	µg/L	0.1	-	-	<0.1
Acenaphthylene	µg/L	0.1	-	-	<0.1
Acenaphthene	µg/L	0.1	-	-	<0.1
Fluorene	µg/L	0.1	-	-	<0.1
Phenanthrene	µg/L	0.1	-	-	<0.1
Anthracene	µg/L	0.1	-	-	<0.1
Fluoranthene	µg/L	0.1	-	-	<0.1
Pyrene	µg/L	0.1	-	-	<0.1
Benzo(a)anthracene	µg/L	0.1	-	-	<0.1
Chrysene	µg/L	0.1	-	-	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	-	-	<0.1
Benzo(k)fluoranthene	µg/L	0.1	-	-	<0.1
Benzo(a)pyrene	µg/L	0.1	-	-	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	-	-	<0.1
Dibenzo(a&h)anthracene	µg/L	0.1	-	-	<0.1
Benzo(ghi)perylene	µg/L	0.1	-	-	<0.1
Total PAH (18)	µg/L	1	-	-	<1

Surrogates

d5-nitrobenzene (Surrogate)	%	-	-	-	72
2-fluorobiphenyl (Surrogate)	%	-	-	-	74
d14-p-terphenyl (Surrogate)	%	-	-	-	94

Total Cyanide in water by Discrete Analyser (Aquakem) Method: AN077/AN287

Total Cyanide	mg/L	0.004	-	-	<0.004
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	Sample Number	SE128955.001	SE128955.002	SE128955.003
	Sample Matrix	Soil	Soil	Water
	Sample Date	21 Jun 2014	21 Jun 2014	21 Jun 2014
	Sample Name	QC301	QC302	QC102
Parameter	Units	LOR		

Trace Metals (Dissolved) in Water by ICPMS Method: AN318

Arsenic, As	µg/L	1	-	-	<1
Cadmium, Cd	µg/L	0.1	-	-	<0.1
Chromium, Cr	µg/L	1	-	-	<1
Copper, Cu	µg/L	1	-	-	2
Lead, Pb	µg/L	1	-	-	<1
Nickel, Ni	µg/L	1	-	-	2
Silver, Ag	µg/L	1	-	-	<1
Zinc, Zn	µg/L	5	-	-	21

Mercury (dissolved) in Water Method: AN311/AN312

Mercury	mg/L	0.0001	-	-	<0.0001
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MB blank results are compared to the Limit of Reporting
 LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
 DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

Mercury (dissolved) in Water Method: ME-(AU)-[ENV]AN311/AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB059916	mg/L	0.0001	<0.0001	0%	110%	112%

Mercury in Soil Method: ME-(AU)-[ENV]AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB059863	mg/kg	0.01	<0.01	0 - 7%	105%	93%

Moisture Content Method: ME-(AU)-[ENV]AN002

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB059820	%	0.5	0 - 3%

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Naphthalene	LB059656	mg/kg	0.1	<0.1	0%	89%	90%	3%
2-methylnaphthalene	LB059656	mg/kg	0.1	<0.1	0%	NA	NA	NA
1-methylnaphthalene	LB059656	mg/kg	0.1	<0.1	0%	NA	NA	NA
Acenaphthylene	LB059656	mg/kg	0.1	<0.1	0%	94%	89%	1%
Acenaphthene	LB059656	mg/kg	0.1	<0.1	0%	101%	97%	1%
Fluorene	LB059656	mg/kg	0.1	<0.1	0%	NA	NA	NA
Phenanthrene	LB059656	mg/kg	0.1	<0.1	0%	87%	97%	2%
Anthracene	LB059656	mg/kg	0.1	<0.1	0%	92%	89%	6%
Fluoranthene	LB059656	mg/kg	0.1	<0.1	0%	79%	63%	1%
Pyrene	LB059656	mg/kg	0.1	<0.1	0%	98%	92%	8%
Benzo(a)anthracene	LB059656	mg/kg	0.1	<0.1	0%	NA	NA	NA
Chrysene	LB059656	mg/kg	0.1	<0.1	0%	NA	NA	NA
Benzo(b&j)fluoranthene	LB059656	mg/kg	0.1	<0.1	0%	NA	NA	NA
Benzo(k)fluoranthene	LB059656	mg/kg	0.1	<0.1	0%	NA	NA	NA
Benzo(a)pyrene	LB059656	mg/kg	0.1	<0.1	0%	105%	92%	2%
Indeno(1,2,3-cd)pyrene	LB059656	mg/kg	0.1	<0.1	0%	NA	NA	NA
Dibenzo(a&h)anthracene	LB059656	mg/kg	0.1	<0.1	0%	NA	NA	NA
Benzo(ghi)perylene	LB059656	mg/kg	0.1	<0.1	0%	NA	NA	NA
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	LB059656	TEQ	0.2	<0.2	0%	NA	NA	NA
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	LB059656	TEQ (mg/kg)	0.3	<0.3	0%	NA	NA	NA
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	LB059656	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA	NA
Total PAH	LB059656	mg/kg	0.8	<0.8	0%	NA	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
d5-nitrobenzene (Surrogate)	LB059656	%	-	92%	0%	86%	88%	9%
2-fluorobiphenyl (Surrogate)	LB059656	%	-	92%	2 - 4%	90%	90%	2%
d14-p-terphenyl (Surrogate)	LB059656	%	-	104%	2 - 12%	106%	94%	10%

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Naphthalene	LB059663	µg/L	0.1	<0.1	93%
2-methylnaphthalene	LB059663	µg/L	0.1	<0.1	NA
1-methylnaphthalene	LB059663	µg/L	0.1	<0.1	NA
Acenaphthylene	LB059663	µg/L	0.1	<0.1	90%
Acenaphthene	LB059663	µg/L	0.1	<0.1	93%
Fluorene	LB059663	µg/L	0.1	<0.1	NA
Phenanthrene	LB059663	µg/L	0.1	<0.1	95%
Anthracene	LB059663	µg/L	0.1	<0.1	93%
Fluoranthene	LB059663	µg/L	0.1	<0.1	93%
Pyrene	LB059663	µg/L	0.1	<0.1	93%
Benzo(a)anthracene	LB059663	µg/L	0.1	<0.1	NA
Chrysene	LB059663	µg/L	0.1	<0.1	NA
Benzo(b&j)fluoranthene	LB059663	µg/L	0.1	<0.1	NA
Benzo(k)fluoranthene	LB059663	µg/L	0.1	<0.1	NA
Benzo(a)pyrene	LB059663	µg/L	0.1	<0.1	118%
Indeno(1,2,3-cd)pyrene	LB059663	µg/L	0.1	<0.1	NA
Dibenzo(a&h)anthracene	LB059663	µg/L	0.1	<0.1	NA
Benzo(ghi)perylene	LB059663	µg/L	0.1	<0.1	NA
Total PAH (18)	LB059663	µg/L	1	<1	

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
d5-nitrobenzene (Surrogate)	LB059663	%	-	104%	92%
2-fluorobiphenyl (Surrogate)	LB059663	%	-	106%	100%
d14-p-terphenyl (Surrogate)	LB059663	%	-	118%	104%

PCBs in Soil Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Arochlor 1016	LB059656	mg/kg	0.2	<0.2	0%	NA
Arochlor 1221	LB059656	mg/kg	0.2	<0.2	0%	NA
Arochlor 1232	LB059656	mg/kg	0.2	<0.2	0%	NA
Arochlor 1242	LB059656	mg/kg	0.2	<0.2	0%	NA
Arochlor 1248	LB059656	mg/kg	0.2	<0.2	0%	NA
Arochlor 1254	LB059656	mg/kg	0.2	<0.2	0%	NA
Arochlor 1260	LB059656	mg/kg	0.2	<0.2	0%	107%
Arochlor 1262	LB059656	mg/kg	0.2	<0.2	0%	NA
Arochlor 1268	LB059656	mg/kg	0.2	<0.2	0%	NA
Total PCBs (Arochlors)	LB059656	mg/kg	1	<1	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB059656	%	-	88%	4%	96%

MB blank results are compared to the Limit of Reporting
 LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
 DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

pH in soil (1:5) Method: ME-(AU)-[ENV]AN101

Parameter	QC Reference	Units	LOR	DUP %RPD	LCS %Recovery
pH	LB059913	pH Units	-	0 - 1%	100%

Total Cyanide in soil by Discrete Analyser (Aquakem) Method: ME-(AU)-[ENV]AN077/AN287

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Total Cyanide	LB059801	mg/kg	0.5	<0.5	104%

Total Cyanide in water by Discrete Analyser (Aquakem) Method: ME-(AU)-[ENV]AN077/AN287

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Cyanide	LB059797	mg/L	0.004	<0.004	0%	98%

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: ME-(AU)-[ENV]AN040/AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB059807	mg/kg	3	<3	7 - 9%	100%	
Cadmium, Cd	LB059807	mg/kg	0.3	<0.3	0 - 6%	99%	
Chromium, Cr	LB059807	mg/kg	0.3	<0.3	2 - 9%	100%	
Copper, Cu	LB059807	mg/kg	0.5	<0.5	1 - 3%	98%	
Lead, Pb	LB059807	mg/kg	1	<1	0 - 6%	98%	
Nickel, Ni	LB059807	mg/kg	0.5	<0.5	11 - 14%	100%	84%
Zinc, Zn	LB059807	mg/kg	0.5	<0.5	7%	98%	80%
Silver, Ag*	LB059807	mg/kg	1	<1	0%	84%	

Trace Metals (Dissolved) in Water by ICPMS Method: ME-(AU)-[ENV]AN318

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB059727	µg/L	1	<1	0%	94%	94%
Cadmium, Cd	LB059727	µg/L	0.1	<0.1	0%	98%	97%
Chromium, Cr	LB059727	µg/L	1	<1	0%	103%	100%
Copper, Cu	LB059727	µg/L	1	<1	0 - 2%	100%	109%
Lead, Pb	LB059727	µg/L	1	<1	0%	100%	98%
Nickel, Ni	LB059727	µg/L	1	<1	0 - 2%	102%	98%
Silver, Ag	LB059727	µg/L	1	<1		87%	
Zinc, Zn	LB059727	µg/L	5	<5	0 - 1%	105%	109%

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

TRH (Total Recoverable Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C10-C14	LB059656	mg/kg	20	<20	0%	100%	105%
TRH C15-C28	LB059656	mg/kg	45	<45	0%	98%	100%
TRH C29-C36	LB059656	mg/kg	45	<45	0%	88%	118%
TRH C37-C40	LB059656	mg/kg	100	<100	0%	NA	NA
TRH C10-C36 Total	LB059656	mg/kg	110	<110	0%	NA	NA
TRH C10-C40 Total	LB059656	mg/kg	210	<210	0%	NA	NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH >C10-C16 (F2)	LB059656	mg/kg	25	<25	0%	98%	93%
TRH >C16-C34 (F3)	LB059656	mg/kg	90	<90	0%	98%	98%
TRH >C34-C40 (F4)	LB059656	mg/kg	120	<120	0%	80%	NA

TRH (Total Recoverable Hydrocarbons) in Water Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
TRH C10-C14	LB059663	µg/L	50	<50	82%
TRH C15-C28	LB059663	µg/L	200	<200	93%
TRH C29-C36	LB059663	µg/L	200	<200	93%
TRH C37-C40	LB059663	µg/L	200	<200	NA
TRH C10-C36	LB059663	µg/L	450	<450	NA
TRH C10-C40	LB059663	µg/L	650	<650	NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
TRH >C10-C16 (F2)	LB059663	µg/L	60	<60	87%
TRH >C16-C34 (F3)	LB059663	µg/L	500	<500	94%
TRH >C34-C40 (F4)	LB059663	µg/L	500	<500	95%

MB blank results are compared to the Limit of Reporting
 LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
 DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

VOC's in Soil Method: ME-(AU)-[ENV]AN433/AN434

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene	LB059678	mg/kg	0.1	<0.1	0%	107%	84%
Toluene	LB059678	mg/kg	0.1	<0.1	0%	111%	80%
Ethylbenzene	LB059678	mg/kg	0.1	<0.1	0%	106%	88%
m/p-xylene	LB059678	mg/kg	0.2	<0.2	0%	84%	77%
o-xylene	LB059678	mg/kg	0.1	<0.1	0%	82%	74%

Polycyclic VOCs

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB059678	mg/kg	0.1	<0.1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB059678	%	-	94%	6 - 7%	92%	83%
d4-1,2-dichloroethane (Surrogate)	LB059678	%	-	108%	4 - 9%	117%	112%
d8-toluene (Surrogate)	LB059678	%	-	120%	1 - 2%	110%	77%
Bromofluorobenzene (Surrogate)	LB059678	%	-	87%	4 - 6%	126%	111%

Totals

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Xylenes*	LB059678	mg/kg	0.3	<0.3	0%	NA	NA
Total BTEX*	LB059678	mg/kg	0.6	<0.6	0%	NA	NA

VOCs in Water Method: ME-(AU)-[ENV]AN433/AN434

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Benzene	LB059627	µg/L	0.5	<0.5	122%
Toluene	LB059627	µg/L	0.5	<0.5	123%
Ethylbenzene	LB059627	µg/L	0.5	<0.5	126%
m/p-xylene	LB059627	µg/L	1	<1	119%
o-xylene	LB059627	µg/L	0.5	<0.5	123%

Polycyclic VOCs

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Naphthalene	LB059627	µg/L	0.5	<0.5	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Dibromofluoromethane (Surrogate)	LB059627	%	-	81%	99%
d4-1,2-dichloroethane (Surrogate)	LB059627	%	-	118%	100%
d8-toluene (Surrogate)	LB059627	%	-	93%	99%
Bromofluorobenzene (Surrogate)	LB059627	%	-	82%	104%

Totals

Parameter	QC Reference	Units	LOR	MB
Total Xylenes	LB059627	µg/L	1.5	<1.5
Total BTEX	LB059627	µg/L	3	<3

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared to the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

Volatile Petroleum Hydrocarbons in Soil Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C6-C10	LB059678	mg/kg	25	<25	0 - 6%	94%	91%
TRH C6-C9	LB059678	mg/kg	20	<20	0%	97%	94%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB059678	%	-	94%	6 - 7%	92%	83%
d4-1,2-dichloroethane (Surrogate)	LB059678	%	-	108%	4 - 9%	117%	112%
d8-toluene (Surrogate)	LB059678	%	-	120%	1 - 2%	110%	77%
Bromofluorobenzene (Surrogate)	LB059678	%	-	87%	4 - 6%	126%	111%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene (F0)	LB059678	mg/kg	0.1	<0.1	0%	NA	NA
TRH C6-C10 minus BTEX (F1)	LB059678	mg/kg	25	<25	0 - 6%	88%	117%

Volatile Petroleum Hydrocarbons in Water Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
TRH C6-C10	LB059627	µg/L	50	<50	119%
TRH C6-C9	LB059627	µg/L	40	<40	113%

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Dibromofluoromethane (Surrogate)	LB059627	%	-	81%	99%
d4-1,2-dichloroethane (Surrogate)	LB059627	%	-	118%	100%
d8-toluene (Surrogate)	LB059627	%	-	93%	99%
Bromofluorobenzene (Surrogate)	LB059627	%	-	82%	104%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Benzene (F0)	LB059627	µg/L	0.5	<0.5	NA
TRH C6-C10 minus BTEX (F1)	LB059627	µg/L	50	<50	124%

METHOD

METHODOLOGY SUMMARY

AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN077	Hydrogen cyanide is liberated from an acidified alkali soil extract by distillation and purging with air. The hydrogen cyanide gas is then collected by passing it through a sodium hydroxide scrubbing solution. The scrubbing solution will then be analysed for cyanide by the appropriate method.
AN083	Separatory funnels are used for aqueous samples and extracted by transferring an appropriate volume (mass) of liquid into a separatory funnel and adding 3 serial aliquots of dichloromethane. Samples receive a single extraction at pH 7 to recover base / neutral analytes and two extractions at pH < 2 to recover acidic analytes. QC samples are prepared by spiking organic free water with target analytes and extracting as per samples.
AN088	Orbital rolling for Organic pollutants are extracted from soil/sediment by transferring an appropriate mass of sample to a clear soil jar and extracting with 1:1 Dichloromethane/Acetone. Orbital Rolling method is intended for the extraction of semi-volatile organic compounds from soil/sediment samples, and is based somewhat on USEPA method 3570 (Micro Organic extraction and sample preparation). Method 3700.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water (or 0.01M CaCl ₂) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN287	A buffered distillate or water sample is treated with chloramine/barbituric acid reagents and the intensity of the colour developed is proportional to the cyanide concentration by Aquakem DA.
AN311/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)

METHOD

METHODOLOGY SUMMARY

AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is not corrected for Naphthalene.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependant on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433/AN434	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN433/AN434/AN410	VOCs and C6-C9/C6-C10 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic 'clues', which provide a reasonable degree of certainty, dispersion staining is a mandatory 'clue' for positive identification. If sufficient 'clues' are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocally identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf).
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	This analysis is not covered by the scope of accreditation.	QFH	QC result is above the upper tolerance
**	Indicative data, theoretical holding time exceeded.	QFL	QC result is below the lower tolerance
^	Performed by outside laboratory.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
<http://www.sgs.com.au/pv.sgsv3/~media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf>

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Project **490810 - St George Hospital**
 Order Number **ENVI - 2KNPDF**
 Samples 3

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SGS Reference SE128955 R0
 Report Number 0000086064
 Date Reported 01 Jul 2014
 Date Received 23 Jun 2014

COMMENTS

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

No respirable fibres detected in all samples using trace analysis technique.

Asbestos analysed by Approved Identifier Ravee Sivasubramaniam.

SIGNATORIES



Andy Sutton
Senior Organic Chemist



Dong Liang
Metals/Inorganics Team Leader



Huong Crawford
Production Manager



Jaimie Cheung
Metals Chemist



Kamrul Ahsan
Senior Chemist



Ly Kim Ha
Organic Section Head

RESULTS

Fibre Identification in soil

Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w
SE128955.001	QC301	Soil	81g Sandy cement mixture	21 Jun 2014	No Asbestos Found	<0.01
SE128955.002	QC302	Soil	78g Sandy soil	21 Jun 2014	No Asbestos Found	<0.01

METHOD

METHODOLOGY SUMMARY

AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocally identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf).
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FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	Not Accredited
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client.

Where reported: 'Asbestos Detected': Asbestos detected by polarized light microscopy, including dispersion staining.

Where reported: 'No Asbestos Found': No Asbestos Found by polarized light microscopy, including dispersion staining.

Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarized light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : <http://www.sgs.com.au/pv.sgsv3/~media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf>

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Project **490810 - St George Hospital**
 Order Number **ENVI - 2KNPDF**
 Samples 3

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SGS Reference SE128955 R0
 Report Number 0000086066
 Date Reported 01 Jul 2014

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client. This QA/QC Statement must be read in conjunction with the referenced Analytical Report. The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

Sample counts by matrix	2 Soils & 1 Water	Type of documentation received	COC
Date documentation received	23/6/2014	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	7.6°C
Sample container provider	Other Lab	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice	Samples clearly labelled	Yes
Complete documentation received	Yes	Number of eskies/boxes received	

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059925	21 Jun 2014	23 Jun 2014	21 Jun 2015	30 Jun 2014	21 Jun 2015	01 Jul 2014
QC302	SE128955.002	LB059925	21 Jun 2014	23 Jun 2014	21 Jun 2015	30 Jun 2014	21 Jun 2015	01 Jul 2014

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC102	SE128955.003	LB059916	21 Jun 2014	23 Jun 2014	19 Jul 2014	30 Jun 2014	19 Jul 2014	01 Jul 2014

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059863	21 Jun 2014	23 Jun 2014	19 Jul 2014	27 Jun 2014	19 Jul 2014	01 Jul 2014
QC302	SE128955.002	LB059863	21 Jun 2014	23 Jun 2014	19 Jul 2014	27 Jun 2014	19 Jul 2014	01 Jul 2014

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059820	21 Jun 2014	23 Jun 2014	05 Jul 2014	27 Jun 2014	02 Jul 2014	30 Jun 2014
QC302	SE128955.002	LB059820	21 Jun 2014	23 Jun 2014	05 Jul 2014	27 Jun 2014	02 Jul 2014	30 Jun 2014

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059656	21 Jun 2014	23 Jun 2014	05 Jul 2014	25 Jun 2014	04 Aug 2014	01 Jul 2014
QC302	SE128955.002	LB059656	21 Jun 2014	23 Jun 2014	05 Jul 2014	25 Jun 2014	04 Aug 2014	01 Jul 2014

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC102	SE128955.003	LB059663	21 Jun 2014	23 Jun 2014	28 Jun 2014	25 Jun 2014	04 Aug 2014	01 Jul 2014

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059656	21 Jun 2014	23 Jun 2014	05 Jul 2014	25 Jun 2014	04 Aug 2014	01 Jul 2014
QC302	SE128955.002	LB059656	21 Jun 2014	23 Jun 2014	05 Jul 2014	25 Jun 2014	04 Aug 2014	01 Jul 2014

pH in soil (1:5)

Method: ME-(AU)-[ENV]AN101

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059913	21 Jun 2014	23 Jun 2014	28 Jun 2014	27 Jun 2014	28 Jun 2014	27 Jun 2014
QC302	SE128955.002	LB059913	21 Jun 2014	23 Jun 2014	28 Jun 2014	27 Jun 2014	28 Jun 2014	27 Jun 2014

Total Cyanide in soil by Discrete Analyser (AquaKem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059801	21 Jun 2014	23 Jun 2014	05 Jul 2014	27 Jun 2014	05 Jul 2014	30 Jun 2014
QC302	SE128955.002	LB059801	21 Jun 2014	23 Jun 2014	05 Jul 2014	27 Jun 2014	05 Jul 2014	30 Jun 2014

Total Cyanide in water by Discrete Analyser (AquaKem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC102	SE128955.003	LB059797	21 Jun 2014	23 Jun 2014	05 Jul 2014	27 Jun 2014	05 Jul 2014	27 Jun 2014

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059807	21 Jun 2014	23 Jun 2014	18 Dec 2014	27 Jun 2014	18 Dec 2014	30 Jun 2014
QC302	SE128955.002	LB059807	21 Jun 2014	23 Jun 2014	18 Dec 2014	27 Jun 2014	18 Dec 2014	30 Jun 2014

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC102	SE128955.003	LB059727	21 Jun 2014	23 Jun 2014	18 Dec 2014	26 Jun 2014	18 Dec 2014	27 Jun 2014

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059656	21 Jun 2014	23 Jun 2014	05 Jul 2014	25 Jun 2014	04 Aug 2014	01 Jul 2014
QC302	SE128955.002	LB059656	21 Jun 2014	23 Jun 2014	05 Jul 2014	25 Jun 2014	04 Aug 2014	01 Jul 2014

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref
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SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

TRH (Total Recoverable Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC102	SE128955.003	LB059663	21 Jun 2014	23 Jun 2014	28 Jun 2014	25 Jun 2014	04 Aug 2014	01 Jul 2014

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059678	21 Jun 2014	23 Jun 2014	05 Jul 2014	25 Jun 2014	04 Aug 2014	30 Jun 2014
QC302	SE128955.002	LB059678	21 Jun 2014	23 Jun 2014	05 Jul 2014	25 Jun 2014	04 Aug 2014	30 Jun 2014

VOCs in Water

Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC102	SE128955.003	LB059627	21 Jun 2014	23 Jun 2014	28 Jun 2014	24 Jun 2014	03 Aug 2014	30 Jun 2014

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC301	SE128955.001	LB059678	21 Jun 2014	23 Jun 2014	05 Jul 2014	25 Jun 2014	04 Aug 2014	30 Jun 2014
QC302	SE128955.002	LB059678	21 Jun 2014	23 Jun 2014	05 Jul 2014	25 Jun 2014	04 Aug 2014	30 Jun 2014

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC102	SE128955.003	LB059627	21 Jun 2014	23 Jun 2014	28 Jun 2014	24 Jun 2014	03 Aug 2014	26 Jun 2014

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	QC301	SE128955.001	%	60 - 130%	92
	QC302	SE128955.002	%	60 - 130%	94
d14-p-terphenyl (Surrogate)	QC301	SE128955.001	%	60 - 130%	114
	QC302	SE128955.002	%	60 - 130%	114
d5-nitrobenzene (Surrogate)	QC301	SE128955.001	%	60 - 130%	88
	QC302	SE128955.002	%	60 - 130%	92

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	QC102	SE128955.003	%	40 - 130%	74
d14-p-terphenyl (Surrogate)	QC102	SE128955.003	%	40 - 130%	94
d5-nitrobenzene (Surrogate)	QC102	SE128955.003	%	40 - 130%	72

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	QC301	SE128955.001	%	60 - 130%	105
	QC302	SE128955.002	%	60 - 130%	117

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QC301	SE128955.001	%	60 - 130%	99
	QC302	SE128955.002	%	60 - 130%	113
d4-1,2-dichloroethane (Surrogate)	QC301	SE128955.001	%	60 - 130%	99
	QC302	SE128955.002	%	60 - 130%	104
d8-toluene (Surrogate)	QC301	SE128955.001	%	60 - 130%	83
	QC302	SE128955.002	%	60 - 130%	82
Dibromofluoromethane (Surrogate)	QC301	SE128955.001	%	60 - 130%	110
	QC302	SE128955.002	%	60 - 130%	89

VOCs in Water

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QC102	SE128955.003	%	40 - 130%	86
d4-1,2-dichloroethane (Surrogate)	QC102	SE128955.003	%	40 - 130%	111
d8-toluene (Surrogate)	QC102	SE128955.003	%	40 - 130%	100
Dibromofluoromethane (Surrogate)	QC102	SE128955.003	%	40 - 130%	108

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QC301	SE128955.001	%	60 - 130%	99
	QC302	SE128955.002	%	60 - 130%	113
d4-1,2-dichloroethane (Surrogate)	QC301	SE128955.001	%	60 - 130%	99
	QC302	SE128955.002	%	60 - 130%	104
d8-toluene (Surrogate)	QC301	SE128955.001	%	60 - 130%	83
	QC302	SE128955.002	%	60 - 130%	82
Dibromofluoromethane (Surrogate)	QC301	SE128955.001	%	60 - 130%	110
	QC302	SE128955.002	%	60 - 130%	89

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QC102	SE128955.003	%	60 - 130%	86
d4-1,2-dichloroethane (Surrogate)	QC102	SE128955.003	%	60 - 130%	111
d8-toluene (Surrogate)	QC102	SE128955.003	%	60 - 130%	100
Dibromofluoromethane (Surrogate)	QC102	SE128955.003	%	60 - 130%	108

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Sample Number	Parameter	Units	LOR	Result
LB059916.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB059863.001	Mercury	mg/kg	0.01	<0.01

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB059656.001	Naphthalene	mg/kg	0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1	<0.1
	1-methylnaphthalene	mg/kg	0.1	<0.1
	Acenaphthylene	mg/kg	0.1	<0.1
	Acenaphthene	mg/kg	0.1	<0.1
	Fluorene	mg/kg	0.1	<0.1
	Phenanthrene	mg/kg	0.1	<0.1
	Anthracene	mg/kg	0.1	<0.1
	Fluoranthene	mg/kg	0.1	<0.1
	Pyrene	mg/kg	0.1	<0.1
	Benzo(a)anthracene	mg/kg	0.1	<0.1
	Chrysene	mg/kg	0.1	<0.1
	Benzo(a)pyrene	mg/kg	0.1	<0.1
	Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
	Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1
	Benzo(ghi)perylene	mg/kg	0.1	<0.1
	Total PAH	mg/kg	0.8	<0.8
Surrogates	d5-nitrobenzene (Surrogate)	%	-	92
	2-fluorobiphenyl (Surrogate)	%	-	92
	d14-p-terphenyl (Surrogate)	%	-	104

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB059663.001	Naphthalene	µg/L	0.1	<0.1
	2-methylnaphthalene	µg/L	0.1	<0.1
	1-methylnaphthalene	µg/L	0.1	<0.1
	Acenaphthylene	µg/L	0.1	<0.1
	Acenaphthene	µg/L	0.1	<0.1
	Fluorene	µg/L	0.1	<0.1
	Phenanthrene	µg/L	0.1	<0.1
	Anthracene	µg/L	0.1	<0.1
	Fluoranthene	µg/L	0.1	<0.1
	Pyrene	µg/L	0.1	<0.1
	Benzo(a)anthracene	µg/L	0.1	<0.1
	Chrysene	µg/L	0.1	<0.1
	Benzo(a)pyrene	µg/L	0.1	<0.1
	Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
	Dibenzo(a&h)anthracene	µg/L	0.1	<0.1
	Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-
2-fluorobiphenyl (Surrogate)		%	-	106
d14-p-terphenyl (Surrogate)		%	-	118

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result
LB059656.001	Arochlor 1016	mg/kg	0.2	<0.2
	Arochlor 1221	mg/kg	0.2	<0.2
	Arochlor 1232	mg/kg	0.2	<0.2
	Arochlor 1242	mg/kg	0.2	<0.2
	Arochlor 1248	mg/kg	0.2	<0.2
	Arochlor 1254	mg/kg	0.2	<0.2

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result
LB059656.001	Arochlor 1260	mg/kg	0.2	<0.2
	Arochlor 1262	mg/kg	0.2	<0.2
	Arochlor 1268	mg/kg	0.2	<0.2
	Total PCBs (Arochlors)	mg/kg	1	<1
Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	88

Total Cyanide in soil by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result
LB059801.001	Total Cyanide	mg/kg	0.5	<0.5

Total Cyanide in water by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result
LB059797.001	Total Cyanide	mg/L	0.004	<0.004

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB059807.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5
	Silver, Ag*	mg/kg	1	<1

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB059727.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Silver, Ag	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB059656.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB059663.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number	Parameter	Units	LOR	Result	
LB059678.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
Surrogates	Dibromofluoromethane (Surrogate)	%	-	94	

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number	Parameter	Units	LOR	Result	
LB059678.001	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	108
		d8-toluene (Surrogate)	%	-	120
		Bromofluorobenzene (Surrogate)	%	-	87
	Totals	Total BTEX*	mg/kg	0.6	<0.6

VOCs in Water

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number	Parameter	Units	LOR	Result	
LB059627.001	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
	Polycyclic VOCs	o-xylene	µg/L	0.5	<0.5
		Naphthalene	µg/L	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	81
		d4-1,2-dichloroethane (Surrogate)	%	-	118
		d8-toluene (Surrogate)	%	-	93
		Bromofluorobenzene (Surrogate)	%	-	82

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number	Parameter	Units	LOR	Result	
LB059678.001	Surrogates	TRH C6-C9	mg/kg	20	<20
		Dibromofluoromethane (Surrogate)	%	-	94
		d4-1,2-dichloroethane (Surrogate)	%	-	108
		d8-toluene (Surrogate)	%	-	120

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number	Parameter	Units	LOR	Result	
LB059627.001	Surrogates	TRH C6-C9	µg/L	40	<40
		Dibromofluoromethane (Surrogate)	%	-	81
		d4-1,2-dichloroethane (Surrogate)	%	-	118
		d8-toluene (Surrogate)	%	-	93
		Bromofluorobenzene (Surrogate)	%	-	82

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = |OriginalResult - ReplicateResult| \times 100 / Mean$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times SDL / Mean + LR$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE129046.001	LB059916.009	Mercury	µg/L	0.0001	0	0	200	0

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128960.008	LB059863.014	Mercury	mg/kg	0.01	0.18	0.19	57	7
SE128988.001	LB059863.019	Mercury	mg/kg	0.01	<0.01	0.01	200	0

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128960.003	LB059820.011	% Moisture	%w/w	0.5	17.2	16.7	36	3
SE128973.001	LB059820.022	% Moisture	%	0.5	5.4	4.8	50	11
SE128988.001	LB059820.025	% Moisture	%	0.5	8.4	8.4	42	0

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128964.018	LB059656.016	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
		Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ	0.2	<0.2	<0.2	200	0
		<LOR=0*	TEQ (mg/kg)	0.2	<0.2	<0.2	200	0
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	<0.3	<0.3	134	0
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	<0.2	<0.2	175	0
		Total PAH	mg/kg	0.8	<0.8	<0.8	200	0
Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	30	0	
	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	2	
	d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	12	
SE128973.001	LB059656.025	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
		Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0		
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	200	0		

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = |OriginalResult - ReplicateResult| \times 100 / Mean$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times SDL / Mean + LR$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128973.001	LB059656.025	Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ	0.2	<0.2	<0.2	200	0
		<LOR=0*	TEQ (mg/kg)	0.2	<0.2	<0.2	200	0
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	<0.3	<0.3	134	0
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	<0.2	<0.2	175	0
		Total PAH	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates						
		d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	0
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.6	0.6	30	2

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128955.002	LB059656.009	Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
		Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates						
		Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	30	4

pH in soil (1:5)

Method: ME-(AU)-[ENV]AN101

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE129015.002	LB059913.012	pH	pH Units	-	5.35	5.39	32	1
SE129015.007	LB059913.016	pH	pH Units	-	5.11	5.12	32	0

Total Cyanide in water by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128955.003	LB059797.004	Total Cyanide	mg/L	0.004	<0.004	<0.004	200	0

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128267A.027	LB059807.018	Lead, Pb	mg/kg	1	260	260	30	0
SE128955.001	LB059807.014	Arsenic, As	mg/kg	3	6	6	47	9
		Cadmium, Cd	mg/kg	0.3	0.3	0.3	120	6
		Chromium, Cr	mg/kg	0.3	11	11	34	2
		Copper, Cu	mg/kg	0.5	37	37	31	1
		Lead, Pb	mg/kg	1	110	150	31	28
		Nickel, Ni	mg/kg	0.5	4.1	3.6	43	14
		Zinc, Zn	mg/kg	0.5	120	130	32	7
		Silver, Ag*	mg/kg	1	<1	<1	200	0
SE128955.002	LB059807.016	Arsenic, As	mg/kg	3	6	6	47	7
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	149	0
		Chromium, Cr	mg/kg	0.3	8.5	9.3	36	9
		Copper, Cu	mg/kg	0.5	19	19	33	3
		Lead, Pb	mg/kg	1	87	92	31	6
		Nickel, Ni	mg/kg	0.5	3.3	3.7	44	11
		Zinc, Zn	mg/kg	0.5	110	110	32	7
		Silver, Ag*	mg/kg	1	<1	<1	200	0

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128966.001	LB059727.014	Arsenic, As	µg/L	1	0.507	0.545	200	0
		Cadmium, Cd	µg/L	0.1	0.034	0.04	200	0
		Chromium, Cr	µg/L	1	0.313	0.191	200	0
		Copper, Cu	µg/L	1	6.639	6.611	30	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = |OriginalResult - ReplicateResult| \times 100 / Mean$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times SDL / Mean + LR$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Trace Metals (Dissolved) in Water by ICPMS (continued)

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128966.001	LB059727.014	Lead, Pb	µg/L	1	0.094	0.091	200	0
		Nickel, Ni	µg/L	1	6.873	6.871	30	0
		Zinc, Zn	µg/L	5	43.072	42.837	27	1
SE129046.001	LB059727.024	Arsenic, As	µg/L	1	0.512	0.559	200	0
		Cadmium, Cd	µg/L	0.1	0.009	0.005	200	0
		Chromium, Cr	µg/L	1	-0.241	-0.261	200	0
		Copper, Cu	µg/L	1	3.217	3.146	46	2
		Lead, Pb	µg/L	1	-0.003	-0.002	200	0
		Nickel, Ni	µg/L	1	3.752	3.683	42	2
		Zinc, Zn	µg/L	5	15.957	15.968	46	0

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %	
SE128964.018	LB059656.015	TRH C10-C14	mg/kg	20	<20	<20	200	0	
		TRH C15-C28	mg/kg	45	<45	<45	200	0	
		TRH C29-C36	mg/kg	45	<45	<45	200	0	
		TRH C37-C40	mg/kg	100	<100	<100	200	0	
		TRH C10-C36 Total	mg/kg	110	<110	<110	200	0	
		TRH C10-C40 Total	mg/kg	210	<210	<210	200	0	
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	<25	200	0
		TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0	
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0			

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %			
SE128964.008	LB059678.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0		
			Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0	
		Ethylbenzene		mg/kg	0.1	<0.1	<0.1	200	0		
		m/p-xylene		mg/kg	0.2	<0.2	<0.2	200	0		
		o-xylene		mg/kg	0.1	<0.1	<0.1	200	0		
		Polycyclic		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0	
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.7	4.4	50	6		
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	4.4	50	4		
			d8-toluene (Surrogate)	mg/kg	-	4.3	4.4	50	2		
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.4	5.1	50	6		
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0		
			Total BTEX*	mg/kg	0.6	<0.6	<0.6	200	0		
		SE128964.018	LB059678.025	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
					Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200
Ethylbenzene	mg/kg			0.1		<0.1	<0.1	200	0		
m/p-xylene	mg/kg			0.2		<0.2	<0.2	200	0		
o-xylene	mg/kg			0.1		<0.1	<0.1	200	0		
Polycyclic	Naphthalene			mg/kg		0.1	<0.1	<0.1	200	0	
Surrogates	Dibromofluoromethane (Surrogate)			mg/kg	-	5.6	5.2	50	7		
	d4-1,2-dichloroethane (Surrogate)			mg/kg	-	4.9	4.5	50	9		
	d8-toluene (Surrogate)			mg/kg	-	4.2	4.2	50	1		
	Bromofluorobenzene (Surrogate)			mg/kg	-	4.4	4.2	50	4		
Totals	Total Xylenes*			mg/kg	0.3	<0.3	<0.3	200	0		
	Total BTEX*			mg/kg	0.6	<0.6	<0.6	200	0		

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %	
SE128964.008	LB059678.014	TRH C6-C10	mg/kg	25	110	100	53	6	
		TRH C6-C9	mg/kg	20	<20	<20	200	0	
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.7	4.4	30	6
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	4.4	30	4
			d8-toluene (Surrogate)	mg/kg	-	4.3	4.4	30	2
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.4	5.1	30	6
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
TRH C6-C10 minus BTEX (F1)	mg/kg		25	110	100	53	6		
SE128964.018	LB059678.025	TRH C6-C10	mg/kg	25	<25	<25	200	0	
		TRH C6-C9	mg/kg	20	<20	<20	200	0	

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128964.018	LB059678.025	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.6	5.2	30	7
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.9	4.5	30	9
			d8-toluene (Surrogate)	mg/kg	-	4.2	4.2	30	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.4	4.2	30	4
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB059863.002	Mercury	mg/kg	0.01	0.21	0.2	70 - 130	105

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB059656.002	Naphthalene	mg/kg	0.1	3.6	4	60 - 140	89	
	Acenaphthylene	mg/kg	0.1	3.8	4	60 - 140	94	
	Acenaphthene	mg/kg	0.1	4.0	4	60 - 140	101	
	Phenanthrene	mg/kg	0.1	3.5	4	60 - 140	87	
	Anthracene	mg/kg	0.1	3.7	4	60 - 140	92	
	Fluoranthene	mg/kg	0.1	3.2	4	60 - 140	79	
	Pyrene	mg/kg	0.1	3.9	4	60 - 140	98	
	Benzo(a)pyrene	mg/kg	0.1	4.2	4	60 - 140	105	
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	86
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
	d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	106	

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB059663.002	Naphthalene	µg/L	0.1	37	40	60 - 140	93	
	Acenaphthylene	µg/L	0.1	36	40	60 - 140	90	
	Acenaphthene	µg/L	0.1	37	40	60 - 140	93	
	Phenanthrene	µg/L	0.1	38	40	60 - 140	95	
	Anthracene	µg/L	0.1	37	40	60 - 140	93	
	Fluoranthene	µg/L	0.1	37	40	60 - 140	93	
	Pyrene	µg/L	0.1	37	40	60 - 140	93	
	Benzo(a)pyrene	µg/L	0.1	47	40	60 - 140	118	
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.5	0.5	40 - 130	92
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	100
	d14-p-terphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	104	

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB059656.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	107

pH in soil (1:5)

Method: ME-(AU)-[ENV]AN101

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB059913.001	pH	pH Units	-	7.4	7.415	98 - 102	100

Total Cyanide in soil by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB059801.002	Total Cyanide	mg/kg	0.5	<0.5	0.25	70 - 130	104

Total Cyanide in water by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB059797.002	Total Cyanide	mg/L	0.004	0.025	0.025	80 - 120	98

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB059807.002	Arsenic, As	mg/kg	3	50	50	80 - 120	100
	Cadmium, Cd	mg/kg	0.3	49	50	80 - 120	99
	Chromium, Cr	mg/kg	0.3	50	50	80 - 120	100
	Copper, Cu	mg/kg	0.5	49	50	80 - 120	98
	Lead, Pb	mg/kg	1	49	50	80 - 120	98
	Nickel, Ni	mg/kg	0.5	50	50	80 - 120	100

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB059807.002	Zinc, Zn	mg/kg	0.5	49	50	80 - 120	98
	Silver, Ag*	mg/kg	1	42	50	80 - 120	84

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB059727.002	Arsenic, As	µg/L	1	19	20	80 - 120	94
	Cadmium, Cd	µg/L	0.1	20	20	80 - 120	98
	Chromium, Cr	µg/L	1	21	20	80 - 120	103
	Copper, Cu	µg/L	1	20	20	80 - 120	100
	Lead, Pb	µg/L	1	20	20	80 - 120	100
	Nickel, Ni	µg/L	1	20	20	80 - 120	102
	Silver, Ag	µg/L	1	17	20	80 - 120	87
	Zinc, Zn	µg/L	5	21	20	80 - 120	105

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB059656.002	TRH C10-C14	mg/kg	20	40	40	60 - 140	100	
	TRH C15-C28	mg/kg	45	<45	40	60 - 140	98	
	TRH C29-C36	mg/kg	45	<45	40	60 - 140	88	
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	39	40	60 - 140	98
	TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	98	
	TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	80	

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB059663.002	TRH C10-C14	µg/L	50	980	1200	60 - 140	82	
	TRH C15-C28	µg/L	200	1100	1200	60 - 140	93	
	TRH C29-C36	µg/L	200	1100	1200	60 - 140	93	
	TRH F Bands	TRH >C10-C16 (F2)	µg/L	60	1000	1200	60 - 140	87
	TRH >C16-C34 (F3)	µg/L	500	1100	1200	60 - 140	94	
	TRH >C34-C40 (F4)	µg/L	500	570	600	60 - 140	95	

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB059678.002	Monocyclic	Benzene	mg/kg	0.1	3.1	2.9	60 - 140	107
		Aromatic	Toluene	mg/kg	0.1	3.2	2.9	60 - 140
	Ethylbenzene		mg/kg	0.1	3.1	2.9	60 - 140	106
	m/p-xylene		mg/kg	0.2	4.9	5.8	60 - 140	84
	Surrogates	o-xylene	mg/kg	0.1	2.4	2.9	60 - 140	82
		Dibromofluoromethane (Surrogate)	mg/kg	-	4.6	5	60 - 140	92
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.9	5	60 - 140	117
		d8-toluene (Surrogate)	mg/kg	-	5.5	5	60 - 140	110
	Bromofluorobenzene (Surrogate)	mg/kg	-	6.3	5	60 - 140	126	

VOCs in Water

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB059627.002	Monocyclic	Benzene	µg/L	0.5	56	45.45	60 - 140	122
		Aromatic	Toluene	µg/L	0.5	56	45.45	60 - 140
	Ethylbenzene		µg/L	0.5	57	45.45	60 - 140	126
	m/p-xylene		µg/L	1	110	90.9	60 - 140	119
	Surrogates	o-xylene	µg/L	0.5	56	45.45	60 - 140	123
		Dibromofluoromethane (Surrogate)	µg/L	-	5.0	5	60 - 140	99
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.0	5	60 - 140	100
		d8-toluene (Surrogate)	µg/L	-	5.0	5	60 - 140	99
	Bromofluorobenzene (Surrogate)	µg/L	-	5.2	5	60 - 140	104	

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB059678.002	Surrogates	TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	94
		TRH C6-C9	mg/kg	20	22	23.2	60 - 140	97
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.6	5	60 - 140	92
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.9	5	60 - 140	117
		d8-toluene (Surrogate)	mg/kg	-	5.5	5	60 - 140	110
		Bromofluorobenzene (Surrogate)	mg/kg	-	6.3	5	60 - 140	126

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB059678.002	VPH F Bands TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	88

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB059627.002	TRH C6-C10	µg/L	50	1100	946.63	60 - 140	119	
	TRH C6-C9	µg/L	40	920	818.71	60 - 140	113	
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.0	5	60 - 140	99
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.0	5	60 - 140	100
		d8-toluene (Surrogate)	µg/L	-	5.0	5	60 - 140	99
		Bromofluorobenzene (Surrogate)	µg/L	-	5.2	5	60 - 140	104
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	800	639.67	60 - 140	124

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE128955.003	LB059916.004	Mercury	mg/L	0.0001	0.0090	<0.0001	0.008	112

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE128955.001	LB059863.004	Mercury	mg/kg	0.01	0.33	0.14	0.2	93

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE128964.015	LB059656.011	Naphthalene	mg/kg	0.1	3.6	<0.1	4	90
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Acenaphthylene	mg/kg	0.1	3.6	<0.1	4	89
		Acenaphthene	mg/kg	0.1	3.9	<0.1	4	97
		Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
		Phenanthrene	mg/kg	0.1	3.9	<0.1	4	97
		Anthracene	mg/kg	0.1	3.6	<0.1	4	89
		Fluoranthene	mg/kg	0.1	2.5	<0.1	4	63
		Pyrene	mg/kg	0.1	3.7	<0.1	4	92
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
		Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
		Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
		Benzo(a)pyrene	mg/kg	0.1	3.7	<0.1	4	92
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
		Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ	0.2	3.7	<0.2	-	-
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	3.8	<0.3	-	-
Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	3.7	<0.2	-	-		
Total PAH	mg/kg	0.8	28	<0.8	-	-		
Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	-	88	
	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	90	
	d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	94	

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE128712A.00	LB059807.004	Nickel, Ni	mg/kg	0.5	56	14	50	84
1		Zinc, Zn	mg/kg	0.5	120	82	50	80

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE128615.001	LB059727.004	Arsenic, As	µg/L	1	19	<1	20	94
		Cadmium, Cd	µg/L	0.1	19	<0.1	20	97
		Chromium, Cr	µg/L	1	20	<1	20	100
		Copper, Cu	µg/L	1	120	94	20	109
		Lead, Pb	µg/L	1	20	<1	20	98
		Nickel, Ni	µg/L	1	34	15	20	98
		Zinc, Zn	µg/L	5	260	240	20	109

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE128964.016	LB059656.012	TRH C10-C14	mg/kg	20	170	120	40	105
		TRH C15-C28	mg/kg	45	140	97	40	100
		TRH C29-C36	mg/kg	45	51	<45	40	118
		TRH C37-C40	mg/kg	100	<100	<100	-	-
		TRH C10-C36 Total	mg/kg	110	350	230	-	-
		TRH C10-C40 Total	mg/kg	210	350	230	-	-

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE128964.016	LB059656.012	TRH F Bands						
		TRH >C10-C16 (F2)	mg/kg	25	190	150	40	93
		TRH >C16-C34 (F3)	mg/kg	90	110	<90	40	98
		TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE128955.001	LB059678.004	Monocyclic						
		Benzene	mg/kg	0.1	2.5	<0.1	2.9	84
		Aromatic						
		Toluene	mg/kg	0.1	2.3	<0.1	2.9	80
		Ethylbenzene	mg/kg	0.1	2.5	<0.1	2.9	88
		m/p-xylene	mg/kg	0.2	4.5	<0.2	5.8	77
		o-xylene	mg/kg	0.1	2.1	<0.1	2.9	74
		Polycyclic						
		Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates						
		Dibromofluoromethane (Surrogate)	mg/kg	-	4.1	5.5	5	83
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.6	5.0	5	112
		d8-toluene (Surrogate)	mg/kg	-	3.9	4.2	5	77
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.5	5.0	5	111
Totals								
Total Xylenes*	mg/kg	0.3	6.6	<0.3	-	-		
Total BTEX*	mg/kg	0.6	14	<0.6	-	-		

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE128955.001	LB059678.004	TRH C6-C10	mg/kg	25	<25	<25	24.65	91
		TRH C6-C9	mg/kg	20	22	<20	23.2	94
		Surrogates						
		Dibromofluoromethane (Surrogate)	mg/kg	-	4.1	5.5	5	83
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.6	5.0	5	112
		d8-toluene (Surrogate)	mg/kg	-	3.9	4.2	5	77
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.5	5.0	5	111
		VPH F						
		Benzene (F0)	mg/kg	0.1	2.5	<0.1	-	-
		Bands						
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	117		

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: $RPD = |OriginalResult - ReplicateResult| \times 100 / Mean$

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times SDL / Mean + LR$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE128964.015	LB059656.012	Naphthalene	mg/kg	0.1	3.6	3.7	33	3
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	-
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	-
		Acenaphthylene	mg/kg	0.1	3.6	3.6	33	1
		Acenaphthene	mg/kg	0.1	3.9	3.9	33	1
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	-
		Phenanthrene	mg/kg	0.1	3.9	4.0	33	2
		Anthracene	mg/kg	0.1	3.6	3.8	33	6
		Fluoranthene	mg/kg	0.1	2.5	2.5	34	1
		Pyrene	mg/kg	0.1	3.7	4.0	33	8
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	-
		Chrysene	mg/kg	0.1	<0.1	<0.1	200	-
		Benzo(b&i)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	-
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	-
		Benzo(a)pyrene	mg/kg	0.1	3.7	3.6	33	2
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	-
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	200	-
		Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	-
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ	0.2	3.7	3.6	16	-
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	3.8	3.7	18	-
		Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	3.7	3.7	15	-
		Total PAH	mg/kg	0.8	28	29	33	-
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	30	9
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	10

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: <http://www.sgs.com.au/~media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf>

- * Non-accredited analysis.
- Sample not analysed for this analyte.
- ^ Analysis performed by external laboratory.

- IS Insufficient sample for analysis.
- LNR Sample listed, but not received.
- LOR Limit of reporting.
- QFH QC result is above the upper tolerance.
- QFL QC result is below the lower tolerance.

- ① At least 2 of 3 surrogates are within acceptance criteria.
- ② RPD failed acceptance criteria due to sample heterogeneity.
- ③ Results less than 5 times LOR preclude acceptance criteria for RPD.
- ④ Recovery failed acceptance criteria due to matrix interference.
- ⑤ Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
- ⑥ LOR was raised due to sample matrix interference.
- ⑦ LOR was raised due to dilution of significantly high concentration of analyte in sample.
- ⑧ Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
- ⑨ Recovery failed acceptance criteria due to sample heterogeneity.
- ⑩ LOR was raised due to high conductivity of the sample (required dilution).
- † Refer to Analytical Report comments for further information.

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APPENDIX G – QA/QC ASSESSMENT

1. Introduction

A review of the quality of data has been based on the following:

- Review of the findings of sample analyses against field observations and measurements;
- Review of data quality based on the verification of field Quality Assurance / Quality Control (QA/QC) procedures, evidence of proper transference of samples and sample analysis and extraction within recommended holding times;
- Analysis of duplicate samples at the laboratory (blind duplicate);
- Analysis of duplicate samples by an independent laboratory (split duplicate);
- Analysis of trip blank and trip spike results; and
- Internal laboratory QA/QC analyses including analysis of reagent blanks, spike recoveries and duplicates.

These requirements are defined in NSW EPA endorsed guidelines and relevant Australian Standards.

The sample and QA/QC results were reported in seven laboratory reports, six from the primary lab EnviroLab and one from the secondary laboratory SGS. The data quality assessment described herein is based upon the results reported in these laboratory certificates and associated QC reports.

A summary of the QC analyses from these reports completed as part of the study is provided in the tables at the end of this appendix.

2. Data Quality Indicators

Data Quality Indicators (DQIs) are developed to provide goals for the quality of data required to sufficiently meet the site-specific objectives of Environmental Site Assessments. Precision, sensitivity, accuracy, representativeness, comparability and completeness (PSARCC parameters), are all indicators of data quality. The below points describe each PSARCC parameter in relation to assessment of data quality:

- Precision - measure of the variation in results from a laboratory method. Achieved through assessment of laboratory and field duplicate results;
- Sensitivity - the ability of an analytical method or technology to reliably identify a compound in the sample medium at an appropriate level of interest. Achieved through ensuring that laboratory detection limits are below the adopted criteria;
- Accuracy – measure of the closeness of the analytical result obtained by a method to the 'true' value. Assessed through laboratory QA/QC samples such as matrix spikes, laboratory control samples, method blanks and surrogate spikes;
- Representativeness – expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sample point or an environmental condition. Achieved through assessment of trip spike, trip blank and rinsate sample results along with standard procedures for sample collection, transport and extraction and holding times;

- Comparability – is a qualitative parameter expressing the confidence with which one data set can be compared with another. Achieved through undertaking fieldwork using standard operating procedures and consistent field personnel; and
- Completeness – defined as the percentage of measurements made which are judged to be valid measurements. Achieved through assessment of the percentage of data that passed the QA/QC assessment with a goal of 95%.

The DQIs used to assess the PSARCC parameters for this investigation are detailed in **Table A** below.

Table A Summary of Data Quality Indicators	
<i>Site Investigation</i> <i>Gray Street, Kogarah</i>	
Data Quality Indicator	Data Quality Indicators
Precision Field Duplicate RPDs.	AS4482.1-2005 states that the RPDs of duplicates are typically 30-50%, however, variation can be expected to be higher for organic analyses than inorganic analyses and for low concentrations of analytes. CH2M HILL has developed the following DQIs for field duplicates that are generally consistent with AS4482.1-2005: Less than 10 times LOR: no limit Between 10-20 times LOR: <50% RPD Greater than 20 times LOR: <20% RPD One intra-laboratory duplicate should be submitted to the primary laboratory every twenty samples. One inter-laboratory duplicate should be submitted to the secondary laboratory every twenty samples.
Sensitivity Laboratory detection limits	Laboratory achieved LORs to be appropriate for comparison to screening criteria.
Accuracy Laboratory Control Samples (inorganics) Single Control Spikes (organics) Matrix Spikes Method Blanks Surrogate Spikes	70% to 130% recovery for inorganics. Laboratory specified limits Laboratory specified limits Not detected above laboratory limit of reporting (LOR)
Representativeness Trip Blanks Trip Spikes (soil and water) and Trip Spike Controls (soil)	Not detected above laboratory LOR The trip spikes are used to assess potential volatile losses during the handing and transport of the closed primary samples. The trip spikes were taken into the field and transported with the primary samples to the laboratory. The trip spikes were not opened in the field. The DQI for these trip spikes is percentage recovery between 30% and 130%, which is generally consistent with AS4482.1-2005 for field duplicates. All fieldwork including decontamination procedures to be undertaken in general accordance with CH2M HILL's Standard Operating Procedures (SOPs). QAQC to be conducted in accordance with NEPM 1999 (2013 amendment).

Table A Summary of Data Quality Indicators	
<i>Site Investigation</i> <i>Gray Street, Kogarah</i>	
Data Quality Indicator	Data Quality Indicators
Rinsate	<p>Sample handling, storage and transport to be in accordance with the requirements of NEPM 1999 (2013 amendment).</p> <p>Samples to be extracted and analysed within appropriate holding times.</p> <p>Samples to be transported under full chain of custody documentation (COC). The laboratory to return a copy of the signed COC acknowledging the receipt data and time and identity of samples included in the shipment.</p> <p>Include Laboratory Certificates of Analysis which detail any standard and non-standard methods used.</p> <p>The rinsate should be collected from re-useable equipment that was used at multiple sampling locations and decontaminated in between samples. The rinsate should be collected from decontaminated equipment using laboratory supplied rinsate water and collection bottles. The DQI for the rinsate is below detection limits or low concentrations of contaminants of concern.</p>
Comparability	<p>Samples to be collected in general accordance CH2M HILL's SOPs and NEPM 1999 (2013 amendment). All field team members to be appropriately trained in these documents.</p> <p>Logs and field data to be recorded for each sample location noting any observed variations between conditions and signs of potential contamination.</p> <p>Primary samples to be stored, handled and transported under the same conditions and analysed by the same laboratory using consistent methods.</p> <p>DQIs to indicate acceptable Precision and Accuracy.</p>
Completeness	<p>Data from all critical samples to be considered valid.</p> <p>Overall dataset to be considered valid (>95% acceptable after data validation procedures).</p>

2.1. Precision

The precision of duplicate determination is measured as relative percent difference (RPD), as calculated from the following equation:

$$RPD = \frac{|X_1 - X_2|}{\frac{X_1 + X_2}{2}} \times 100$$

where: X1 is the first duplicate value
 X2 is the second duplicate value

The following sections discuss the precision of the field and laboratory duplicates analysed.

2.1.1. Field Duplication Precision

Intra-laboratory field duplicates are taken and analysed as an indicator of the effect of the field sampling protocol on the precision of analytical results. These duplicates also provide an indication of the nature of the field samples in terms of their relative heterogeneity and media variance. Intra-laboratory

duplicate samples are required to be collected at a rate of one per 20 samples in accordance with NEPM 1999 (2013 amendment).

A total of three intra-laboratory duplicates and two inter-laboratory duplicates were collected and analysed, two for soil and one for water. This represents an appropriate frequency of duplicate analyses based on a total of 19 samples being analysed for soil and three samples for water.

Calculated RPDs for primary and intra-laboratory/inter-laboratory duplicate water and soil sample pairs are presented in **Tables J1** and **J2** at the end of this appendix.

Soil RPDs were inside the stipulated DQIs specified in **Table A** above with the exception of a small number of duplicate pairs. These reported minor exceedances where both results were within assessment criteria, and are not considered to impact the quality of the data. Water field duplicate results are considered acceptable.

2.1.2. Laboratory Duplicate Precision

Precision is a measure of the variation in results from a laboratory method. The laboratory measures the precision of the analyses performed on a particular batch of samples using laboratory duplicates. Laboratory duplicate samples were analysed at minimum of one in every twenty samples. Acceptable control limits for organic parameters are specified by the laboratories in the Certificates of Analysis.

The certificate of analysis (refer to **Appendix F** of the report) indicates that laboratory duplicates passed the acceptance criteria.

2.2. Sensitivity

The achieved LORs for CoC in the investigation were below the relevant screening criteria except for B(a)P and silver (Ag) and therefore the sensitivity of the analytical methods was considered satisfactory to meet the investigation objectives.

2.3. Accuracy

Accuracy is a measure of the closeness of the analytical result obtained by a method to the 'true' value. The laboratory measures accuracy using laboratory control samples, control spikes, matrix spikes, method blanks and surrogate spikes.

2.3.1. Laboratory Control Samples

Control samples are prepared by spiking a clean matrix (i.e. a matrix with none of the target analytes above the LOR), with known quantities of a spiking compound. Control samples are analysed at a minimum rate of one per batch. Laboratory control spike results were within the project DQIs.

2.3.2. Matrix Spikes

Matrix spikes are prepared by spiking a field sample with a known quantity of a recommended spiking compound in order to ascertain the effects of the specific sample matrix on the recovery of analytes. Matrix spikes are analysed at a minimum rate of one per 20 samples. Matrix spike results were within the DQIs specified by the laboratory.

2.3.3. Method Blanks

Method blanks monitor the externally introduced contaminants, which potentially derive from glassware, cleaning reagents and digestion reagents during the analysis process. The blank, prepared in the laboratories, consisted of de-ionised water. The laboratory blank is treated as a sample in the laboratory, going through the same sample preparation and analysis procedures as corresponding samples. Method blanks were analysed at a rate of one per batch. Method blank results were within the project DQIs.

2.3.4. Surrogates

Surrogates are used to demonstrate matrix compatibility with the chosen method of analysis. Each sample is spiked with a known concentration of surrogate compound(s) prior to the preparation and analysis of the sample. The surrogate recovery is then measured against control values to assess potential matrix interferences. Surrogate recovery results were considered acceptable.

2.4. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sample point or an environmental condition. Representativeness is a qualitative parameter, which is most concerned with the proper design and implementation of the sampling program.

To maximise the likelihood that the representativeness is of acceptable quality the following procedures were undertaken.

2.4.1. General Parameters

General parameters employed to ensure representativeness were;

- The sampling and analysis program was developed by experienced professionals based on an adequate site history and site walkover in accordance with NSW EPA guidelines and the NEPM 1999 (2013 amendment);
- Critical sample locations were identified and critical samples were collected and analysed in accordance with the sample and analytical plan and data generated is validated to be of acceptable quality;
- Samples were placed in clean, laboratory supplied containers suitable for the target analytes. Samples were stored, transported and handled in accordance with NEPM 1999 (2013 amendment);
- Samples were generally extracted within appropriate holding times in accordance with NEPM 1999 (2013 amendment);
- Samples were transported under full chain of custody (COC) documentation including the sampler, nature of the sample, collection date, analyses to be performed, sample preservation method and departure time from the site. The laboratory returned a copy of the signed COC acknowledging the receipt data and time and identity of samples included in the shipment; and
- Fieldwork was undertaken in general accordance with CH2M HILL's SOPs.

2.4.2. Trip Blanks

One trip blank was submitted for analysis and all reported results that were below the LOR. Analytical results for the trip blank sample are provided in **Table J3** at the rear of this appendix.

2.4.3. Trip Spikes

One soil trip spike was submitted for analysis and recorded results were within the recovery limits.

2.4.4. Rinsate Blanks

Two rinsate blank samples were collected during the fieldwork program and all recorded results were below the LOR. Analytical results for the trip blank sample are provided in **Table J4** at the rear of this appendix.

2.5. Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. Sample data should be comparable with other measurement data for similar samples and sample conditions. Data comparability was maintained by undertaking the investigations as follows:

- Samples were collected by the same CH2M HILL field personnel in general accordance with CH2M HILL SOPs and the NEPM 1999 (2013 amendment) (except for three samples collected from Coffey geotechnical boreholes);
- Field data were recorded for each sample location with variations observed between conditions and signs of potential contamination noted;
- Primary samples were stored, handled and transported under the same conditions and analysed by the same laboratory using consistent methods; and
- DQIs indicated acceptable Precision and Accuracy.

2.6. Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is that a sufficient amount of valid data is generated, generally considered to be that greater than 95% of the data is valid.

The DQI for completeness is that valid data is generated for all critical samples and that, overall, the data is considered to be valid. This DQI is considered to have been met for this investigation, based on the data quality assessment discussed herein.

3. Laboratory Accreditation

EnviroLab and SGS are registered by the National Association of Testing Authority (NATA) for the requested analyses and conduct the requested analyses in accordance with the guidelines outlined in NEPM 1999 (2013 amendment). Extraction and analysis methods and the LORs for the both laboratories are provided in the laboratory reports found in **Appendix F** of the SI report.

4. Conclusions

Although some minor non-conformances were identified, the majority of the PSARCC indicators were within the specified DQIs and therefore, overall, the data is considered to be of sufficient quality to meet the objectives of the investigation.

Field Duplicates (soil)
Filter: ALL

				SDG	111995	111995	RPD	111995	111995	RPD	111995	Interlab_D	RPD	111995	Interlab_D	RPD	
				Field_ID	BH505	QC201		BH506	QC202		BH505	QC301		BH506	QC302		
				Sampled_Date-Time	21/06/2014	21/06/2014		21/06/2014	21/06/2014		21/06/2014	21/06/2014		21/06/2014	21/06/2014		
Method_Type	ChemName	Units	EQL														
8 metals in soil	Arsenic	mg/kg	4 (Primary): 3 (Interlab)	7.0	4.0	55	<4.0	5.0	22	7.0	6.0	15	<4.0	6.0	40		
	Cadmium	mg/kg	0.4 (Primary): 0.3 (Interlab)	<0.4	<0.4	0	<0.4	<0.4	0	<0.4	0.3	0	<0.4	<0.3	0		
	Chromium (III+VI)	mg/kg	1 (Primary): 0.3 (Interlab)	21.0	18.0	15	8.0	10.0	22	21.0	11.0	63	8.0	8.5	6		
	Copper	mg/kg	1 (Primary): 0.5 (Interlab)	15.0	270.0	179	20.0	21.0	5	15.0	37.0	85	20.0	19.0	5		
	Lead	mg/kg	1	79.0	120.0	41	93.0	100.0	7	79.0	110.0	33	93.0	87.0	7		
	Mercury	mg/kg	0.1 (Primary): 0.01 (Interlab)	0.1	<0.1	0	<0.1	0.1	0	0.1	0.14	33	<0.1	0.12	18		
	Nickel	mg/kg	1 (Primary): 0.5 (Interlab)	2.0	14.0	150	2.0	3.0	40	2.0	4.1	69	2.0	3.3	49		
	Silver	mg/kg	1	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0		
	Zinc	mg/kg	1 (Primary): 0.5 (Interlab)	120.0	150.0	22	84.0	100.0	17	120.0	120.0	0	84.0	110.0	27		
Asbestos ID - soils	Asbestos fibres	-		0.0	0.0	0	0.0	0.0	0	0.0			0.0				
Miscellaneous Inorg - soil	Cyanide Total	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0		
	pH (aqueous extract)	pH_Units		9.1	9.6	5	7.1	7.2	1	9.1			7.1				
Moisture	Moisture	%	0.1	10.0	13.0	26	12.0	12.0	0	10.0			12.0				
PAHs in Soil	Acenaphthene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0		
	Acenaphthylene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0		
	Anthracene	mg/kg	0.1	<0.1	0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0		
	Benz(a)anthracene	mg/kg	0.1	0.2	0.2	0	0.2	0.2	0	0.2	0.2	0	0.2	0.2	0		
	Benzo(a)pyrene	mg/kg	0.05 (Primary): 0.1 (Interlab)	0.26	0.16	48	0.32	0.31	3	0.26	0.2	26	0.32	0.2	46		
	Benzo(a)pyrene TEQ NEPM B1	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5			<0.5				
	Benzo(b)&(k)fluoranthene	mg/kg	0.2	0.5	0.4	22	0.7	0.5	33	0.5			0.7				
	Benzo(g,h,i)perylene	mg/kg	0.1	0.2	0.2	0	0.3	0.3	0	0.2	0.1	67	0.3	0.1	100		
	Chrysene	mg/kg	0.1	0.2	0.2	0	0.3	0.3	0	0.2	0.1	67	0.3	0.2	40		
	Dibenz(a,h)anthracene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0		
	Fluoranthene	mg/kg	0.1	0.4	0.6	40	0.6	0.5	18	0.4	0.3	29	0.6	0.3	67		
	Fluorene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0		
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.3	0.2	40	0.3	0.3	0	0.3	0.1	100	0.3	0.2	40		
	Naphthalene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0		
	Phenanthrene	mg/kg	0.1	0.2	0.5	86	0.3	0.3	0	0.2	0.1	67	0.3	0.2	40		
Pyrene	mg/kg	0.1	0.4	0.6	40	0.6	0.5	18	0.4	0.3	29	0.6	0.4	40			
Total +ve PAHs	mg/kg		2.5	3.0	18	3.5	3.2	9	2.5			3.5					
PCBs in Soil	Arochlor 1016	mg/kg	0.1 (Primary): 0.2 (Interlab)	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.2	0		
	Arochlor 1221	mg/kg	0.1 (Primary): 0.2 (Interlab)	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.2	0		
	Arochlor 1232	mg/kg	0.1 (Primary): 0.2 (Interlab)	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.2	0		
	Arochlor 1242	mg/kg	0.1 (Primary): 0.2 (Interlab)	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.2	0		
	Arochlor 1248	mg/kg	0.1 (Primary): 0.2 (Interlab)	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.2	0		
	Arochlor 1254	mg/kg	0.1 (Primary): 0.2 (Interlab)	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.2	0		
	Arochlor 1260	mg/kg	0.1 (Primary): 0.2 (Interlab)	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.2	0		
TRH Soil C10-C40 NEPM	C10-C16	mg/kg	50 (Primary): 25 (Interlab)	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<25.0	0	<50.0	<25.0	0		
	C16-C34	mg/kg	100 (Primary): 90 (Interlab)	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<90.0	0	<100.0	<90.0	0		
	C34-C40	mg/kg	100 (Primary): 120 (Interlab)	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<120.0	0	<100.0	<120.0	0		
	F2-NAPHTHALENE	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	<50.0			<50.0				
	C10 - C14	mg/kg	50 (Primary): 20 (Interlab)	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<20.0	0	<50.0	<20.0	0		
	C15 - C28	mg/kg	100 (Primary): 45 (Interlab)	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<45.0	0	<100.0	<45.0	0		
	C29-C36	mg/kg	100 (Primary): 45 (Interlab)	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<45.0	0	<100.0	<45.0	0		
VTRH & BTEXN in Soil NEPM	Benzene	mg/kg	0.2 (Primary): 0.1 (Interlab)	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.1	0		
	Ethylbenzene	mg/kg	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<0.1	0	<1.0	<0.1	0		
	Naphthalene	mg/kg	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<0.1	0	<1.0	<0.1	0		

Field Duplicates (soil)
Filter: ALL

SDG	111995	111995	RPD	111995	111995	RPD	111995	Interlab_D	RPD	111995	Interlab_D	RPD			
Field_ID	BH505	QC201		BH506	QC202		BH505	QC301		BH506	QC302				
Sampled_Date-Time	21/06/2014	21/06/2014		21/06/2014	21/06/2014		21/06/2014	21/06/2014		21/06/2014	21/06/2014				
Toluene	mg/kg	0.5 (Primary); 0.1 (Interlab)		<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.1	0
C6 - C9	mg/kg	25 (Primary); 20 (Interlab)		<25.0	<25.0	0	<25.0	<25.0	0	<25.0	<20.0	0	<25.0	<20.0	0
Xylene (m & p)	mg/kg	2 (Primary); 0.2 (Interlab)		<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<0.2	0	<2.0	<0.2	0
Xylene (o)	mg/kg	1 (Primary); 0.1 (Interlab)		<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<0.1	0	<1.0	<0.1	0
C6-C10 less BTEX (F1)	mg/kg	25		<25.0	<25.0	0	<25.0	<25.0	0	<25.0	<25.0	0	<25.0	<25.0	0
C6-C10	mg/kg	25		<25.0	<25.0	0	<25.0	<25.0	0	<25.0	<25.0	0	<25.0	<25.0	0

*RPDs have only been considered where a concentration is greater than 1 times the EQL.

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 80 (1-10 x EQL); 50 (10-30 x EQL); 30 (> 30 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Field Duplicates (water)
Filter: ALL

SDG Field_ID Sampled_Date-Time	111995 BH405 20/06/2014	111995 QC101 20/06/2014	RPD	111995 BH405 20/06/2014	Interlab_D QC102 20/06/2014	RPD
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Method_Type	ChemName	Units	EQL							
8 HM in water - dissolved	Arsenic (Filtered)	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0	
	Cadmium (Filtered)	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	0	
	Chromium (III+VI) (Filtered)	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0	
	Copper (Filtered)	mg/l	0.001	0.002	0.002	0	0.002	0.002	0	
	Lead (Filtered)	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0	
	Mercury (Filtered)	mg/l	0.00005 (Primary): 0.0001 (Interlab)	<0.0001	<0.0001	0	<0.0001	<0.0001	0	
	Nickel (Filtered)	mg/l	0.001	0.003	0.003	0	0.003	0.002	40	
	Zinc (Filtered)	mg/l	0.001 (Primary): 0.005 (Interlab)	0.023	0.023	0	0.023	0.021	9	
	Miscellaneous Inorg - water	Cyanide Total	mg/l	0.004	<0.004	<0.004	0	<0.004	<0.004	0
	PAHs in Water	Acenaphthene	µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0
Acenaphthylene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Anthracene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Benz(a)anthracene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Benzo(a) pyrene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Benzo(b)&(k)fluoranthene		µg/L	2	<2.0	<2.0	0	<2.0			
Benzo(g,h,i)perylene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Chrysene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Dibenz(a,h)anthracene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Fluoranthene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Fluorene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Indeno(1,2,3-c,d)pyrene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Naphthalene		µg/L	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Phenanthrene		µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
Pyrene	µg/L	1 (Primary): 0.1 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0		
TRH Water(C10-C40) NEPM	C10-C16	mg/l	0.05 (Primary): 0.06 (Interlab)	<0.05	<0.05	0	<0.05	<0.06	0	
	C16-C34	mg/l	0.1 (Primary): 0.5 (Interlab)	<0.1	<0.1	0	<0.1	<0.5	0	
	C34-C40	mg/l	0.1 (Primary): 0.5 (Interlab)	<0.1	<0.1	0	<0.1	<0.5	0	
	C10 - C14	µg/L	50	<50.0	<50.0	0	<50.0	<50.0	0	
	C15 - C28	µg/L	100 (Primary): 200 (Interlab)	<100.0	<100.0	0	<100.0	<200.0	0	
	C29-C36	µg/L	100 (Primary): 200 (Interlab)	<100.0	<100.0	0	<100.0	<200.0	0	
vTRH & BTEXN in Water NEPM	Benzene	µg/L	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0	
	Ethylbenzene	µg/L	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0	
	Naphthalene	µg/L	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.1	0	
	Toluene	µg/L	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0	
	C6 - C9	µg/L	10 (Primary): 40 (Interlab)	<10.0	<10.0	0	<10.0	<40.0	0	
	Xylene (m & p)	µg/L	2 (Primary): 1 (Interlab)	<2.0	<2.0	0	<2.0	<1.0	0	
	Xylene (o)	µg/L	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0	
	C6-C10 less BTEX (F1)	mg/l	0.01 (Primary): 0.05 (Interlab)	<0.01	<0.01	0	<0.01	<0.05	0	
	C6-C10	mg/l	0.01 (Primary): 0.05 (Interlab)	<0.01	<0.01	0	<0.01	<0.05	0	

*RPDs have only been considered where a concentration is greater than 1 times the EQL.

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 80 (1-10 x EQL); 50 (10-30 x EQL); 30 (> 30 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Field Blanks (soil)
Filter: ALL

SDG	111995
Field_ID	Trip Blank
Sampled_Date-Time	21/06/2014
Sample_Type	Trip_B

Method_Type	ChemName	Units	EQL
8 metals in soil	Arsenic	mg/kg	4
	Cadmium	mg/kg	0.4
	Chromium (III+VI)	mg/kg	1
	Copper	mg/kg	1
	Lead	mg/kg	1
	Mercury	mg/kg	0.1
	Nickel	mg/kg	1
	Silver	mg/kg	1
	Zinc	mg/kg	1
Asbestos ID - soils	Asbestos fibres	-	
ES_APHA4500CNCE_DA	Cyanide Total	mg/kg	0.5
ES_EPA418	C10-C16	mg/kg	25
	C16-C34	mg/kg	90
	C34-C40	mg/kg	120
	C10 - C14	mg/kg	20
	C15 - C28	mg/kg	45
	C29-C36	mg/kg	45
	+C10 - C36 (Sum of total)	mg/kg	110
	C10 - C40 (Sum of total)	mg/kg	210
	TRH C37-C40	mg/kg	100
ES_EPA6010C_200_8	Arsenic	mg/kg	3
	Cadmium	mg/kg	0.3
	Chromium (III+VI)	mg/kg	0.3
	Copper	mg/kg	0.5
	Lead	mg/kg	1
	Nickel	mg/kg	0.5
	Silver	mg/kg	1
Zinc	mg/kg	0.5	
ES_EPA7471B	Mercury	mg/kg	0.01
ES_EPA8082	Arochlor 1016	mg/kg	0.2
	Arochlor 1221	mg/kg	0.2
	Arochlor 1232	mg/kg	0.2
	Arochlor 1242	mg/kg	0.2
	Arochlor 1248	mg/kg	0.2
	Arochlor 1254	mg/kg	0.2
	Arochlor 1260	mg/kg	0.2
	Arochlor 1268	mg/kg	0.2
	Arochlor 1262	mg/kg	0.2
	PCBs (Sum of total)	mg/kg	1
	ES_EPA8100	Benzo[b+]fluoranthene	mg/kg
1-Methylnaphthalene		mg/kg	0.1
2-methylnaphthalene		mg/kg	0.1
Acenaphthene		mg/kg	0.1
Acenaphthylene		mg/kg	0.1
Anthracene		mg/kg	0.1
Benz(a)anthracene		mg/kg	0.1
Benzo(a) pyrene		mg/kg	0.1
Benzo(b)&(k)fluoranthene		mg/kg	0.2
Benzo(g,h,i)perylene		mg/kg	0.1
Benzo(k)fluoranthene		mg/kg	0.1
Chrysene		mg/kg	0.1
Dibenz(a,h)anthracene		mg/kg	0.1
Fluoranthene		mg/kg	0.1
Fluorene		mg/kg	0.1
Indeno(1,2,3-c,d)pyrene		mg/kg	0.1
Naphthalene		mg/kg	0.1
PAHs (Sum of total)		mg/kg	0.8
Phenanthrene		mg/kg	0.1
Pyrene	mg/kg	0.1	
ES_EPA8260	Benzene	mg/kg	0.1
	Ethylbenzene	mg/kg	0.1
	Naphthalene	mg/kg	0.1
	Toluene	mg/kg	0.1
	Total BTEX	mg/kg	0.6
	Xylene (m & p)	mg/kg	0.2
	Xylene (o)	mg/kg	0.1
Xylene Total	mg/kg	0.3	
ES_EPA8260_B	Benzene	mg/kg	0.1
	C6 - C9	mg/kg	20
	C6-C10 less BTEX (F1)	mg/kg	25
	C6-C10	mg/kg	25
ES_NEPM103	pH (Lab)	pH_Units	0
ESD_AS4964	Estimated Fibres	mg/kg	100
Miscellaneous Inorg - soil	Cyanide Total	mg/kg	0.5

Field Blanks (soil)
Filter: ALL

			SDG Field_ID Sampled_Date-Time Sample_Type	111995 Trip Blank 21/06/2014 Trip_B
	pH (aqueous extract)	pH_Units		
Moisture	Moisture	%	0.1	0.1
PAHs in Soil	Acenaphthene	mg/kg	0.1	
	Acenaphthylene	mg/kg	0.1	
	Anthracene	mg/kg	0.1	
	Benz(a)anthracene	mg/kg	0.1	
	Benzo(a) pyrene	mg/kg	0.05	
	Benzo(a)pyrene TEQ NEPM B1	mg/kg	0.5	
	Benzo(b)&(k)fluoranthene	mg/kg	0.2	
	Benzo(g,h,i)perylene	mg/kg	0.1	
	Chrysene	mg/kg	0.1	
	Dibenz(a,h)anthracene	mg/kg	0.1	
	Fluoranthene	mg/kg	0.1	
	Fluorene	mg/kg	0.1	
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	
	Naphthalene	mg/kg	0.1	
	Phenanthrene	mg/kg	0.1	
	Pyrene	mg/kg	0.1	
	Total +ve PAHs	mg/kg		
PCBs in Soil	Arochlor 1016	mg/kg	0.1	
	Arochlor 1221	mg/kg	0.1	
	Arochlor 1232	mg/kg	0.1	
	Arochlor 1242	mg/kg	0.1	
	Arochlor 1248	mg/kg	0.1	
	Arochlor 1254	mg/kg	0.1	
	Arochlor 1260	mg/kg	0.1	
TRH Soil C10-C40 NEPM	C10-C16	mg/kg	50	
	C16-C34	mg/kg	100	
	C34-C40	mg/kg	100	
	F2-NAPHTHALENE	mg/kg	50	
	C10 - C14	mg/kg	50	
	C15 - C28	mg/kg	100	
	C29-C36	mg/kg	100	
VTRH & BTEXN in Soil NEPM	Benzene	mg/kg	0.2	<0.2
	Ethylbenzene	mg/kg	1	<1
	Naphthalene	mg/kg	1	
	Toluene	mg/kg	0.5	<0.5
	C6 - C9	mg/kg	25	
	Xylene (m & p)	mg/kg	2	<2
	Xylene (o)	mg/kg	1	<1
	C6-C10 less BTEX (F1)	mg/kg	25	
	C6-C10	mg/kg	25	

Field Blanks (water)
Filter: ALL

SDG	111995	111995
Field_ID	QCRinsate	QC103
Sampled_Date-Time	21/06/2014	20/06/2014
Sample_Type	Rinsate	Rinsate

Method_Type	ChemName	Units	EQL			
8 HM in water - dissolved	Arsenic (Filtered)	mg/l	0.001		<0.001	
	Cadmium (Filtered)	mg/l	0.0001		<0.0001	
	Chromium (III+VI) (Filtered)	mg/l	0.001		<0.001	
	Copper (Filtered)	mg/l	0.001		<0.001	
	Lead (Filtered)	mg/l	0.001		<0.001	
	Mercury (Filtered)	mg/l	0.00005		<0.00005	
	Nickel (Filtered)	mg/l	0.001		<0.001	
	Silver (Filtered)	mg/l	0.001			
	Zinc (Filtered)	mg/l	0.001		<0.001	
	8 HM in water - total	Arsenic	mg/l	0.001		<0.001
Cadmium		mg/l	0.0001		<0.0001	
Chromium (III+VI)		mg/l	0.001		<0.001	
Copper		mg/l	0.001		<0.001	
Lead		mg/l	0.001		<0.001	
Mercury		mg/l	0.00005		<0.00005	
Nickel		mg/l	0.001		<0.001	
Zinc		mg/l	0.001		<0.001	
EW_APHA3112B		Mercury (Filtered)	mg/l	0.0001		
EW_APHA4500CNCE_DA		Cyanide Total	mg/l	0.004		
EW_EPA418	C10-C16	mg/l	0.06			
	C16-C34	mg/l	0.5			
	C34-C40	mg/l	0.5			
	C10 - C14	µg/L	50			
	C15 - C28	µg/L	200			
	C29-C36	µg/L	200			
	+C10 - C36 (Sum of total)	µg/L	450			
	C10 - C40 (Sum of total)	µg/L	650			
EW_EPA6020A_DIS	Arsenic (Filtered)	mg/l	0.001			
	Cadmium (Filtered)	mg/l	0.0001			
	Chromium (III+VI) (Filtered)	mg/l	0.001			
	Copper (Filtered)	mg/l	0.001			
	Lead (Filtered)	mg/l	0.001			
	Nickel (Filtered)	mg/l	0.001			
	Silver (Filtered)	mg/l	0.001			
	Zinc (Filtered)	mg/l	0.005			
	EW_EPA8100	Benzo[b+]fluoranthene	mg/l	0.0001		
1-Methylnaphthalene		µg/L	0.1			
2-methylnaphthalene		µg/L	0.1			
Acenaphthene		µg/L	0.1			
Acenaphthylene		µg/L	0.1			
Anthracene		µg/L	0.1			
Benz(a)anthracene		µg/L	0.1			
Benzo(a) pyrene		µg/L	0.1			
Benzo(b&k)fluoranthene		µg/L	0.2			
Benzo(g,h,i)perylene		µg/L	0.1			
Benzo(k)fluoranthene		µg/L	0.1			
Chrysene		µg/L	0.1			
Dibenz(a,h)anthracene		µg/L	0.1			
Fluoranthene		µg/L	0.1			
Fluorene		µg/L	0.1			
Indeno(1,2,3-c,d)pyrene		µg/L	0.1			
Naphthalene		µg/L	0.1			
PAHs (Sum of total)		µg/L	1			
Phenanthrene	µg/L	0.1				
Pyrene	µg/L	0.1				
EW_EPA8260	Benzene	µg/L	0.5			
	Ethylbenzene	µg/L	0.5			
	Naphthalene	µg/L	0.5			
	Toluene	µg/L	0.5			
	Total BTEX	mg/l	0.003			
	Xylene (m & p)	µg/L	1			
	Xylene (o)	µg/L	0.5			
Xylene Total	µg/L	1.5				
EW_EPA8260_B	Benzene	µg/L	0.5			
	C6 - C9	µg/L	40			
	C6-C10 less BTEX (F1)	mg/l	0.05			
	C6-C10	mg/l	0.05			
Miscellaneous Inorg - water	Cyanide Total	mg/l	0.004			
PAHs in Water	Acenaphthene	µg/L	1		<1	
	Acenaphthylene	µg/L	1		<1	
	Anthracene	µg/L	1		<1	
	Benz(a)anthracene	µg/L	1		<1	
	Benzo(a) pyrene	µg/L	1		<1	
	Benzo(b&k)fluoranthene	µg/L	2		<2	
	Benzo(g,h,i)perylene	µg/L	1		<1	
Chrysene	µg/L	1		<1		

Field Blanks (water)
Filter: ALL

		SDG		111995	111995
		Field_ID		QCRinsate	QC103
		Sampled_Date-Time		21/06/2014	20/06/2014
		Sample_Type		Rinsate	Rinsate
	Dibenz(a,h)anthracene	µg/L	1	<1	
	Fluoranthene	µg/L	1	<1	
	Fluorene	µg/L	1	<1	
	Indeno(1,2,3-c,d)pyrene	µg/L	1	<1	
	Naphthalene	µg/L	1	<1	
	Phenanthrene	µg/L	1	<1	
	Pyrene	µg/L	1	<1	
PCBs in Water	Arochlor 1016	µg/L	2	<2	
	Arochlor 1221	µg/L	2	<2	
	Arochlor 1232	µg/L	2	<2	
	Arochlor 1242	µg/L	2	<2	
	Arochlor 1248	µg/L	2	<2	
	Arochlor 1254	µg/L	2	<2	
	Arochlor 1260	µg/L	2	<2	
TRH Water(C10-C40) NEPM	C10-C16	mg/l	0.05	<0.05	<0.05
	C16-C34	mg/l	0.1	<0.1	<0.1
	C34-C40	mg/l	0.1	<0.1	<0.1
	F2-NAPHTHALENE	mg/l	0.05		
	C10 - C14	µg/L	50	<50	<50
	C15 - C28	µg/L	100	<100	<100
	C29-C36	µg/L	100	<100	<100
VTRH & BTEXN in Water NEPM	Benzene	µg/L	1	<1	
	Ethylbenzene	µg/L	1	<1	
	Naphthalene	µg/L	1	<1	
	Toluene	µg/L	1	<1	
	C6 - C9	µg/L	10	<10	<10
	Xylene (m & p)	µg/L	2	<2	
	Xylene (o)	µg/L	1	<1	
	C6-C10 less BTEX (F1)	mg/l	0.01	<0.01	
	C6-C10	mg/l	0.01	<0.01	<0.01

APPENDIX H – HAZARDOUS MATERIALS REPORT

Hazardous Construction Materials Review

Various Buildings at the

St George Hospital, Kogarah NSW

Prepared for:

Ch2M Hill

Level 7, 9 Help Street
Chatswood NSW 2067

Report by:

P. Clifton & Associates Pty Ltd

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DISTRIBUTION

**Hazardous Construction Materials Review
Various Buildings at the
St George Hospital, Kogarah NSW**

14 June 2014

Recipient

CH2M Hill

Level 7, 9 Help Street
Chatswood NSW 2067

Attention: Ms Susan Barnes

This document was prepared for the sole use of CH2M Hill and the regulatory agencies that are directly involved in this project, the only intended beneficiaries of our work. No other party should rely on the information contained herein without the prior written consent of P. Clifton & Associates Pty Ltd and CH2M Hill.

By

P. Clifton & Associates Pty Ltd

ABN: 69 041 751 671

PO Box 447

Pymble Business Centre, NSW 2073



Philip Clifton
Principal

CONTENTS

1	INTRODUCTION	1
2	SURVEY METHODOLOGY	2
3	EXTENT OF SURVEY.....	2
4	RESULTS OF SURVEY	4
4.1	Buildings 1 & 31 – Ward Block and EMU	4
4.2	Building 2 – Cancer Care Centre.....	4
4.3	Building 3 – Clinical Services Building.....	5
4.4	Building 4 – Burt Wing.....	5
4.5	Building 5 – Emergency	6
4.6	Building 6 – Prince William Wing	6
4.7	Building 9 – Pre Admission Clinic.....	7
4.8	Building 10 – Pitney Building	7
4.9	Building 12 – Mental Health Centre	8
4.10	Building 14 – Pathology Collection	8
4.11	Building 15 – EMR and IED.....	9
4.12	Building 16 – JH Laws House.....	9
4.13	Building 17 – Banksia House	10
4.14	Building 18 – Project Staging Facility	10
4.15	Building 19 – Holistic Healing Services	11
4.16	Building 23 – Gray Street, Car Parking Station.....	11
4.17	Building 27 – Research Institute.....	11
4.18	Building 32 – EMU and QRP Building.....	12
4.19	Building 34 – Pritchard Wing	12
4.20	Building 39 – Information Booth.....	13
4.21	Service Tunnels.....	13

Appendix

Appendix 1 - Laboratory Report

1 INTRODUCTION

In May and June 2014, P. Clifton & Associates Pty Ltd undertook visual inspections to confirm the location, presence, and extent of hazardous construction materials with a number of buildings that are located within the St George Hospital site at Kogarah NSW (the site). This inspection was carried out to confirm the information contained in the existing hazardous materials registers for the nominated buildings at the site that were prepared by Noel Arnold & Associates Pty Ltd.

The buildings located on the site that were inspected are as follows:

Building 1 & 31 – Ward Block and EMU
Building 2 – Cancer Care Centre
Building 3 – Clinical Services Building
Building 4 – Burt Wing
Building 5 – Emergency
Building 6 – Prince William Wing
Building 9 – Pre-Admission Clinic
Building 10 – Pitney Building
Building 12 – Mental Health Centre
Building 14 – Pathology Collection
Building 15 – EMR & IED
Building 16 – JH Laws House
Building 17 – Banksia House
Building 18 – Project Staging Facility
Building 19 – Holistic Healing Services
Building 23 – Gray Street Parking Station
Building 26 – Research Institute
Building 32 – EMU and QRP Building
Building 34 – Prichard Wing
Building 39 – Information Booth
Service Tunnels

The visual inspection of the buildings on the site was supplemented with the analysis of two samples of suspected asbestos containing materials that were analysed by a NATA accredited laboratory. The analytical results have been incorporated into the report.

2 SURVEY METHODOLOGY

The survey was undertaken by way of a visual inspection of areas within the abovementioned buildings using the information contained in the Noel Arnold reports. The inspections were undertaken to confirm the information contained in those reports and to ascertain if additional hazardous construction materials are present which had not be reported.

During the site inspections two samples were collected for asbestos analysis. Each sample was placed into a clean resealable plastic bag that was marked with the sample location, sample number and date.

Following collection, the samples were forwarded to ESP Laboratories, a NATA accredited laboratory located in Footscray Victoria for analysis. The samples were analysed using polarised light microscopy supplemented with dispersion oil staining using ESP Laboratories in-house method No. 2 and methodology consistent with AS 4964-2004.

The NATA endorsed laboratory reports of the analysis is included in Appendix 2.

3 EXTENT OF SURVEY

Fundamental to the entire basis of an inspection of this type, where the constraints of a “non-destructive” survey are imposed, is the fact that no matter how thorough or professionally it is conducted, not all hazardous containing construction materials might be found and recorded. For the purpose of this report hazardous materials are construction materials containing asbestos, synthetic mineral fibre (SMF), polychlorinated biphenyl (PCB), lead based paints and lead in settled dust.

Whilst one can be reasonably confident that hazardous construction materials that might be routinely encountered in the normal day-to-day activities undertaken within the buildings at the site can be identified and assessed, no guarantees can be made that all hazardous construction materials have been identified since demolition activities may well reveal hazardous construction materials in areas inaccessible to this inspection.

This report is confined to reporting the discovery (or non-discovery as the case may be) and presence of asbestos containing construction materials by visual inspection and non-destructive methods of those areas of the buildings accessible to and inspected by P. Clifton & Associates on the dates of the site inspections.

Hazardous Construction Materials Review of Various Buildings at the St George Hospital, Kogarah NSW

P. Clifton & Associates will not be liable in the event the report fails to notify the presence of any hazardous construction materials in any area of the buildings which were, on the date of inspection, physically inaccessible for inspection using the methods employed (hand tools to gain access to ceiling spaces and wall cavities) or which was not otherwise inspected on that day. Nothing herein contained implies that any inaccessible or uninspected areas of the buildings contain or do not contain hazardous construction materials.

The survey was limited to accessible areas of the building structures and associated building elements only and does not include any asbestos containing construction materials or contamination that may be in inaccessible areas such as roof spaces, in sub floor areas, buried beneath concrete slabs or in the soil on the site.

PCA have exercised reasonable care, skill and diligence in the preparation of this report. However, except for any non-excludable statutory provision, PCA gives no warranty in relation to its services or this report and is not liable for any loss, injury or death suffered by any party (whether caused by negligence or otherwise) arising from or in relation to the services provided or the use of this report. Where the client has the benefit of any non-excludable condition or warranty, the liability of PCA is, to the extent permitted by law, limited to re-performing the services or refunding the fees paid in relation to the services or sections of the report not complying with the conditions or warranty.

4 RESULTS OF SURVEY

4.1 Buildings 1 & 31 – Ward Block and EMU

This building is a large multi storey structure containing hospital wards, service rooms, staff rooms, etc that was constructed circa 1980 and has concrete roof and floors throughout, reinforced concrete framing and painted masonry facades with aluminium framed windows and entry doors.

Within the building the suspended ceilings are aluminium grid with drop in acoustic or plasterboard tiles, masonry walls are finished with opiated cement render, sheet vinyl or ceramic tiles and the concrete floors are covered with carpet, sheet vinyl and ceramic tiles.

The information contained in the Noel Arnold hazardous materials register is generally accurate with no additional hazardous materials found to be present. No asbestos or PCB containing materials were found to be present in this building. Based on the age of the building the various paint finishes should be non-lead based paints.

SMF materials are present throughout the building and these materials are in good condition with no remediation work required.

The information contained in the hazardous materials register in regard to PCB and lead paint should be disregarded as the use of these materials had ceased at the time that this building was constructed.

Settled dust within the ceiling spaces may contain some lead contamination however as the building is air conditioned the quantity will be minimal.

4.2 Building 2 – Cancer Care Centre

Building 2 was constructed in 2000 and is a reinforced concrete frame and slab building with aluminium framed windows and entry doors. Within the building the suspended ceilings are aluminium grids with drop in tiles, masonry walls are finished with painted cement render, framed walls are lined with plasterboard and the floors are concrete.

The information contained in the Noel Arnold hazardous materials register is generally accurate with no additional hazardous materials found to be present. No asbestos or PCB containing materials were found to be present in this building. Based on the age of the building the various paint finishes should be non-lead based paints.

SMF materials are present throughout the building and these materials are in good condition with no remediation work required.

Hazardous Construction Materials Review of Various Buildings at the St George Hospital, Kogarah NSW

The information contained in the hazardous materials register in regard to PCB and lead paint should be disregarded as the use of these materials had ceased at the time that this building was constructed.

Settled dust within the ceiling spaces may contain some lead contamination however as the building is air conditioned the quantity will be minimal.

4.3 Building 3 – Clinical Services Building

Building 3 was constructed in 1991 and is a reinforced concrete frame and slab building with aluminium framed windows and entry doors. Within the building the suspended ceilings are aluminium grids with drop in tiles, masonry walls are finished with painted cement render, framed walls are lined with plasterboard or fibrous cement sheet and the floors are concrete.

The information contained in the Noel Arnold hazardous materials register is generally accurate with no additional hazardous materials found to be present. No asbestos or PCB containing materials were found to be present in this building. Based on the age of the building the various paint finishes should be non-lead based paints.

SMF materials are present throughout the building and these materials are in good condition with no remediation work required.

The information contained in the hazardous materials register in regard to PCB and lead paint should be disregarded as the use of these materials had ceased at the time that this building was constructed.

Settled dust within the ceiling spaces may contain some lead contamination however as the building is air conditioned the quantity will be minimal.

4.4 Building 4 – Burt Wing

Building 4 was constructed in 1970 and is located in the north western area of the site. The building is of full masonry construction with terracotta roof tiles, face brick walls, timber framed windows, timber fascias and metal eaves gutters and down pipes.

Within the building the suspended ceilings are either set plasterboard or aluminium grids with drop in tiles, masonry walls are finished with painted cement render, framed walls are lined with plasterboard or fibrous cement sheet and the floors are concrete with carpet, sheet vinyl and vinyl tile floor coverings.

The information contained in the Noel Arnold hazardous materials register is generally accurate.

We note that the eaves linings to the perimeter of the upper level of the building were inaccessible and are likely to be asbestos cement sheet.

4.5 Building 5 – Emergency

This building is a large single storey building containing the emergency rooms, service rooms, staff and amenities rooms, etc that was constructed circa 1980.

Within the building the suspended ceilings are aluminium grid with drop in acoustic or plasterboard tiles, masonry walls are finished with opiated cement render, sheet vinyl or ceramic tiles and the concrete floors are covered with carpet, sheet vinyl and ceramic tiles.

The information contained in the Noel Arnold hazardous materials register is generally accurate with no additional hazardous materials found to be present. No asbestos or PCB containing materials were found to be present in this building. Based on the age of the building the various paint finishes should be non-lead based paints.

SMF materials are present throughout the building and these materials are in good condition with no remediation work required.

The information contained in the hazardous materials register in regard to PCB and lead paint should be disregarded as the use of these materials had ceased at the time that this building was constructed.

Settled dust within the ceiling spaces may contain some lead contamination however as the building is air conditioned the quantity will be minimal.

4.6 Building 6 – Prince William Wing

Building 6 was constructed circa 1950 and is located in the northern area of the site near the intersection of Kensington and Belgrave Streets. The building is of full masonry construction with metal roof cladding, face brick walls, timber framed windows, aluminium framed entry doors, metal fascias and metal box gutters and down pipes.

Within the building the suspended ceilings are either set plasterboard or aluminium grids with drop in tiles, masonry walls are finished with painted cement render, framed walls are lined with plasterboard or fibrous cement sheet and the floors are concrete with carpet, sheet vinyl and vinyl tile floor coverings.

The information contained in the Noel Arnold hazardous materials register is generally accurate with no additional hazardous construction materials sighted.

The fluorescent light fittings within the building that contain plastic canister capacitors do not contain PCB. Light fittings that were sighted during the site inspection appear to be relatively new and will not contain PCB.

4.7 Building 9 – Pre Admission Clinic

Building 9 was constructed in 2000 and has metal roof and wall cladding, fibrous cement sheet and plasterboard internal linings and timber floors.

The information contained in the Noel Arnold hazardous materials register is generally accurate. No asbestos or PCB containing materials were found to be present in this building. Based on the age of the building the various paint finishes should be non-lead based paints.

SMF materials are present throughout the building and these materials are in good condition with no remediation work required.

The ceiling and wall cavities were unable to be accessed and are likely to contain SMF insulation.

The information contained in the hazardous materials register in regard to PCB and lead paint should be disregarded as the use of these materials had ceased at the time that this building was constructed.

Given that the building is metal clad with no openings into the ceiling and cavity walls, the likelihood of there being settled dust containing lead contamination within these areas is minimal.

4.8 Building 10 – Pitney Building

Building 10 was constructed circa 1950 and is located in the south eastern area of the site. The building is of full masonry construction with concrete roofs, face brick walls, timber and aluminium framed windows and aluminium framed entry doors.

Within the building the suspended ceilings are either set plasterboard or aluminium grids with drop in tiles, masonry walls are finished with painted cement render, framed walls are lined with plasterboard or fibrous cement sheet and the floors are concrete with carpet, sheet vinyl and vinyl tile floor coverings.

Refurbishment work has been recently completed within the building with the fire doors having been replaced during that work.

The information contained in the Noel Arnold hazardous materials register is generally accurate with no additional hazardous construction materials sighted.

The fluorescent light fittings within the building that contain plastic canister capacitors do not contain PCB. Light fittings that were sighted during the site inspection appear to be relatively new and will not contain PCB.

Paint finishes within the building are in good condition and no areas of peeling or flaking paint were sighted.

Settled dust within the ceiling spaces may contain some lead contamination however as the building is air conditioned the quantity will be minimal.

4.9 Building 12 – Mental Health Centre

Building 12 was constructed in 2000 and is steel framed with metal roof cladding, face brick walls and aluminium framed windows and entry doors. Within the building the suspended ceilings are aluminium grids with drop in tiles, masonry walls are finished with painted cement render, framed walls are lined with plasterboard and the floors are concrete.

The information contained in the Noel Arnold hazardous materials register is generally accurate with no additional hazardous materials found to be present. No asbestos or PCB containing materials were found to be present in this building. Based on the age of the building the various paint finishes should be non-lead based paints.

SMF materials are present throughout the building and these materials are in good condition with no remediation work required.

The information contained in the hazardous materials register in regard to PCB and lead paint should be disregarded as the use of these materials had ceased at the time that this building was constructed.

Settled dust within the ceiling spaces may contain some lead contamination however as the building is air conditioned the quantity will be minimal.

4.10 Building 14 – Pathology Collection

Building 14 is a former house that was constructed circa 1930 and is timber framed and full masonry construction with terracotta roof tiles, face brick walls and timber framed windows and entry doors.

The information contained in the Noel Arnold hazardous materials register is generally accurate with the following additional hazardous materials identified:

- The gable walls on the front of the building are clad with flat asbestos cement sheet. This material is painted and in good condition.
- There are fragments of asbestos cement sheet debris in random locations on the ground surface adjacent to the building.

4.11 Building 15 – EMR and IED

Building 15 was constructed circa 1960 and is located in the eastern area of the site. The building is of full masonry construction with metal roofing, face brick walls, timber framed windows and aluminium framed entry doors.

Within the building the suspended ceilings are either set plasterboard or aluminium grids with drop in tiles, masonry walls are finished with painted cement render, framed walls are lined with plasterboard and the floors are timber.

The information contained in the Noel Arnold hazardous materials register is generally accurate with some of the hazardous materials having been removed since the register was compiled. The items that have been removed are:

- All of the asbestos boiler and pipe insulation materials in the sub floor area have been removed. The timber flooring in these areas has a thin coat of white paint which would have been applied at the completion of the asbestos removal work.

A sample of soil from the north sub floor area was analysed and found to be free of asbestos. This soil contains white plaster like material some of which was included in the sample.

The fluorescent light fittings within the building appear to be relatively new and will not contain PCB.

Paint finishes within the building are in good condition and no areas of peeling or flaking paint were sighted.

4.12 Building 16 – JH Laws House

Building 16 was constructed circa 1930 and is a large multi storey building having terracotta roof tiles, full brick masonry walls, timber framed windows, fascias and metal eave guttering and downpipes.

Within the building the suspended ceilings are either set plasterboard or aluminium grids with drop in tiles, masonry walls are finished with painted cement render, framed walls are lined with plasterboard and the floors are timber or concrete.

The information contained in the Noel Arnold hazardous materials register is generally accurate with no further hazardous construction materials identified.

4.13 Building 17 – Banksia House

Building 17 was constructed circa 1980 and is a demountable type building with metal roof and wall cladding, fibrous cement sheet and plasterboard internal linings and timber floors.

A sample of the fibrous cement sheet packing in the sub floor area was analysed and found to be free of asbestos.

The information contained in the Noel Arnold hazardous materials register is generally accurate. No asbestos or PCB containing materials were found to be present in this building. Based on the age of the building the various paint finishes should be non-lead based paints.

SMF materials are present throughout the building and these materials are in good condition with no remediation work required.

The ceiling and wall cavities were unable to be accessed and are likely to contain SMF insulation.

The information contained in the hazardous materials register in regard to PCB and lead paint should be disregarded as the use of these materials had ceased at the time that this building was constructed.

Given that the building is metal clad with no openings into the ceiling and cavity walls, the likelihood of there being settled dust containing lead contamination within these areas is minimal.

4.14 Building 18 – Project Staging Facility

Building 18 was constructed circa 1980 and is a demountable type building with metal roof and wall cladding, fibrous cement sheet and plasterboard internal linings and timber floors.

The information contained in the Noel Arnold hazardous materials register is generally accurate. No asbestos or PCB containing materials were found to be present in this building. Based on the age of the building the various paint finishes should be non-lead based paints.

SMF materials are present throughout the building and these materials are in good condition with no remediation work required.

The ceiling and wall cavities were unable to be accessed and are likely to contain SMF insulation.

The information contained in the hazardous materials register in regard to PCB and lead paint should be disregarded as the use of these materials had ceased at the time that this building was constructed.

Given that the building is metal clad with no openings into the ceiling and cavity walls, the likelihood of there being settled dust containing lead contamination within these areas is minimal.

4.15 Building 19 – Holistic Healing Services

Building 19 is a former house that was constructed circa 1950 and is timber framed and full masonry construction with terracotta roof tiles, face brick walls and timber framed windows and entry doors.

The information contained in the Noel Arnold hazardous materials register is generally accurate with the following additional hazardous materials identified:

- The gable walls on the front of the building are both clad with flat asbestos cement sheet. This material is painted and in good condition. The total area of this material is approximately 30 square metres, not 10 square metres as listed in the register table.

4.16 Building 23 – Gray Street, Car Parking Station

Building 23 is a multi storey car parking station constructed in 1990 that has concrete floors, columns and perimeter walls to a height of approximately 1.2 metres. On the ground floor is a small office.

The information contained in the Noel Arnold hazardous materials register lists there to be asbestos, PCB, lead based paints and lead dust as being present in the building. Inspection of the building found none of these materials to be present.

The office on Level 1 was unable to be accessed and may contain SMF ceiling tiles.

4.17 Building 27 – Research Institute

Building 27 is a demountable type building that was constructed in 1990 and has metal roof and wall cladding, fibrous cement sheet and plasterboard internal linings and timber floors.

The information contained in the Noel Arnold hazardous materials register is generally accurate. No asbestos or PCB containing materials were found to be present in this building. Based on the age of the building the various paint finishes should be non-lead based paints.

SMF materials are present throughout the building and these materials are in good condition with no remediation work required.

The ceiling and wall cavities were unable to be accessed and are likely to contain SMF insulation.

The information contained in the hazardous materials register in regard to lead paint should be disregarded as the use of these materials had ceased at the time that this building was constructed.

Given that the building is metal clad with no openings into the ceiling and cavity walls, the likelihood of there being settled dust containing lead contamination within these areas is minimal.

4.18 Building 32 – EMU and QRP Building

Building 32 is a demountable type building that was constructed in 1990 and has metal roof and wall cladding, fibrous cement sheet and plasterboard internal linings and timber floors.

The information contained in the Noel Arnold hazardous materials register lists there to be asbestos, PCB, lead based paints and lead dust assumed to be present in the building. Inspection of the building found none of these materials to be present.

SMF materials are present throughout the building and these materials are in good condition with no remediation work required.

Given that the building is metal clad with no openings into the ceiling and cavity walls, the likelihood of there being settled dust containing lead contamination within these areas is minimal.

4.19 Building 34 – Pritchard Wing

Building 34 was constructed circa 1935 and is a large multi storey building having terracotta roof tiles, full brick masonry walls, timber framed windows, fascias and metal eave guttering and downpipes. This building is attached to the southern end of the JH Laws Building.

Within the building the suspended ceilings are either set plasterboard or aluminium grids with drop in tiles, masonry walls are finished with painted cement render, framed walls are lined with plasterboard and the floors are timber or concrete.

The information contained in the Noel Arnold hazardous materials register is generally accurate.

Within the sub floor area near the south end of the building are numerous asbestos insulated pipes that are not detailed in the current register. The roof space was not able to be accessed during our site inspection and we were advised by the hospital engineering staff that asbestos insulated pipes are present throughout the roof space.

Plumbing risers within the building are assumed to contain asbestos insulate pipe work that extends from the roof space to the sub floor area.

4.20 Building 39 – Information Booth

Building 39 is a small prefabricated fibreglass structure housing the hospital information booth.

The information contained in the Noel Arnold hazardous materials register is generally accurate with no additional hazardous materials being sighted.

4.21 Service Tunnels

The service tunnels located in the centre area of the site were inspected and inspected and no asbestos containing materials were found to be present. All accessible insulation materials on steam and hot water pipes was found to be synthetic mineral fibre (SMF). Chilled or cooling water pipes are insulated with polystyrene foam.

The tunnels themselves are all reinforced concrete construction with the penetrations sealed with concrete. There is dirt and other debris on the floors however no visible asbestos containing materials was sighted amongst the debris.

APPENDIX 1

LABORATORY REPORT



esp

Environmental &
Safety Professionals

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Melbourne
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ASBESTOS IDENTIFICATION REPORT

DATE: 22ND MAY 2014

ESP JOB NUMBER: 22526L

NAME: P. CLIFTON & ASSOCIATES PTY LTD

ADDRESS: P. O. BOX 447
PYMBLE BUSINESS CENTRE NSW 2073

ATTENTION: PHIL CLIFTON

SAMPLED FROM: AS RECEIVED (PCA 3985 – 2014)

SAMPLED BY: AS RECEIVED

DATE RECEIVED: 22ND MAY 2014

TEST METHOD: Qualitative identification of asbestos types in bulk samples by polarised light microscopy, including dispersion staining, using ESP in-house Method No. 2 and methodology in accordance with AS4964.

LAB NUMBER	SAMPLE DESCRIPTION	RESULT
E34332	1: BUILDING 15, SUB FLOOR – SOIL (30 x 30 x 35 mm)	NO ASBESTOS DETECTED ^{1,2}
E34333	2: BUILDING 17, FLOOR PACKING – FIBRO CEMENT MATERIAL (30 x 30 x 5 mm)	NO ASBESTOS DETECTED ¹

The results contained in this report relate only to the sample(s) submitted for testing. ESP Environmental & Safety Professionals accepts no responsibilities for the representivity of the sample(s) submitted.

¹ Organic fibre(s) detected.

² Synthetic mineral fibre(s) detected.



WORLD RECOGNISED
ACCREDITATION

NATA Accredited Laboratory

Number: 3110

Accredited for compliance with ISO/IEC 17025


Rosie Fedele
Approved Identifier


Ray Boast
Approved Signatory

R_140522_22526L_PCA 3985_2014_ID_F1

Page 1 of 1