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Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS

147493

Client:

Larry Cook & Associates
PO Box 8146
TUMBIUMBI
NSW 2261

Attention: Larry Cook

Sample log in details:

Your Reference:	<u>Larry Cook - Admore Park</u>
No. of samples:	11 Waters
Date samples received / completed instructions received	27/05/16 / 27/05/16

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:	3/06/16 / 20/06/16
Date of Preliminary Report:	Not issued

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Results Approved By:


Jacinta Hurst
Laboratory Manager

Envirolab Reference: 147493
Revision No: R 00



vTRH(C6-C10)/BTEXN in Water Our Reference: Your Reference Type of sample	UNITS ----- - -----	147493-4 BH1 Water	147493-5 BH2 Water	147493-6 BH3 Water	147493-7 BH4 Water	147493-8 BH5 Water
Date extracted	-	29/05/2016	29/05/2016	29/05/2016	29/05/2016	29/05/2016
Date analysed	-	29/05/2016	29/05/2016	29/05/2016	29/05/2016	29/05/2016
TRHC ₆ - C ₉	µg/L	<10	<10	<10	<10	<10
TRHC ₆ - C ₁₀	µg/L	<10	<10	<10	<10	<10
TRHC ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	102	103	103	103	101
Surrogate toluene-d8	%	98	99	97	98	97
Surrogate 4-BFB	%	99	99	99	99	100

vTRH(C6-C10)/BTEXN in Water Our Reference: Your Reference Type of sample	UNITS ----- - -----	147493-9 BH6 Water	147493-10 Phils Spring Water	147493-11 Southern Spring Water
Date extracted	-	29/05/2016	29/05/2016	29/05/2016
Date analysed	-	29/05/2016	29/05/2016	29/05/2016
TRHC ₆ - C ₉	µg/L	<10	<10	<10
TRHC ₆ - C ₁₀	µg/L	<10	<10	<10
TRHC ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10	<10
Benzene	µg/L	<1	<1	<1
Toluene	µg/L	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2
o-xylene	µg/L	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1
Surrogate Dibromofluoromethane	%	101	102	102
Surrogate toluene-d8	%	98	98	100
Surrogate 4-BFB	%	100	99	100

Client Reference: Larry Cook - Admore Park

svTRH (C10-C40) in Water						
Our Reference:	UNITS	147493-4	147493-5	147493-6	147493-7	147493-8
Your Reference	-----	BH1	BH2	BH3	BH4	BH5
	-					
Type of sample	-----	Water	Water	Water	Water	Water
Date extracted	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Date analysed	-	31/05/2016	31/05/2016	31/05/2016	31/05/2016	31/05/2016
TRHC ₁₀ - C ₁₄	µg/L	<50	<50	<50	<50	<50
TRHC ₁₅ - C ₂₈	µg/L	<100	<100	<100	<100	<100
TRHC ₂₉ - C ₃₆	µg/L	<100	<100	<100	<100	<100
TRH>C ₁₀ - C ₁₆	µg/L	<50	<50	<50	<50	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50	<50	<50	<50	<50
TRH>C ₁₆ - C ₃₄	µg/L	<100	<100	<100	<100	<100
TRH>C ₃₄ - C ₄₀	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	83	85	82	76	86

svTRH (C10-C40) in Water				
Our Reference:	UNITS	147493-9	147493-10	147493-11
Your Reference	-----	BH6	Phils Spring	Southern Spring
	-			
Type of sample	-----	Water	Water	Water
Date extracted	-	30/05/2016	30/05/2016	30/05/2016
Date analysed	-	31/05/2016	31/05/2016	31/05/2016
TRHC ₁₀ - C ₁₄	µg/L	<50	<50	<50
TRHC ₁₅ - C ₂₈	µg/L	<100	<100	<100
TRHC ₂₉ - C ₃₆	µg/L	<100	<100	<100
TRH>C ₁₀ - C ₁₆	µg/L	<50	<50	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50	<50	<50
TRH>C ₁₆ - C ₃₄	µg/L	<100	<100	<100
TRH>C ₃₄ - C ₄₀	µg/L	<100	<100	<100
Surrogate o-Terphenyl	%	85	81	88

Client Reference: Larry Cook - Admore Park

Ion Balance Our Reference: Your Reference	UNITS ----- -	147493-1 BHAP1	147493-2 BHAP5	147493-3 BHAP10	147493-4 BH1	147493-5 BH2
Type of sample	-----	Water	Water	Water	Water	Water
Date prepared	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Date analysed	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Calcium - Dissolved	mg/L	17	25	73	43	8.9
Potassium - Dissolved	mg/L	1.5	0.9	7.8	1.0	0.5
Sodium - Dissolved	mg/L	100	15	390	180	79
Magnesium - Dissolved	mg/L	12	70	95	47	29
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as CaCO ₃	mg/L	28	220	340	210	200
Carbonate Alkalinity as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as CaCO ₃	mg/L	28	220	340	210	200
Sulphate, SO ₄	mg/L	5	23	61	6	8
Chloride, Cl	mg/L	160	48	660	300	57
Ionic Balance	%	11	11	3.6	4.1	4.8

Ion Balance Our Reference: Your Reference	UNITS ----- -	147493-6 BH3	147493-7 BH4	147493-8 BH5	147493-9 BH6	147493-10 Phils Spring
Type of sample	-----	Water	Water	Water	Water	Water
Date prepared	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Date analysed	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Calcium - Dissolved	mg/L	43	38	49	52	49
Potassium - Dissolved	mg/L	0.8	0.7	0.8	0.9	1.1
Sodium - Dissolved	mg/L	34	31	29	61	92
Magnesium - Dissolved	mg/L	52	55	53	48	83
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as CaCO ₃	mg/L	310	310	340	320	430
Carbonate Alkalinity as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as CaCO ₃	mg/L	310	310	340	320	430
Sulphate, SO ₄	mg/L	4	4	3	6	14
Chloride, Cl	mg/L	54	38	45	91	150
Ionic Balance	%	1.1	2.7	-0.31	1.2	0.91

Ion Balance		
Our Reference:	UNITS	147493-11
Your Reference	-----	Southern Spring
	-	
Type of sample	-----	Water
Date prepared	-	30/05/2016
Date analysed	-	30/05/2016
Calcium - Dissolved	mg/L	18
Potassium - Dissolved	mg/L	1.2
Sodium - Dissolved	mg/L	55
Magnesium - Dissolved	mg/L	25
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	<5
Bicarbonate Alkalinity as CaCO ₃	mg/L	140
Carbonate Alkalinity as CaCO ₃	mg/L	<5
Total Alkalinity as CaCO ₃	mg/L	140
Sulphate, SO ₄	mg/L	<1
Chloride, Cl	mg/L	81
Ionic Balance	%	2.5

Client Reference: Larry Cook - Admore Park

Miscellaneous Inorganics	UNITS	147493-1	147493-2	147493-3	147493-4	147493-5
Our Reference:	-----	BHAP1	BHAP5	BHAP10	BH1	BH2
Your Reference	-					
Type of sample	-----	Water	Water	Water	Water	Water
Date prepared	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Date analysed	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
pH	pH Units	6.5	7.9	7.3	7.2	7.0
Electrical Conductivity	µS/cm	610	670	2,300	960	540
Total Dissolved Solids (grav)	mg/L	410	600	1,400	690	340

Miscellaneous Inorganics	UNITS	147493-6	147493-7	147493-8	147493-9	147493-10
Our Reference:	-----	BH3	BH4	BH5	BH6	Phils Spring
Your Reference	-					
Type of sample	-----	Water	Water	Water	Water	Water
Date prepared	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Date analysed	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
pH	pH Units	7.5	7.7	7.7	7.8	7.6
Electrical Conductivity	µS/cm	680	600	630	740	1,000
Total Dissolved Solids (grav)	mg/L	410	410	340	500	560

Miscellaneous Inorganics	UNITS	147493-11
Our Reference:	-----	Southern Spring
Your Reference	-	
Type of sample	-----	Water
Date prepared	-	30/05/2016
Date analysed	-	30/05/2016
pH	pH Units	7.4
Electrical Conductivity	µS/cm	440
Total Dissolved Solids (grav)	mg/L	260

Client Reference: Larry Cook - Admore Park

HM in water - total	UNITS	147493-1	147493-2	147493-3	147493-4	147493-5
Our Reference:	-----	BHAP1	BHAP5	BHAP10	BH1	BH2
Your Reference	-					
Type of sample	-----	Water	Water	Water	Water	Water
Date prepared	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Date analysed	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Arsenic-Total	µg/L	[NA]	[NA]	[NA]	<1	<1
Cadmium-Total	µg/L	[NA]	[NA]	[NA]	<0.1	<0.1
Chromium-Total	µg/L	[NA]	[NA]	[NA]	8	3
Copper-Total	µg/L	[NA]	[NA]	[NA]	2	2
Lead-Total	µg/L	[NA]	[NA]	[NA]	1	<1
Mercury-Total	µg/L	[NA]	[NA]	[NA]	<0.05	<0.05
Nickel-Total	µg/L	[NA]	[NA]	[NA]	15	10
Zinc-Total	µg/L	[NA]	[NA]	[NA]	7	8
Iron-Total	µg/L	34	120	47	1,600	940
Manganese-Total	µg/L	43	6	30	23	<5

HM in water - total	UNITS	147493-6	147493-7	147493-8	147493-9	147493-10
Our Reference:	-----	BH3	BH4	BH5	BH6	Phils Spring
Your Reference	-					
Type of sample	-----	Water	Water	Water	Water	Water
Date prepared	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Date analysed	-	30/05/2016	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Arsenic-Total	µg/L	<1	<1	<1	<1	<1
Cadmium-Total	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Total	µg/L	2	<1	4	<1	<1
Copper-Total	µg/L	<1	<1	<1	<1	<1
Lead-Total	µg/L	<1	<1	<1	<1	<1
Mercury-Total	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total	µg/L	2	<1	3	<1	<1
Zinc-Total	µg/L	24	<1	25	2	<1
Iron-Total	µg/L	44	64	64	67	81
Manganese-Total	µg/L	<5	<5	<5	<5	21

HM in water - total		
Our Reference:	UNITS	147493-11
Your Reference	-----	Southern Spring
	-	
Type of sample	-----	Water
Date prepared	-	30/05/2016
Date analysed	-	30/05/2016
Arsenic-Total	µg/L	<1
Cadmium-Total	µg/L	<0.1
Chromium-Total	µg/L	<1
Copper-Total	µg/L	<1
Lead-Total	µg/L	<1
Mercury-Total	µg/L	<0.05
Nickel-Total	µg/L	1
Zinc-Total	µg/L	<1
Iron-Total	µg/L	88
Manganese-Total	µg/L	13

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Metals-020	Determination of various metals by ICP-AES.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180+/-5oC.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021	Determination of Mercury by Cold Vapour AAS.

Client Reference: Larry Cook - Admore Park

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXN in Water						Base II Duplicate II %RPD		
Date extracted	-			29/05/2016	[NT]	[NT]	LCS-W6	29/05/2016
Date analysed	-			29/05/2016	[NT]	[NT]	LCS-W6	29/05/2016
TRHC ₆ - C ₉	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W6	82%
TRHC ₆ - C ₁₀	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W6	82%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W6	80%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W6	81%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W6	82%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W6	84%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W6	82%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	102	[NT]	[NT]	LCS-W6	101%
Surrogate toluene-d8	%		Org-016	98	[NT]	[NT]	LCS-W6	100%
Surrogate 4-BFB	%		Org-016	99	[NT]	[NT]	LCS-W6	100%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH (C10-C40) in Water						Base II Duplicate II %RPD		
Date extracted	-			30/05/2016	147493-4	30/05/2016 30/05/2016	LCS-W3	30/05/2016
Date analysed	-			31/05/2016	147493-4	31/05/2016 31/05/2016	LCS-W3	31/05/2016
TRHC ₁₀ - C ₁₄	µg/L	50	Org-003	<50	147493-4	<50 <50	LCS-W3	119%
TRHC ₁₅ - C ₂₈	µg/L	100	Org-003	<100	147493-4	<100 <100	LCS-W3	122%
TRHC ₂₉ - C ₃₆	µg/L	100	Org-003	<100	147493-4	<100 <100	LCS-W3	120%
TRH>C ₁₀ - C ₁₆	µg/L	50	Org-003	<50	147493-4	<50 <50	LCS-W3	119%
TRH>C ₁₆ - C ₃₄	µg/L	100	Org-003	<100	147493-4	<100 <100	LCS-W3	122%
TRH>C ₃₄ - C ₄₀	µg/L	100	Org-003	<100	147493-4	<100 <100	LCS-W3	120%
Surrogate o-Terphenyl	%		Org-003	86	147493-4	83 86 RPD: 4	LCS-W3	78%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Ion Balance						Base II Duplicate II %RPD		
Date prepared	-			30/05/2016	147493-1	30/05/2016 30/05/2016	LCS-W2	30/05/2016
Date analysed	-			30/05/2016	147493-1	30/05/2016 30/05/2016	LCS-W2	30/05/2016
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	147493-1	17 [N/T]	LCS-W2	92%
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	147493-1	1.5 [N/T]	LCS-W2	104%
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	147493-1	100 [N/T]	LCS-W2	103%
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	147493-1	12 [N/T]	LCS-W2	97%
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	5	Inorg-006	<5	147493-1	<5 <5	[NR]	[NR]
Bicarbonate Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	147493-1	28 28 RPD: 0	[NR]	[NR]
Carbonate Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	147493-1	<5 <5	[NR]	[NR]

Client Reference: Larry Cook - Admore Park

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Ion Balance						Base Duplicate %RPD		
Total Alkalinity as CaCO ₃	mg/L	5	Inorg-006	100	147493-1	28 28 RPD: 0	LCS-W2	104%
Sulphate, SO ₄	mg/L	1	Inorg-081	<1	147493-1	5 5 RPD: 0	LCS-W2	104%
Chloride, Cl	mg/L	1	Inorg-081	<1	147493-1	160 160 RPD: 0	LCS-W2	95%
Ionic Balance	%		Inorg-040	[NT]	147493-1	11 [N/T]	[NR]	[NR]
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Miscellaneous Inorganics						Base Duplicate %RPD		
Date prepared	-			30/05/2016	147493-1	30/05/2016 30/05/2016	LCS-W1	30/05/2016
Date analysed	-			30/05/2016	147493-1	30/05/2016 30/05/2016	LCS-W1	30/05/2016
pH	pH Units		Inorg-001	[NT]	147493-1	6.5 6.5 RPD: 0	LCS-W1	101%
Electrical Conductivity	µS/cm	1	Inorg-002	<1	147493-1	610 610 RPD: 0	LCS-W1	96%
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	147493-1	410 [N/T]	LCS-W1	119%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
HM in water - total						Base Duplicate %RPD		
Date prepared	-			30/05/2016	147493-1	30/05/2016 30/05/2016	LCS-W2	30/05/2016
Date analysed	-			30/05/2016	147493-1	30/05/2016 30/05/2016	LCS-W2	30/05/2016
Arsenic-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	93%
Cadmium-Total	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-W2	99%
Chromium-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	90%
Copper-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	92%
Lead-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	97%
Mercury-Total	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	LCS-W2	96%
Nickel-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	93%
Zinc-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	96%
Iron-Total	µg/L	10	Metals-022 ICP-MS	<10	147493-1	34 35 RPD: 3	LCS-W2	97%
Manganese-Total	µg/L	5	Metals-022 ICP-MS	<5	147493-1	43 44 RPD: 2	LCS-W2	94%
QUALITY CONTROL	UNITS	Dup. Sm#		Duplicate		Spike Sm#	Spike % Recovery	
svTRH (C10-C40) in Water				Base + Duplicate + %RPD				
Date extracted	-	[NT]		[NT]		147493-5	30/05/2016	
Date analysed	-	[NT]		[NT]		147493-5	31/05/2016	
TRHC ₁₀ - C ₁₄	µg/L	[NT]		[NT]		147493-5	114%	
TRHC ₁₅ - C ₂₈	µg/L	[NT]		[NT]		147493-5	117%	
TRHC ₂₉ - C ₃₆	µg/L	[NT]		[NT]		147493-5	82%	

Client Reference: Larry Cook - Admore Park

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
TRH>C ₁₀ - C ₁₆	µg/L	[NT]	[NT]	147493-5	114%
TRH>C ₁₆ - C ₃₄	µg/L	[NT]	[NT]	147493-5	117%
TRH>C ₃₄ - C ₄₀	µg/L	[NT]	[NT]	147493-5	82%
Surrogate o-Terphenyl	%	[NT]	[NT]	147493-5	85%
QUALITY CONTROL Ion Balance	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	147493-11	30/05/2016 30/05/2016	147493-2	30/05/2016
Date analysed	-	147493-11	30/05/2016 30/05/2016	147493-2	30/05/2016
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	147493-11	<5 <5	[NR]	[NR]
Bicarbonate Alkalinity as CaCO ₃	mg/L	147493-11	140 140 RPD: 0	[NR]	[NR]
Carbonate Alkalinity as CaCO ₃	mg/L	147493-11	<5 <5	[NR]	[NR]
Total Alkalinity as CaCO ₃	mg/L	147493-11	140 140 RPD: 0	[NR]	[NR]
Sulphate, SO ₄	mg/L	147493-11	<1 <1	147493-2	108%
Chloride, Cl	mg/L	147493-11	81 80 RPD: 1	147493-2	94%
QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD		
Date prepared	-	147493-11	30/05/2016 30/05/2016		
Date analysed	-	147493-11	30/05/2016 30/05/2016		
pH	pH Units	147493-11	7.4 7.4 RPD: 0		
Electrical Conductivity	µS/cm	147493-11	440 440 RPD: 0		
QUALITY CONTROL HM in water - total	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	147493-11	30/05/2016 30/05/2016	147493-2	30/05/2016
Date analysed	-	147493-11	30/05/2016 30/05/2016	147493-2	30/05/2016
Arsenic-Total	µg/L	147493-11	<1 <1	147493-2	98%
Cadmium-Total	µg/L	147493-11	<0.1 <0.1	147493-2	102%
Chromium-Total	µg/L	147493-11	<1 <1	147493-2	93%
Copper-Total	µg/L	147493-11	<1 <1	147493-2	90%
Lead-Total	µg/L	147493-11	<1 <1	147493-2	98%
Nickel-Total	µg/L	147493-11	1 1 RPD: 0	147493-2	93%
Zinc-Total	µg/L	147493-11	<1 <1	147493-2	98%
Iron-Total	µg/L	147493-11	88 100 RPD: 13	147493-2	118%
Manganese-Total	µg/L	147493-11	13 16 RPD: 21	147493-2	95%

QUALITY CONTROL Ion Balance	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	147493-5	30/05/2016 30/05/2016
Date analysed	-	147493-5	30/05/2016 30/05/2016
Calcium - Dissolved	mg/L	147493-5	8.9 9.0 RPD: 1
Potassium - Dissolved	mg/L	147493-5	0.5 0.5 RPD: 0
Sodium - Dissolved	mg/L	147493-5	79 79 RPD: 0
Magnesium - Dissolved	mg/L	147493-5	29 29 RPD: 0
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	147493-5	<5 [N/T]
Bicarbonate Alkalinity as CaCO ₃	mg/L	147493-5	200 [N/T]
Carbonate Alkalinity as CaCO ₃	mg/L	147493-5	<5 [N/T]
Total Alkalinity as CaCO ₃	mg/L	147493-5	200 [N/T]
Sulphate, SO ₄	mg/L	147493-5	8 [N/T]
Chloride, Cl	mg/L	147493-5	57 [N/T]
Ionic Balance	%	147493-5	4.8 [N/T]
QUALITY CONTROL HM in water - total	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	147493-4	30/05/2016 30/05/2016
Date analysed	-	147493-4	30/05/2016 30/05/2016
Arsenic-Total	µg/L	147493-4	<1 [N/T]
Cadmium-Total	µg/L	147493-4	<0.1 [N/T]
Chromium-Total	µg/L	147493-4	8 [N/T]
Copper-Total	µg/L	147493-4	2 [N/T]
Lead-Total	µg/L	147493-4	1 [N/T]
Mercury-Total	µg/L	147493-4	<0.05 <0.05
Nickel-Total	µg/L	147493-4	15 [N/T]
Zinc-Total	µg/L	147493-4	7 [N/T]
Iron-Total	µg/L	147493-4	1600 [N/T]
Manganese-Total	µg/L	147493-4	23 [N/T]

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	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	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 (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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