SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen 191478	EIS Job Number: E31452K Date Results Required: STANDARD Page: 3 of 4	ENVIRONMENTAL INVESTIGATION SERVICES REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: ktaylor@ikgroup.net.au

Location: Bowral

Sampler: K.Taylor

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 7a	Combo 7	Combo 2	Combo 3	Asbestos	pH, CEC and clay content	Faecal coliforms & total colifroms	BTEX				
8/05/2018	51	BH24	0.0-0.1	G, A	0	Fill	X											
10/05/2018	52	BH25	0.0-0.2	G, A	0	Fill	X											
	53		0.5-0.7	G	0	Natural			X									
10/05/2018	54	BH26	0.05-0.2	G, A	0	Fill	X											
	55		0.6-0.8	G, A	0	Fill												
	56		1.5-1.7	G	0	Natural		X										
10/05/2018	57	BH27	0.05-0.3	G, A	0	Fill	X											
	58		0.5-0.7	G	0	Natural			X									
9/05/2018	59	BH28	0.1-0.25	G, A	0	Fill	X					X						
	60		0.7-0.95	G, A	0	Fill												
	61		1.7-1.95	G	0	Natural			X									
9/05/2018	62	BH29	0.0-0.2	G, A	0	Fill	X											
	63		0.8-0.95	G, A	0	Fill												
	64		1.7-1.95	G	0	Natural			X									
10/05/2018	65	BH30	0.0-0.2	G, A	0	Fill	X											
	66		0.3-0.5	G	0	Natural				X								
10/05/2018	67	BH31	0.0-0.2	G, A	0	Fill	X											
	68		0.4-0.6	G, A	0	Fill												
	69		1.1-1.3	G	0	Natural												
9/05/2018	70	DUPKT1	-	G	-	Fill		X										
9/05/2018	71	DUPKT2	-	G	-	Fill		X										
9/05/2018	—	DUPKT3	-	G	-	Fill		X										
9/05/2018	—	DUPKT4	-	G	-	Fill		X										
8/05/2018	72	DUPHW1	-	G	-	Fill												

Remarks (comments/detection limits required):
Please send DUPKT3 and DUPKT4 to Envirolab VIC

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
			MT	11/5/18

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CERTIFICATE OF ANALYSIS 191978

Client Details

Client	Environmental Investigation Services
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E31452K, Bowral**
Number of Samples	6 Water
Date samples received	18/05/2018
Date completed instructions received	18/05/2018

Analysis Details

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

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

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

Report Details

Date results requested by	25/05/2018
Date of Issue	23/05/2018

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

Results Approved By
Jaimie Loa-Kum-Cheung, Senior Chemist
Priya Samarawickrama, Senior Chemist
Steven Luong, Senior Chemist

Authorised By

Jacinta Hurst, Laboratory Manager

VOCs in water					
Our Reference		191978-1	191978-2	191978-3	191978-4
Your Reference	UNITS	MW03	MW21	MW28	MW29
Date Sampled		17/05/2018	17/05/2018	17/05/2018	17/05/2018
Type of sample		Water	Water	Water	Water
Date extracted	-	21/05/2018	21/05/2018	21/05/2018	21/05/2018
Date analysed	-	21/05/2018	21/05/2018	21/05/2018	21/05/2018
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1
Bromoform	µg/L	<1	<1	<1	<1

VOCs in water					
Our Reference		191978-1	191978-2	191978-3	191978-4
Your Reference	UNITS	MW03	MW21	MW28	MW29
Date Sampled		17/05/2018	17/05/2018	17/05/2018	17/05/2018
Type of sample		Water	Water	Water	Water
m+p-xylene	µg/L	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	97	96	97	100
Surrogate toluene-d8	%	99	99	99	99
Surrogate 4-BFB	%	95	96	96	97

vTRH(C6-C10)/BTEXN in Water						
Our Reference		191978-1	191978-2	191978-3	191978-4	191978-5
Your Reference	UNITS	MW03	MW21	MW28	MW29	MWDUP1
Date Sampled		17/05/2018	17/05/2018	17/05/2018	17/05/2018	17/05/2018
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	21/05/2018	21/05/2018	21/05/2018	21/05/2018	21/05/2018
Date analysed	-	21/05/2018	21/05/2018	21/05/2018	21/05/2018	21/05/2018
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	<10
TRH C_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	%	97	96	97	100	101
Surrogate toluene-d8	%	99	99	99	99	96
Surrogate 4-BFB	%	95	96	96	97	94

vTRH(C6-C10)/BTEXN in Water		
Our Reference		191978-6
Your Reference	UNITS	TSW
Date Sampled		17/05/2018
Type of sample		Water
Date extracted	-	21/05/2018
Date analysed	-	21/05/2018
Benzene	µg/L	110%
Toluene	µg/L	105%
Ethylbenzene	µg/L	110%
m+p-xylene	µg/L	120%
o-xylene	µg/L	110%
Surrogate Dibromofluoromethane	%	102
Surrogate toluene-d8	%	101
Surrogate 4-BFB	%	102

svTRH (C10-C40) in Water						
Our Reference		191978-1	191978-2	191978-3	191978-4	191978-5
Your Reference	UNITS	MW03	MW21	MW28	MW29	MWDUP1
Date Sampled		17/05/2018	17/05/2018	17/05/2018	17/05/2018	17/05/2018
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	21/05/2018	21/05/2018	21/05/2018	21/05/2018	21/05/2018
Date analysed	-	21/05/2018	21/05/2018	22/05/2018	22/05/2018	22/05/2018
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100	<100
TRH C_{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	%	103	110	106	125	109

PAHs in Water - Low Level						
Our Reference		191978-1	191978-2	191978-3	191978-4	191978-5
Your Reference	UNITS	MW03	MW21	MW28	MW29	MWDUP1
Date Sampled		17/05/2018	17/05/2018	17/05/2018	17/05/2018	17/05/2018
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	22/05/2018	22/05/2018	21/05/2018	21/05/2018	21/05/2018
Date analysed	-	22/05/2018	22/05/2018	21/05/2018	21/05/2018	21/05/2018
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	75	80	104	130	101

HM in water - dissolved						
Our Reference		191978-1	191978-2	191978-3	191978-4	191978-5
Your Reference	UNITS	MW03	MW21	MW28	MW29	MWDUP1
Date Sampled		17/05/2018	17/05/2018	17/05/2018	17/05/2018	17/05/2018
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	21/05/2018	21/05/2018	21/05/2018	21/05/2018	21/05/2018
Date analysed	-	21/05/2018	21/05/2018	21/05/2018	21/05/2018	21/05/2018
Arsenic-Dissolved	µg/L	2	2	5	5	5
Cadmium-Dissolved	µg/L	0.8	0.4	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1	<1
Copper-Dissolved	µg/L	1	4	<1	<1	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	13	22	14	21	21
Zinc-Dissolved	µg/L	49	120	26	11	11

Miscellaneous Inorganics					
Our Reference		191978-1	191978-2	191978-3	191978-4
Your Reference	UNITS	MW03	MW21	MW28	MW29
Date Sampled		17/05/2018	17/05/2018	17/05/2018	17/05/2018
Type of sample		Water	Water	Water	Water
Date prepared	-	18/05/2018	18/05/2018	18/05/2018	18/05/2018
Date analysed	-	18/05/2018	18/05/2018	18/05/2018	18/05/2018
pH	pH Units	6.0	5.8	6.9	6.5
Electrical Conductivity	µS/cm	2,600	1,100	2,100	2,100

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-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.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			21/05/2018	1	21/05/2018	21/05/2018		21/05/2018	[NT]
Date analysed	-			21/05/2018	1	21/05/2018	21/05/2018		21/05/2018	[NT]
Dichlorodifluoromethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	87	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-013	<1	1	<1	<1	0	86	[NT]
2,2-dichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	87	[NT]
1,1,1-trichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	85	[NT]
1,1-dichloropropene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	82	[NT]
Bromodichloromethane	µg/L	1	Org-013	<1	1	<1	<1	0	88	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-013	<1	1	<1	<1	0	84	[NT]
1,2-dibromoethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	82	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
m+p-xylene	µg/L	2	Org-013	<2	1	<2	<2	0	[NT]	[NT]
Styrene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
o-xylene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
1,2,3-trichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-013	97	1	97	104	7	92	[NT]
Surrogate toluene-d8	%		Org-013	100	1	99	97	2	99	[NT]
Surrogate 4-BFB	%		Org-013	96	1	95	89	7	99	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			21/05/2018	1	21/05/2018	21/05/2018		21/05/2018	[NT]
Date analysed	-			21/05/2018	1	21/05/2018	21/05/2018		21/05/2018	[NT]
TRH C_6 - C_9	µg/L	10	Org-016	<10	1	<10	<10	0	88	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	1	<10	<10	0	88	[NT]
Benzene	µg/L	1	Org-016	<1	1	<1	<1	0	88	[NT]
Toluene	µg/L	1	Org-016	<1	1	<1	<1	0	88	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	1	<1	<1	0	88	[NT]
m+p-xylene	µg/L	2	Org-016	<2	1	<2	<2	0	89	[NT]
o-xylene	µg/L	1	Org-016	<1	1	<1	<1	0	88	[NT]
Naphthalene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-016	100	1	97	104	7	92	[NT]
Surrogate toluene-d8	%		Org-016	96	1	99	97	2	99	[NT]
Surrogate 4-BFB	%		Org-016	97	1	95	89	7	99	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			22/05/2018	[NT]	[NT]	[NT]	[NT]	21/05/2018	[NT]
Date analysed	-			22/05/2018	[NT]	[NT]	[NT]	[NT]	21/05/2018	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	116	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	116	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
Surrogate o-Terphenyl	%		Org-003	106	[NT]	[NT]	[NT]	[NT]	116	[NT]

QUALITY CONTROL: PAHs in Water - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			22/05/2018	[NT]	[NT]	[NT]	[NT]	22/05/2018	[NT]
Date analysed	-			22/05/2018	[NT]	[NT]	[NT]	[NT]	22/05/2018	[NT]
Naphthalene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	77	[NT]
Acenaphthylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Phenanthrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	79	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	127	[NT]	[NT]	[NT]	[NT]	113	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			21/05/2018	1	21/05/2018	21/05/2018		21/05/2018	[NT]
Date analysed	-			21/05/2018	1	21/05/2018	21/05/2018		21/05/2018	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	2	[NT]		104	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	0.8	[NT]		101	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		102	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	1	1	[NT]		101	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		104	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	102	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	13	[NT]		100	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	49	[NT]		101	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			18/05/2018	[NT]	[NT]	[NT]	[NT]	18/05/2018	[NT]
Date analysed	-			18/05/2018	[NT]	[NT]	[NT]	[NT]	18/05/2018	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]

Result Definitions

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

Quality Control Definitions

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Katrina Taylor

Sample Login Details

Your reference	E31452K, Bowral
Envirolab Reference	191978
Date Sample Received	18/05/2018
Date Instructions Received	18/05/2018
Date Results Expected to be Reported	25/05/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	6 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	9.7
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	VOCs in water	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Low Level	HM in water - dissolved	pH	Electrical Conductivity
MW03	✓	✓	✓	✓	✓	✓	✓
MW21	✓	✓	✓	✓	✓	✓	✓
MW28	✓	✓	✓	✓	✓	✓	✓
MW29	✓	✓	✓	✓	✓	✓	✓
MWDUP1		✓	✓	✓	✓		
TSW		✓					

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E31452K Date Results Required: STANDARD Page: 1 of 1	ENVIRONMENTAL INVESTIGATION SERVICES REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: ktaylor@jkgroup.net.au

Location: Bowral

Sampler: H.Wang

Sample Preserved In Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Combo 3L	VOCs	pH / EC	BTEX								
17/05/2018	1	MW03	G1, V, H, PVC		Water	X	X	X									
17/05/2018	2	MW21	G1, V, H, PVC		Water	X	X	X									
17/05/2018	3	MW28	G1, V, H, PVC		Water	X	X	X									
17/05/2018	4	MW29	G1, V, H, PVC		Water	X	X	X									
17/05/2018	5	MWDUP1	G1, V, H, PVC		Water	X											
17/05/2018	6	TSW	V		Water				X								

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

Job No: 191978
Date Received: 18/5/18
Time Received: 12:15
Received By: RW
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):

All analysis PQLs to ANZECC (2000) Detection Limits Please

Sample Containers:
G1 - 500mL Amber Glass Bottle G2 - 1L Amber Glass Bottle
V - BTEX Vial H - HNO3 Wash PVC
PVC - HDPE Plastic Bottles

Relinquished By:	Date:	Time:	Received By:	Date:
	18/5/18		Rebecca EVS RW	18/5/18 12:15

Appendix D: Report Explanatory Notes

STANDARD SAMPLING PROCEDURE

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by EIS. The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

Soil Sampling

- Prepare a borehole/test pit log or made a note of the sample description for stockpiles.
- Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill rig/excavator such that the machine can operate in a safe manner.
- Ensure all sampling equipment has been decontaminated prior to use.
- Remove any surface debris from the immediate area of the sampling location.
- Collect samples and place in glass jar with a Teflon seal. This should be undertaken as quickly as possible to prevent the loss of any volatiles. If possible, fill the glass jars completely.
- Collect samples for asbestos analysis and place in a zip-lock plastic bag.
- Label the sampling containers with the EIS job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
- Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled zip-lock plastic bags. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.
- Record the lithology of the sample and sample depth on the borehole/test pit log generally in accordance with AS1726-1993[23].
- Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with the standards outlined in the report.
- Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork where it is safe to do so. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.
- Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

Decontamination Procedures for Soil Sampling Equipment

- All sampling equipment should be decontaminated between every sampling location. This excludes single use PVC tubing used for push tubes etc. Equipment and materials required for the decontamination include:
  - Phosphate free detergent (Decon 90);
  - Potable water;
  - Stiff brushes; and
  - Plastic sheets.
- Ensure the decontamination materials are clean prior to proceeding with the decontamination.
- Fill both buckets with clean potable water and add phosphate free detergent to one bucket.

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[23] Standards Australia, (1993), *Geotechnical Site Investigations.* (AS1726-1993)

- In the bucket containing the detergent, scrub the sampling equipment until all the material attached to the equipment has been removed.
- Rinse sampling equipment in the bucket containing potable water.
- Place cleaned equipment on clean plastic sheets.

If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes, then the equipment should not be used until it has been thoroughly cleaned.

Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

- After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
- Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling, the condition of each well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
- Measure the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.
- Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or other low flow) techniques.
- Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
    - Stericup single-use filters (for heavy metals samples);
    - Bucket with volume increments;
    - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles;
    - Bucket with volume increments;
    - Flow cell;
    - pH/EC/Eh/Temperature meters;
    - Plastic drums used for transportation of purged water;
    - Esky and ice;
    - Nitrile gloves;
    - Distilled water (for cleaning);
    - Electronic dip meter;
    - Low flow peristaltic pump and associated tubing; and
    - Groundwater sampling forms.

- Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.
- Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.
- Groundwater samples are obtained from the monitoring wells using low flow sampling equipment to reduce the disturbance of the water column and loss of volatiles.
- During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%.
- All measurements are recorded on specific data sheets.
- Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.
- All samples are preserved in accordance with water sampling requirements specified by the laboratory and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice.
- At the end of each water sampling complete a chain of custody form for samples being sent to the laboratory.

Decontamination Procedures for Groundwater Sampling Equipment

- All equipment associated with the groundwater sampling procedure (other than single-use items) should be decontaminated between every sampling location.
- The following equipment and materials are required for the decontamination procedure:
  - Phosphate free detergent;
  - Potable water;
  - Distilled water; and
  - Plastic Sheets or bulk bags (plastic bags).
- Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.
- Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.
- Flush pump head with distilled water.
- Change water and detergent solution after each sampling location.
- Rinse sampling equipment in the bucket containing distilled water.
- Place cleaned equipment on clean plastic sheets.
- If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned

QA/QC DEFINITIONS

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[24] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[25].

Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" (Keith, 1991).

Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;

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[24] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[25] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide.*

- All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{(\text{Spike Sample Result} - \text{Sample Result}) \times 100}{\text{Concentration of Spike Added}}$$

Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

SCREENING CRITERIA DEFINITIONS

The following definitions have been adopted based on Schedule B(1) of NEPM (2013) and are relevant to Tier 1 screening criteria adopted for contamination assessments.

Health investigation levels (HILs) have been developed for a broad range of metals and organic substances. The HILs are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are generic to all soil types and apply generally to a depth of 3 m below the surface for residential use. Site-specific conditions should determine the depth to which HILs apply for other land uses.

Health screening levels (HSLs) have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via the inhalation and direct contact pathways. The HSLs depend on specific soil physicochemical properties, land use scenarios, and the characteristics of building structures. They apply to different soil types, and depths below surface to >4 m. HSLs have also been developed for asbestos and apply to the top 3m of soil.

Ecological investigation levels (EILs) have been developed for selected metals and organic substances and are applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and land use scenarios and generally apply to the top 2 m of soil.

Ecological screening levels (ESLs) have been developed for selected petroleum hydrocarbon compounds and total petroleum/recoverable hydrocarbon (TPH/TRH) fractions and are applicable for assessing risk to terrestrial ecosystems. ESLs broadly apply to coarse- and fine-grained soils and various land uses.
They are generally applicable to the top 2 m of soil.

Groundwater investigation levels (GILs) are the concentrations of a contaminant in groundwater above which further investigation (point of extraction) or a response (point of use) is required. GILs are based on Australian water quality guidelines and drinking water guidelines and are applicable for assessing human health risk and ecological risk from direct contact (including consumption) with groundwater.

Management Limits for Petroleum hydrocarbons are applicable to petroleum hydrocarbon compounds only. They are applicable as screening levels following evaluation of human health and ecological risks and risks to groundwater resources. They are relevant for operating sites where significant sub-surface leakage of petroleum compounds has occurred and when decommissioning industrial and commercial sites.

Interim soil vapour health investigation levels (interim HILs) have been developed for selected volatile organic chlorinated compounds (VOCCs) and are applicable to assessing human health risk by the inhalational pathway. They have interim status pending further scientific work on volatile gas modelling from the sub-surface to building interiors for chlorinated compounds.

Appendix E: Data (QA/QC) Evaluation

DATA (QA/QC) EVALUATION

INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 5.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this assessment is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	DUPKT1 (primary sample BH03 0.14-0.3m)	Approximately 2% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, Phenolics and PCBs
Intra-laboratory duplicate (soil)	DUPKT2 (primary sample BH29 0.0-0.2m)	As above	Heavy metals, TRH/BTEX, PAHs, OCPs, Phenolics and PCBs
Intra-laboratory duplicate (water)	MWDUP1 (primary sample MW29)	Approximately 25% of primary samples	Heavy metals, TRH/BTEX, PAHs
Inter-laboratory duplicate (soil)	DUPKT3 (primary sample BH28 0.1-0.25m)	Approximately 2% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs and PCBs
Inter-laboratory duplicate (soil)	DUPKT4 (primary sample BH21 0.0-0.2m)	As above	Heavy metals, TRH/BTEX, PAHs, OCPs and PCBs
Trip spike (water)	TS1 (17/5/2018)	One for the assessment to demonstrate adequacy of preservation, storage and transport methods	BTEX

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Trip blank (soil)	TB1 (11/5/18)	One for the assessment to demonstrate adequacy of storage and transport methods	BTEX
Rinsate (soil - Hand Auger)	RS1 (11/5/2018)	One for the assessment to demonstrate adequacy of decontamination methods	BTEX

The results for the field QA/QC samples are detailed in the laboratory summary tables (Table I to Table L inclusive) attached to the assessment report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

Data Assessment Criteria

EIS adopted the following criteria for assessing the field and laboratory QA/QC analytical results:

Field Duplicates

Acceptable targets for precision of field duplicates in this report will be less than 50% RPD for concentrations greater than 10 times the PQL, less than 75% RPD for concentrations between five and 10 times the PQL and less than 100% RPD for concentrations that are less than five times the PQL. RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Field Blanks and Rinsates

Acceptable targets for field blank and rinsate samples in this report will be less than the PQL for organic analytes. Metals will be considered on a case-by-case basis with regards to typical background concentrations in soils and published drinking water guidelines for waters.

Trip Spikes

Acceptable targets for trip spike samples in this report will be 70% to 130%. This is in line with spike recovery limits adopted by the laboratory for organic analysis.

Laboratory QA/QC

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the laboratory reports. These criteria were developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

Surrogate Spikes

- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

Method Blanks

- All results less than PQL.

DATA EVALUATION

Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance with the EIS SSP. The SSP was developed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

Laboratory PQLs

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC, with the exception of:

- the anthracene PQL for groundwater analysis which was 10 times greater than the ecological SAC. In light of the PAH concentrations reported for soil and groundwater, EIS are of the opinion that this is not significant, and it does not affect the quality of the dataset as a whole or the outcome of the assessment; and

- the PQL for total coliforms in soil was twice the adopted SAC. EIS are of the opinion that this is not significant as the purpose of the microbiological screening was to provide an indication of significant contamination in the vicinity of the medical waste area.

Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. RPD non-conformances were reported for some analytes as discussed below:

- An elevated RPD for benzo(a)pyrene was reported in DUPKT3/BH28 (0.0-0.2m); and
- Elevated RPDs were reported for several PAH compounds in DUPKT4/BH21 (0.0-0.2m).

As both the primary and duplicate sample results were less than the SAC, the exceedances are not considered to have had an adverse impact on the data set as a whole.

Field Blanks

During the investigation, one soil trip blank was placed in the esky during sampling and transported back to the laboratory. The results were all less than the PQLs, therefore cross contamination between samples that may have significance for data validity did not occur.

Rinsates

All results were below the PQL. This indicated that cross-contamination artefacts associated with sampling equipment were not present and the potential for cross-contamination to have occurred was low.

Trip Spikes

The results ranged from 105% to 120% and indicated that field preservation methods were appropriate.

Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this assessment.

A review of the laboratory QA/QC data identified the following minor non-conformances:

- The laboratory % RPD was exceeded for one sample for PAHs in soil, therefore a triplicate result was issued.

DATA QUALITY SUMMARY

EIS are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

Non-conformances were reported for some field QA/QC samples and laboratory QA/QC analysis. These non-conformances were considered to be sporadic and minor, and were not considered to be indicative of systematic sampling or analytical errors. On this basis, these non-conformances are not considered to materially impact the report findings.

There was only one groundwater monitoring event undertaken for the assessment. On this basis there is some uncertainty around the representativeness of the groundwater data, particularly during different climatic conditions and after wet/dry periods. However, given the low contaminant concentrations reported, the site history and the surrounding land uses, this is not considered to alter the conclusions of the assessment.

Appendix F: Field Work Documents

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

Client:	NSW Health Infrastructure	Job No.:	E31452K
Project:	Proposed Hospital Redevelopment	Well No.:	MW03
Location:	97-103 BOWRAL ROAD, BOWRAL, NSW	Depth (m):	6.18

WELL FINISH DETAILS

Gatic Cover ☒ Standpipe ☐ Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Electric pump	SWL – Before (m):	3.13
Date:	10.5.18	Time – Before:	15.20
Undertaken By:	K.Taylor	SWL – After (m):	5.81
Total Vol. Removed:	17	Time – After:	15.40
PID Reading (ppm):	—		
Comments:			

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/m)	pH	Eh (mV)
5	20.5	7.6	3070	—	622.2
10	20.9	6.5	3380	—	577.8
15	20.3	6.5	3209	—	476.8
17	20.2	5.5	3236	—	439.3

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))

Slow recharge from 15L. – 3 well volumes purged.

Tested By:	K.Taylor
Date Tested:	10.5.18
Checked By:	[signature]
Date:	29/5/2018

Remarks:

- All measurements are corrected to ground level
- All stated Volumes are in Litres
- SWL is an abbreviation for standing water level
- Steady state conditions - difference in the pH less than 0.2 units and difference in conductivity less than 10%
- Minimum 3 monitoring well volumes are purged

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

Client:	NSW Health Infrastructure	Job No.:	E31452K
Project:	Proposed Hospital Redevelopment	Well No.:	MW21
Location:	97-103 BOWRAL ROAD, BOWRAL, NSW	Depth (m):	5.33

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Electric pump	SWL – Before (m):	2.85
Date:	10.5.18	Time – Before:	15.50
Undertaken By:	K. Taylor	SWL – After (m):	5.01
Total Vol. Removed:	15	Time – After:	16.10
PID Reading (ppm):	—		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/m)	pH	Eh (mV)
5	17.1	17.5	2894	—	158.2
10	16.9	10.1	2348	—	155.1
15	17.0	7.1	2285	—	167.5

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Slow recharge from BL. – 3 well volumes purged.

Tested By:	K. Taylor
Date Tested:	10.5.18
Checked By:	[signature]
Date:	29/5/2018

Remarks:

- All measurements are corrected to ground level
- All stated Volumes are in Litres
- SWL is an abbreviation for standing water level
- Steady state conditions - difference in the pH less than 0.2 units and difference in conductivity less than 10%
- Minimum 3 monitoring well volumes are purged

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

Client:	NSW Health Infrastructure	Job No.:	E31452K
Project:	Proposed Hospital Redevelopment	Well No.:	MW28
Location:	97-103 BOWRAL ROAD, BOWRAL, NSW	Depth (m):	5.09

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Electric	SWL – Before (m):	4.77
Date:	9.5.18	Time – Before:	15.25
Undertaken By:	K. Taylor	SWL – After (m):	
Total Vol. Removed:		Time – After:	15.45
PID Reading (ppm):	—		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/m)	pH	Eh (mV)

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Not enough water to lift.

Tested By:	K. Taylor
Date Tested:	9.5.18.
Checked By:	
Date:	29/5/2018

Remarks:

- All measurements are corrected to ground level
- All stated Volumes are in Litres
- SWL is an abbreviation for standing water level
- Steady state conditions - difference in the pH less than 0.2 units and difference in conductivity less than 10%
- Minimum 3 monitoring well volumes are purged

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

Client:	NSW Health Infrastructure	**Job No.:**	E31452K
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW29
Location:	97-103 BOWRAL ROAD, BOWRAL, NSW	**Depth (m):**	5.60

WELL FINISH DETAILS

	Gatic Cover ☒	**Standpipe** ☐	**Other (describe)** ☐

WELL DEVELOPMENT DETAILS

Method:	Electric	**SWL – Before (m):**	1.44
Date:	9.5.18	**Time – Before:**	14.40pm
Undertaken By:	K Taylor	**SWL – After (m):**	
Total Vol. Removed:	30 L	**Time – After:**	15.00
PID Reading (ppm):	—		
Comments:			

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/m)	pH	Eh (mV)
5	19.1	8.7	1366	—	733.8
10	19.2	5.5	3138	—	593.2
15	19.0	2.7	3102	—	455.1
20	18.8	2.4	3096.	—	434.4
25	18.6	3.3	3123	—	310.5
30	18.6	3.1	3011	—	316.7

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))

3 well volumes purged.

* pH meter not working on WQM

Tested By:	K. Taylor	**Remarks:**
Date Tested:	9.5.18.	- All measurements are corrected to ground level - All stated Volumes are in Litres - SWL is an abbreviation for standing water level - Steady state conditions - difference in the pH less than 0.2 units and difference in conductivity less than 10% - Minimum 3 monitoring well volumes are purged
Checked By:	[signature]	
Date:	29/5/2018	

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

Client:	NSW Health Infrastructure	**Job No.:**	E31452K
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW03
Location:	97-103 BOWRAL ROAD, BOWRAL, NSW	**Depth (m):**	6.25

WELL FINISH

	Gatic Cover ✓		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Peristaltic pump	**SWL – Before:**	3.25m
Date:	17/5/18	**Time – Before:**	12:20pm
Undertaken By:	HW	**Total Vol Removed:**	6litres
Pump Program No:	7.92	**PID (ppm):**	7

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
2	3.59	1		20.50	3.50	3028	7.24	85.30
4	3.87	2		21.0	2.80	2853	6.70	116.40
6	4.03	3		21.20	2.70	2738	6.49	127.30
8	4.38	4		21.40	2.30	2525	6.31	134.80
10	4.41	5		21.50	2.10	2422	6.24	137.40
12	4.50	6		21.50	2.0	2390	6.16	143.10

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Sampling Containers Used: 2x glass amber, 4 x BTEX vials, / x H2NO3 plastic, x H2SO4 plastic, / x unpreserved plastic

Tested By: ~~Katrina Taylor~~ HW	**Remarks:**
Date Tested: 17.5.18	- All measurements are corrected to ground level
Checked By: [signature]	- SWL is an abbreviation for standing water level
Date: 29.5.18	- Steady state conditions - difference in the pH less than 0.2 units and difference in conductivity less than 10%

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

Client:	NSW Health Infrastructure	**Job No.:**	E31452K
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW21
Location:	97-103 BOWRAL ROAD, BOWRAL, NSW	**Depth (m):**	5.35

WELL FINISH

	Gatic Cover ✓		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Peristaltic pump	**SWL – Before:**	2.05m
Date:	17/5/18	**Time – Before:**	1:50 pm
Undertaken By:	HW	**Total Vol Removed:**	6 litres
Pump Program No:	7.91	**PID (ppm):**	0

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
2	2.40	1		17.80	3.30	1437	6.18	94.70
4	2.69	2		17.70	2.80	1187	5.73	101.20
6	2.87	3		17.60	2.30	1040	5.55	106.30
8	3.02	4		17.60	2.10	927	5.49	108.0
10	3.16	5		17.60	2.0	755	5.49	105.40
12	3.33	6		17.70	2.10	624	5.48	113.90

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Sampling Containers Used: 2 x glass amber, 4 x BTEX vials, 1 x H2NO3 plastic, x H2SO4 plastic, 1 x unpreserved plastic

Tested By: ~~Katrina Taylor~~ HW	**Remarks:**
Date Tested: 17.5.18	- All measurements are corrected to ground level
Checked By: [signature]	- SWL is an abbreviation for standing water level
Date: 29.5.18	- Steady state conditions - difference in the pH less than 0.2 units and difference in conductivity less than 10%

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

Client:	NSW Health Infrastructure	**Job No.:**	E31452K
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW28
Location:	97-103 BOWRAL ROAD, BOWRAL, NSW	**Depth (m):**	5.10

WELL FINISH

	Gatic Cover ✓		**Standpipe**		**Other (describe)**

WELL PURGE DETAILS:

Method:	Peristaltic pump	**SWL – Before:**	1.25m
Date:	17/5/2018	**Time – Before:**	10:22am
Undertaken By:	HW	**Total Vol Removed:**	4 Litres
Pump Program No:	9.01	**PID (ppm):**	1

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
2	1.71	1		16.60	3.30	2531	6.53	60.30
4	2.19	2		17.40	1.80	2548	6.66	53.30
6	2.22	3		17.60	1.70	2544	6.69	53.30
8	2.55	4		17.90	1.50	2540	6.69	53.60
Slow recharge rate								

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Sampling Containers Used: 2 x glass amber, 4 x BTEX vials, 1 x H2NO3 plastic, x H2SO4 plastic, 1 x unpreserved plastic

Tested By: ~~Katrina Taylor~~ HW	**Remarks:**
Date Tested: 17.5.18	- All measurements are corrected to ground level
Checked By: [signature]	- SWL is an abbreviation for standing water level
Date: 29.5.18	- Steady state conditions - difference in the pH less than 0.2 units and difference in conductivity less than 10%

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

Client:	NSW Health Infrastructure	Job No.:	E31452K
Project:	Proposed Hospital Redevelopment	Well No.:	MW29
Location:	97-103 BOWRAL ROAD, BOWRAL, NSW	Depth (m):	5.45

WELL FINISH

	Gatic Cover ✓		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Peristaltic pump	SWL – Before:	1.24m
Date:	17/5/2018	Time – Before:	8:30am
Undertaken By:	HW	Total Vol Removed:	6 litres
Pump Program No:	9.92,	PID (ppm):	0

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
1	1.55	1		14.90	2.0	3127	6.210	27.90
2	1.77	2		16.0	1.90	3237	5.90	11.30
4	1.95	3		16.40	1.20	3274	5.920	2.70
6	1.90	4		16.30	0.70	3253	5.910	0.50
8	1.90	5		16.30	0.60	3260	5.910	0.30
10	1.90	6		16.30	0.50	3264	5.910	0.20
DUP1								

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Sampling Containers Used: 4 x glass amber, 6 x BTEX vials, 2 x H2NO3 plastic, x H2SO4 plastic, 1 x unpreserved plastic

Tested By: ~~Katrina Taylor~~ HW	**Remarks:**
Date Tested: 17.5.18	- All measurements are corrected to ground level
Checked By: KW	- SWL is an abbreviation for standing water level
Date: 29.5.18	- Steady state conditions - difference in the pH less than 0.2 units and difference in conductivity less than 10%

Appendix G: Guidelines and Reference Documents

Australian and New Zealand Environment Conservation Council (ANZECC), (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

CRC Care, (2017). Technical Report No. 39 – Risk-based management and guidance for benzo(a)pyrene

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map (Series 9130N3, Ed 2)

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

National Health and Medical Research Council (NHMRC), (2011). National Water Quality Management Strategy, Australian Drinking Water Guidelines

NSW Department of Environment and Conservation, (2007). Guidelines for the Assessment and Management of Groundwater Contamination

NSW EPA, (1995). Contaminated Sites Sampling Design Guidelines

NSW EPA, (2014). Waste Classification Guidelines - Part 1: Classifying Waste

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

Olszowy, H., Torr, P., and Imray, P., (1995). Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy No.55 – Remediation of Land 1998 (NSW)

World Health Organisation (WHO), (2008). Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality