Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1694833	1694834	1694835	1694836
			Sample ID	MPA_AUK_TP1 19	MPA_AUK_TP1 14	MPA_AUK_TP1 09	MPA_AUK_TP1 16
			Depth	1	0.8	0.9	0.8
			Other ID	3	2A	3	3
			Sample Type	ES	ES	ES	ES
			Sampling Date	06/07/2020	06/07/2020	06/07/2020	06/07/2020
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PCBs							
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01			
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1694837	1695460	1695461	1695462	1695463
			Sample ID	MPA_AUK_TP1 15	MPA_AUK_TP 123	MPA_AUK_TP 120	MPA_AUK_TP 121	MPA_AUK_TP 122
			Depth	0.6	1	0.8	0.8	0.7
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	06/07/2020	07/07/2020	07/07/2020	07/07/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Asbestos Quantification	DETSC 1102	0.001	%					
Metals								
Aluminium	DETSC 2301*	1	mg/kg	10000	20000	40000	10000	44000
Antimony	DETSC 2301*	1	mg/kg	12	5.0	4.9	13	4.6
Arsenic	DETSC 2301#	0.2	mg/kg	17	14	6.7	9.6	7.5
Barium	DETSC 2301#	1.5	mg/kg	130	250	390	280	500
Beryllium	DETSC 2301#	0.2	mg/kg	0.2	1.8	3.9	0.5	4.4
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.2	2.1	2.0	2.7	2.6
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.5	0.1	1.3	0.5
Chromium	DETSC 2301#	0.15	mg/kg	520	150	240	680	240
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	28	63	25	89	30
Iron	DETSC 2301	25	mg/kg	250000	150000	92000	240000	85000
Lead	DETSC 2301#	0.3	mg/kg	22	57	17	180	59
Magnesium	DETSC 2301*	1	mg/kg	30000	31000	36000	35000	33000
Manganese	DETSC 2301#	20	mg/kg	14000	9200	8300	23000	10000
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.05	< 0.05	< 0.05	0.07
Molybdenum	DETSC 2301#	0.4	mg/kg	2.6	5.9	2.3	10	3.8
Nickel	DETSC 2301#	1	mg/kg	8.8	41	12	39	14
Silicon	DETSC 2301*	10	mg/kg	13000	15000	54000	21000	38000
Vanadium	DETSC 2301#	0.8	mg/kg	470	320	270	2500	300
Zinc	DETSC 2301#	1	mg/kg	45	170	87	650	190
Inorganics								
pH	DETSC 2008#		pH	12.6	11.5	12.0	12.5	11.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	< 0.1	0.1	0.3
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	1.7	< 0.6	1.1	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.4	0.5	0.4	0.6	0.4
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	86	120	110	13	260
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	28	< 0.75	8.0

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1694837	1695460	1695461	1695462	1695463
			Sample ID	MPA_AUK_TP115	MPA_AUK_TP123	MPA_AUK_TP120	MPA_AUK_TP121	MPA_AUK_TP122
			Depth	0.6	1	0.8	0.8	0.7
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	06/07/2020	07/07/2020	07/07/2020	07/07/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	5.5	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	33	2.0
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	86	33
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	130	37
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	2.5
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	130	39
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.78	0.05	< 0.03	0.15	0.08
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.18	0.09	0.04	0.12	0.11
Pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.08	0.03	0.06	0.10
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06	0.03	< 0.03	0.06
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.05	< 0.03	0.05	0.06
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	< 0.03	0.04	0.09
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03	< 0.03	< 0.03	0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	< 0.03	0.07
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.04
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.2	0.47	< 0.10	0.42	0.68

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Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1694837	1695460	1695461	1695462	1695463
			Sample ID	MPA_AUK_TP115	MPA_AUK_TP123	MPA_AUK_TP120	MPA_AUK_TP121	MPA_AUK_TP122
			Depth	0.6	1	0.8	0.8	0.7
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	06/07/2020	07/07/2020	07/07/2020	07/07/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PCBs								
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01			
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01			
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01			
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01			
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01			
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01			
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01			
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01			
Phenols								
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1695464	1695465	1696136	1696137	1696138
			Sample ID	MPA_AUK_TP 124	MPA_AUK_TP 125	MPA_AUK_TP1 06	MPA_AUK_TP1 07	MPA_AUK_TP1 12
			Depth	0.8	0.8	1	0.9	0.9
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	07/07/2020	07/07/2020	08/07/2020	08/07/2020	08/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Asbestos Quantification	DETSC 1102	0.001	%					
Metals								
Aluminium	DETSC 2301*	1	mg/kg	35000	2800	50000	14000	15000
Antimony	DETSC 2301*	1	mg/kg	8.8	5.0	2.6	7.8	9.6
Arsenic	DETSC 2301#	0.2	mg/kg	230	20	33	3.1	5.7
Barium	DETSC 2301#	1.5	mg/kg	240	570	350	530	170
Beryllium	DETSC 2301#	0.2	mg/kg	3.8	3.0	4.6	1.0	0.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	3.0	3.3	7.8	7.7	3.1
Cadmium	DETSC 2301#	0.1	mg/kg	1.0	1.4	0.5	0.4	0.5
Chromium	DETSC 2301#	0.15	mg/kg	400	270	140	380	580
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	110	37	33	80	40
Iron	DETSC 2301	25	mg/kg	120000	5900	59000	230000	200000
Lead	DETSC 2301#	0.3	mg/kg	140	200	29	23	15
Magnesium	DETSC 2301*	1	mg/kg	21000	2200	29000	21000	40000
Manganese	DETSC 2301#	20	mg/kg	7200	1500	29000	18000	21000
Mercury	DETSC 2325#	0.05	mg/kg	0.08	0.24	< 0.05	< 0.05	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	62	2.4	3.1	13	6.9
Nickel	DETSC 2301#	1	mg/kg	150	16	38	40	19
Silicon	DETSC 2301*	10	mg/kg	55000	49000	33000	26000	34000
Vanadium	DETSC 2301#	0.8	mg/kg	670	75	410	490	760
Zinc	DETSC 2301#	1	mg/kg	240	470	140	72	110
Inorganics								
pH	DETSC 2008#		pH	9.8	11.2	11.1	11.9	12.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	3.2	7.4	0.3	0.3	0.2
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	1.1	0.7	0.6
Organic matter	DETSC 2002#	0.1	%	0.5	0.4	1.7	1.4	1.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1500	190	490	27	< 10
Sulphur (free)	DETSC 3049#	0.75	mg/kg	10	3.3	30	23	< 0.75

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Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1695464	1695465	1696136	1696137	1696138
			Sample ID	MPA_AUK_TP 124	MPA_AUK_TP 125	MPA_AUK_TP1 06	MPA_AUK_TP1 07	MPA_AUK_TP1 12
			Depth	0.8	0.8	1	0.9	0.9
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	07/07/2020	07/07/2020	08/07/2020	08/07/2020	08/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	1.7	2.9	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	4.4	15	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	11	27	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	120	160	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	130	200	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	130	200	< 10
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.20	0.16	0.07	0.05	0.09
Anthracene	DETSC 3303	0.03	mg/kg	0.04	0.04	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.43	0.39	0.10	0.09	0.12
Pyrene	DETSC 3303#	0.03	mg/kg	0.37	0.32	0.09	0.08	0.09
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.22	0.13	0.04	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.19	0.14	0.06	0.06	0.06
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.26	0.20	0.05	0.05	0.05
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.11	0.08	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.16	0.11	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.08	0.06	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.10	0.07	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	2.1	1.8	0.41	0.33	0.40

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Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1695464	1695465	1696136	1696137	1696138
			Sample ID	MPA_AUK_TP124	MPA_AUK_TP125	MPA_AUK_TP106	MPA_AUK_TP107	MPA_AUK_TP112
			Depth	0.8	0.8	1	0.9	0.9
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	07/07/2020	07/07/2020	08/07/2020	08/07/2020	08/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PCBs								
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01	
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01	
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01	
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01	
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01	
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01	
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01	
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01	
Phenols								
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

	Lab No	1696139	1696140	1696141	1699073	1699074
	Sample ID	MPA_AUK_TP1 13	MPA_AUK_TP1 17	MPA_AUK_TP1 18	MPA_AUK_TP 126	MPA_AUK_TP 127
	Depth	0.9	0.6	0.8	0.8	0.9
	Other ID	3	3	3	3	3
	Sample Type	ES	ES	ES	ES	ES
	Sampling Date	08/07/2020	08/07/2020	08/07/2020	13/07/2020	10/07/2020
	Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Asbestos Quantification	DETSC 1102	0.001	%					
Metals								
Aluminium	DETSC 2301*	1	mg/kg	11000	11000	25000	26000	17000
Antimony	DETSC 2301*	1	mg/kg	11	10	9.3	7.2	10
Arsenic	DETSC 2301#	0.2	mg/kg	5.5	1.1	6.4	9.6	7.1
Barium	DETSC 2301#	1.5	mg/kg	96	120	460	800	280
Beryllium	DETSC 2301#	0.2	mg/kg	0.2	0.2	1.9	1.9	0.6
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	3.5	2.4	4.0	11	10
Cadmium	DETSC 2301#	0.1	mg/kg	0.8	0.2	0.7	0.3	0.2
Chromium	DETSC 2301#	0.15	mg/kg	360	710	580	420	710
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	1500	27	44	42	35
Iron	DETSC 2301	25	mg/kg	440000	140000	150000	140000	140000
Lead	DETSC 2301#	0.3	mg/kg	35	8.0	49	20	13
Magnesium	DETSC 2301*	1	mg/kg	19000	30000	33000	33000	27000
Manganese	DETSC 2301#	20	mg/kg	12000	15000	20000	62000	32000
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	23	4.3	5.2	3.9	3.3
Nickel	DETSC 2301#	1	mg/kg	66	13	16	27	20
Silicon	DETSC 2301*	10	mg/kg	35000	43000	39000	46000	50000
Vanadium	DETSC 2301#	0.8	mg/kg	190	770	510	490	800
Zinc	DETSC 2301#	1	mg/kg	460	60	180	60	53
Inorganics								
pH	DETSC 2008#		pH	12.0	12.3	12.0	12.0	12.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.4	< 0.1	0.9	0.3	0.3
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	1.2	< 0.6
Organic matter	DETSC 2002#	0.1	%	1.8	0.9	0.8	1.2	1.9
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	11	< 10	47	11	13
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	24	< 0.75	< 0.75

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1696139	1696140	1696141	1699073	1699074
			Sample ID	MPA_AUK_TP1 13	MPA_AUK_TP1 17	MPA_AUK_TP1 18	MPA_AUK_TP 126	MPA_AUK_TP 127
			Depth	0.9	0.6	0.8	0.8	0.9
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	08/07/2020	08/07/2020	08/07/2020	13/07/2020	10/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	7.9	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	34	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	890	32	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	940	33	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	0.6	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	1.3	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	100	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	110	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	1000	33	< 10	< 10	< 10
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	0.14	0.12	0.09
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.19	< 0.03	0.21	0.17	0.08
Pyrene	DETSC 3303#	0.03	mg/kg	0.14	< 0.03	0.16	0.12	0.06
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	0.07	0.05	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.09	< 0.03	0.10	0.08	0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03	0.11	0.13	0.04
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	0.06	0.09	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	0.05	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.04	0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.04	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.70	< 0.10	0.98	0.79	0.31

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Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

				Lab No	1696139	1696140	1696141	1699073	1699074
				Sample ID	MPA_AUK_TP1 13	MPA_AUK_TP1 17	MPA_AUK_TP1 18	MPA_AUK_TP 126	MPA_AUK_TP 127
				Depth	0.9	0.6	0.8	0.8	0.9
				Other ID	3	3	3	3	3
				Sample Type	ES	ES	ES	ES	ES
				Sampling Date	08/07/2020	08/07/2020	08/07/2020	13/07/2020	10/07/2020
				Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PCBs									
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg						
PCB 52	DETSC 3401#	0.01	mg/kg						
PCB 101	DETSC 3401#	0.01	mg/kg						
PCB 118	DETSC 3401#	0.01	mg/kg						
PCB 153	DETSC 3401#	0.01	mg/kg						
PCB 138	DETSC 3401#	0.01	mg/kg						
PCB 180	DETSC 3401#	0.01	mg/kg						
PCB 7 Total	DETSC 3401#	0.01	mg/kg						
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1699075	1699076	1699077	1699078	1699079
			Sample ID	MPA_AUK_TP 128	MPA_AUK_TP 129	MPA_AUK_TP 130	MPA_AUK_TP 102A	MPA_AUK_TP 110
			Depth	0.9	1.1	0.6	1	1
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	10/07/2020	13/07/2020	10/07/2020	13/07/2020	13/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Asbestos Quantification	DETSC 1102	0.001	%			0.002	0.002	
Metals								
Aluminium	DETSC 2301*	1	mg/kg	5000	19000	21000	23000	17000
Antimony	DETSC 2301*	1	mg/kg	9.8	9.5	6.1	8.4	6.7
Arsenic	DETSC 2301#	0.2	mg/kg	6.6	5.3	20	32	3.5
Barium	DETSC 2301#	1.5	mg/kg	49	380	110	270	140
Beryllium	DETSC 2301#	0.2	mg/kg	< 0.2	0.6	0.5	2.9	0.5
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	18	3.4	5.9	18	3.6
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.9	0.2	0.5	0.2
Chromium	DETSC 2301#	0.15	mg/kg	320	520	350	500	360
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	160	41	29	47	28
Iron	DETSC 2301	25	mg/kg	510000	250000	140000	120000	120000
Lead	DETSC 2301#	0.3	mg/kg	17	24	13	33	21
Magnesium	DETSC 2301*	1	mg/kg	30000	31000	67000	31000	34000
Manganese	DETSC 2301#	20	mg/kg	9800	18000	18000	65000	16000
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	68	6.1	4.5	5.8	3.6
Nickel	DETSC 2301#	1	mg/kg	100	18	100	23	24
Silicon	DETSC 2301*	10	mg/kg	29000	41000	40000	45000	32000
Vanadium	DETSC 2301#	0.8	mg/kg	120	970	230	740	340
Zinc	DETSC 2301#	1	mg/kg	63	100	57	100	160
Inorganics								
pH	DETSC 2008#		pH	11.8	12.3	12.4	12.3	12.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	< 0.1	0.5	0.2
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	1.8	< 0.6
Organic matter	DETSC 2002#	0.1	%	2.5	1.9	1.1	1.8	1.4
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	24	< 10	< 10	44	< 10
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1699075	1699076	1699077	1699078	1699079
			Sample ID	MPA_AUK_TP 128	MPA_AUK_TP 129	MPA_AUK_TP 130	MPA_AUK_TP 102A	MPA_AUK_TP 110
			Depth	0.9	1.1	0.6	1	1
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	10/07/2020	13/07/2020	10/07/2020	13/07/2020	13/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	2.1	< 1.5	< 1.5	2.0	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	4.6	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	12	< 1.5	< 1.5	5.8	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	180	< 3.4	< 3.4	28	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	200	< 10	< 10	37	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	7.7	4.1	< 0.5	2.8	4.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	26	15	< 0.6	16	15
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	190	35	< 1.4	60	39
Aromatic C5-C35	DETSC 3072*	10	mg/kg	220	54	< 10	79	60
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	420	54	< 10	120	60
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	0.27	< 0.03	0.09	0.28
Anthracene	DETSC 3303	0.03	mg/kg	0.06	0.04	0.05	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.41	< 0.03	0.23	0.34
Pyrene	DETSC 3303#	0.03	mg/kg	0.03	0.31	< 0.03	0.21	0.27
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.12	< 0.03	0.11	0.11
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.15	< 0.03	0.13	0.15
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.20	< 0.03	0.15	0.16
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	< 0.03	0.06	0.19
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.12	< 0.03	0.06	0.08
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	< 0.03	0.05	0.07
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	< 0.03	0.05	0.08
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.13	1.9	< 0.10	1.1	1.7

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1699075	1699076	1699077	1699078	1699079
			Sample ID	MPA_AUK_TP 128	MPA_AUK_TP 129	MPA_AUK_TP 130	MPA_AUK_TP 102A	MPA_AUK_TP 110
			Depth	0.9	1.1	0.6	1	1
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	10/07/2020	13/07/2020	10/07/2020	13/07/2020	13/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PCBs								
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg					
PCB 52	DETSC 3401#	0.01	mg/kg					
PCB 101	DETSC 3401#	0.01	mg/kg					
PCB 118	DETSC 3401#	0.01	mg/kg					
PCB 153	DETSC 3401#	0.01	mg/kg					
PCB 138	DETSC 3401#	0.01	mg/kg					
PCB 180	DETSC 3401#	0.01	mg/kg					
PCB 7 Total	DETSC 3401#	0.01	mg/kg					
Phenols								
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis
Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

				Lab No	1699080	1705062	1705063	1705064	1705065
				Sample ID	MPA_AUK_TP 111	MPA_AUK_TP1 01	MPA_AUK_TP1 01	MPA_AUK_TP1 02	MPA_AUK_TP1 03
				Depth	1.2	0.9	3.5	0.6	0.8
				Other ID	3	3	9	3	3
				Sample Type	ES	ES	ES	ES	ES
				Sampling Date	10/07/2020	09/07/2020	09/07/2020	09/07/2020	09/07/2020
				Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification	DETSC 1102	0.001	%				0.003		
Metals									
Aluminium	DETSC 2301*	1	mg/kg	15000	9700	19000	20000	20000	
Antimony	DETSC 2301*	1	mg/kg	9.4	2.4	13	8.5	8.1	
Arsenic	DETSC 2301#	0.2	mg/kg	2.5	64	220	31	13	
Barium	DETSC 2301#	1.5	mg/kg	240	120	890	220	360	
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	1.1	2.0	0.7	0.7	
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	3.6	19	7.5	5.1	4.5	
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.3	7.6	0.4	0.5	
Chromium	DETSC 2301#	0.15	mg/kg	620	130	320	570	500	
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Copper	DETSC 2301#	0.2	mg/kg	28	170	250	110	55	
Iron	DETSC 2301	25	mg/kg	160000	39000	190000	230000	200000	
Lead	DETSC 2301#	0.3	mg/kg	28	68	480	43	39	
Magnesium	DETSC 2301*	1	mg/kg	37000	7600	17000	40000	35000	
Manganese	DETSC 2301#	20	mg/kg	20000	14000	30000	28000	26000	
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.20	1.9	0.12	< 0.05	
Molybdenum	DETSC 2301#	0.4	mg/kg	3.6	1.5	7.8	5.1	4.6	
Nickel	DETSC 2301#	1	mg/kg	11	12	56	19	19	
Silicon	DETSC 2301*	10	mg/kg	33000	130000	52000	29000	22000	
Vanadium	DETSC 2301#	0.8	mg/kg	840	90	780	510	730	
Zinc	DETSC 2301#	1	mg/kg	73	160	1600	150	140	
Inorganics									
pH	DETSC 2008#		pH	12.5	11.2	11.3	12.7	12.6	
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.5	1.0	20	0.4	1.2	
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Thiocyanate	DETSC 2130#	0.6	mg/kg	0.8	1.4	< 0.6	0.9	< 0.6	
Organic matter	DETSC 2002#	0.1	%	1.5	4.0	3.8	1.4	1.3	
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	< 10	900	630	< 10	11	
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	3.8	35	< 0.75	2.3	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1699080	1705062	1705063	1705064	1705065
			Sample ID	MPA_AUK_TP 111	MPA_AUK_TP1 01	MPA_AUK_TP1 01	MPA_AUK_TP1 02	MPA_AUK_TP1 03
			Depth	1.2	0.9	3.5	0.6	0.8
			Other ID	3	3	9	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	10/07/2020	09/07/2020	09/07/2020	09/07/2020	09/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	1.6
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	2.4
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	17	< 1.5	6.8
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	350	< 3.4	37
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	370	< 10	48
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	4.8	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	24	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	8.1	160	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	190	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	560	< 10	48
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.42	< 0.03	0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.39	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.66	< 0.03	0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.25	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	1.8	< 0.03	0.81
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.87	< 0.03	0.17
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03	7.6	0.09	0.83
Pyrene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	4.8	0.06	0.55
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	2.5	< 0.03	0.17
Chrysene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	2.7	< 0.03	0.27
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	4.6	< 0.03	0.26
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	1.5	< 0.03	0.11
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	4.2	< 0.03	0.14
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	2.5	< 0.03	0.10
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.55	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	3.5	< 0.03	0.10
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.28	< 0.10	39	0.16	3.6

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1699080	1705062	1705063	1705064	1705065
			Sample ID	MPA_AUK_TP 111	MPA_AUK_TP1 01	MPA_AUK_TP1 01	MPA_AUK_TP1 02	MPA_AUK_TP1 03
			Depth	1.2	0.9	3.5	0.6	0.8
			Other ID	3	3	9	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	10/07/2020	09/07/2020	09/07/2020	09/07/2020	09/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PCBs								
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg					
PCB 52	DETSC 3401#	0.01	mg/kg					
PCB 101	DETSC 3401#	0.01	mg/kg					
PCB 118	DETSC 3401#	0.01	mg/kg					
PCB 153	DETSC 3401#	0.01	mg/kg					
PCB 138	DETSC 3401#	0.01	mg/kg					
PCB 180	DETSC 3401#	0.01	mg/kg					
PCB 7 Total	DETSC 3401#	0.01	mg/kg					
Phenols								
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis
Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

				Lab No	1705066	1705067	1705068	1740101	1740102
				Sample ID	MPA_AUK_TP104	MPA_AUK_TP105	MPA_AUK_TP108	SSA	SSD
				Depth	1	1	1	0.00	0.00
				Other ID	3	3	3	A	D
				Sample Type	ES	ES	ES	ES	ES
				Sampling Date	09/07/2020	09/07/2020	08/07/2020	02/10/2020	02/10/2020
				Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification	DETSC 1102	0.001	%						
Metals									
Aluminium	DETSC 2301*	1	mg/kg	22000	14000	12000		
Antimony	DETSC 2301*	1	mg/kg	3.5	10	10		
Arsenic	DETSC 2301#	0.2	mg/kg	60	6.7	0.8	3.2	12
Barium	DETSC 2301#	1.5	mg/kg	230	500	130		
Beryllium	DETSC 2301#	0.2	mg/kg	3.3	1.0	0.3		
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	28	12	2.4	4.3	11
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.3	0.1	0.1	0.2
Chromium	DETSC 2301#	0.15	mg/kg	120	500	740	300	300
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	46	39	22	24	28
Iron	DETSC 2301	25	mg/kg	80000	200000	170000		
Lead	DETSC 2301#	0.3	mg/kg	17	20	12	20	44
Magnesium	DETSC 2301*	1	mg/kg	23000	31000	29000		
Manganese	DETSC 2301#	20	mg/kg	62000	27000	19000		
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	9.1	7.8	4.4		
Nickel	DETSC 2301#	1	mg/kg	39	17	5.8	9.0	13
Silicon	DETSC 2301*	10	mg/kg	39000	36000	30000		
Vanadium	DETSC 2301#	0.8	mg/kg	170	400	830	540	41
Zinc	DETSC 2301#	1	mg/kg	82	84	59	77	93
Inorganics									
pH	DETSC 2008#		pH	11.6	12.4	12.9	12.4	12.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.6	0.5	< 0.1	1.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	0.7
Organic matter	DETSC 2002#	0.1	%	0.9	1.2	1.2	2.1	1.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	95	34	< 10	23	500
Sulphur (free)	DETSC 3049#	0.75	mg/kg	3.3	< 0.75	< 0.75	1.4	< 0.75

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1705066	1705067	1705068	1740101	1740102
			Sample ID	MPA_AUK_TP104	MPA_AUK_TP105	MPA_AUK_TP108	SSA	SSD
			Depth	1	1	1	0.00	0.00
			Other ID	3	3	3	A	D
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	09/07/2020	09/07/2020	08/07/2020	02/10/2020	02/10/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	41	21
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	42	22
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	42	22
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.07	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.15	< 0.03	0.09	0.73	0.13
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.14	0.08	0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.41	0.05	0.06	0.93	0.33
Pyrene	DETSC 3303#	0.03	mg/kg	0.29	< 0.03	0.05	0.64	0.27
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	< 0.03	0.33	0.15
Chrysene	DETSC 3303	0.03	mg/kg	0.15	< 0.03	0.03	0.33	0.15
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.38	0.18
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.15	0.09
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.20	0.13
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.11	0.06
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.13	0.08
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.2	< 0.10	0.37	4.1	1.6

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

	Lab No	1705066	1705067	1705068	1740101	1740102
	Sample ID	MPA_AUK_TP104	MPA_AUK_TP105	MPA_AUK_TP108	SSA	SSD
	Depth	1	1	1	0.00	0.00
	Other ID	3	3	3	A	D
	Sample Type	ES	ES	ES	ES	ES
	Sampling Date	09/07/2020	09/07/2020	08/07/2020	02/10/2020	02/10/2020
	Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg			
PCB 52	DETSC 3401#	0.01	mg/kg			
PCB 101	DETSC 3401#	0.01	mg/kg			
PCB 118	DETSC 3401#	0.01	mg/kg			
PCB 153	DETSC 3401#	0.01	mg/kg			
PCB 138	DETSC 3401#	0.01	mg/kg			
PCB 180	DETSC 3401#	0.01	mg/kg			
PCB 7 Total	DETSC 3401#	0.01	mg/kg			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis
Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1740103	1740104	1740105
			Sample ID	SSC	SSE	SSB
			Depth	0.00	0.00	0.00
			Other ID	C	E	B
			Sample Type	ES	ES	ES
			Sampling Date	02/10/2020	02/10/2020	02/10/2020
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Asbestos Quantification	DETSC 1102	0.001	%			
Metals						
Aluminium	DETSC 2301*	1	mg/kg			
Antimony	DETSC 2301*	1	mg/kg			
Arsenic	DETSC 2301#	0.2	mg/kg	4.8	8.7	8.1
Barium	DETSC 2301#	1.5	mg/kg			
Beryllium	DETSC 2301#	0.2	mg/kg			
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	2.4	7.0	5.2
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	2.1
Chromium	DETSC 2301#	0.15	mg/kg	370	260	460
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	25	23	39
Iron	DETSC 2301	25	mg/kg			
Lead	DETSC 2301#	0.3	mg/kg	11	22	130
Magnesium	DETSC 2301*	1	mg/kg			
Manganese	DETSC 2301#	20	mg/kg			
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.10
Molybdenum	DETSC 2301#	0.4	mg/kg			
Nickel	DETSC 2301#	1	mg/kg	15	12	20
Silicon	DETSC 2301*	10	mg/kg			
Vanadium	DETSC 2301#	0.8	mg/kg	410	230	410
Zinc	DETSC 2301#	1	mg/kg	52	150	610
Inorganics						
pH	DETSC 2008#		pH	12.0	12.2	12.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.5	1.1	5.2
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	0.7	< 0.6	0.8
Organic matter	DETSC 2002#	0.1	%	4.3	1.5	2.1
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	22	22	< 10
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	52	< 0.75

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1740103	1740104	1740105
			Sample ID	SSC	SSE	SSB
			Depth	0.00	0.00	0.00
			Other ID	C	E	B
			Sample Type	ES	ES	ES
			Sampling Date	02/10/2020	02/10/2020	02/10/2020
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	12	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	35	48	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	35	59	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	3.4	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	56	7.2
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	170	17
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	230	24
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	35	290	24
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.25	0.05
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	1.1	0.05
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.52	0.06
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.45	0.06
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.36	4.2	0.43
Anthracene	DETSC 3303	0.03	mg/kg	0.08	1.5	0.10
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.84	11	0.91
Pyrene	DETSC 3303#	0.03	mg/kg	0.61	13	0.77
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.36	9.3	0.40
Chrysene	DETSC 3303	0.03	mg/kg	0.28	8.1	0.39
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.36	11	0.41
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.16	5.6	0.19
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.20	9.2	0.33
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.10	4.1	0.12
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.95	0.04
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.11	4.9	0.15
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	3.5	85	4.5

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

	Lab No	1740103	1740104	1740105
	Sample ID	SSC	SSE	SSB
	Depth	0.00	0.00	0.00
	Other ID	C	E	B
	Sample Type	ES	ES	ES
	Sampling Date	02/10/2020	02/10/2020	02/10/2020
	Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**	
PCBs				
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	
PCB 52	DETSC 3401#	0.01	mg/kg	
PCB 101	DETSC 3401#	0.01	mg/kg	
PCB 118	DETSC 3401#	0.01	mg/kg	
PCB 153	DETSC 3401#	0.01	mg/kg	
PCB 138	DETSC 3401#	0.01	mg/kg	
PCB 180	DETSC 3401#	0.01	mg/kg	
PCB 7 Total	DETSC 3401#	0.01	mg/kg	
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1694833	1694837	1695460	1695462	1695464
			Sample ID	MPA_AUK_TP1 19	MPA_AUK_TP1 15	MPA_AUK_TP 123	MPA_AUK_TP 121	MPA_AUK_TP 124
			Depth	1	0.6	1	0.8	0.8
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	06/07/2020	06/07/2020	07/07/2020	07/07/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
VOCs								
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1694833	1694837	1695460	1695462	1695464
			Sample ID	MPA_AUK_TP1 19	MPA_AUK_TP1 15	MPA_AUK_TP 123	MPA_AUK_TP 121	MPA_AUK_TP 124
			Depth	1	0.6	1	0.8	0.8
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	06/07/2020	06/07/2020	07/07/2020	07/07/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs								
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1694833	1694837	1695460	1695462	1695464
			Sample ID	MPA_AUK_TP1 19	MPA_AUK_TP1 15	MPA_AUK_TP 123	MPA_AUK_TP 121	MPA_AUK_TP 124
			Depth	1	0.6	1	0.8	0.8
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	06/07/2020	06/07/2020	07/07/2020	07/07/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1696136	1696140	1699080	1705065	1705068
			Sample ID	MPA_AUK_TP106	MPA_AUK_TP117	MPA_AUK_TP111	MPA_AUK_TP103	MPA_AUK_TP108
			Depth	1	0.6	1.2	0.8	1
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	08/07/2020	08/07/2020	10/07/2020	09/07/2020	08/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
VOCs								
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

				Lab No	1696136	1696140	1699080	1705065	1705068
				Sample ID	MPA_AUK_TP1 06	MPA_AUK_TP1 17	MPA_AUK_TP 111	MPA_AUK_TP1 03	MPA_AUK_TP1 08
				Depth	1	0.6	1.2	0.8	1
				Other ID	3	3	3	3	3
				Sample Type	ES	ES	ES	ES	ES
				Sampling Date	08/07/2020	08/07/2020	10/07/2020	09/07/2020	08/07/2020
				Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Tert-butylbenzene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs									
Phenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1696136	1696140	1699080	1705065	1705068
			Sample ID	MPA_AUK_TP106	MPA_AUK_TP117	MPA_AUK_TP111	MPA_AUK_TP103	MPA_AUK_TP108
			Depth	1	0.6	1.2	0.8	1
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	08/07/2020	08/07/2020	10/07/2020	09/07/2020	08/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

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Summary of Chemical Analysis

Leachate Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1695466	1695467	1695468	1695469	1695470
				MPA_AUK_TP	MPA_AUK_TP	MPA_AUK_TP	MPA_AUK_TP	MPA_AUK_TP
			Sample ID	123	121	124	119	115
			Depth	1	0.8	0.8	1	0.6
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	07/07/2020	07/07/2020	07/07/2020	07/07/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Preparation								
Leachate 2:1 250g Non-WAC	DETSC 1009*			Y	Y	Y	Y	Y
Metals								
Antimony, Dissolved	DETSC 2306	0.17	ug/l	0.35	0.21	0.24	< 0.17	0.68
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.99	0.44	23	0.25	1.8
Barium, Dissolved	DETSC 2306	0.26	ug/l	40	380	53	45	11
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	63	37	76	22	28
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	0.04	0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	5.7	8.3	1.0	< 0.25	0.35
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	6.6	9.7	3.2	9.9	4.1
Iron, Dissolved	DETSC 2306	5.5	ug/l	13	< 5.5	5.9	< 5.5	120
Lead, Dissolved	DETSC 2306	0.09	ug/l	2.2	61	2.6	0.25	0.83
Magnesium, Dissolved	DETSC 2306	0.02	mg/l	0.11	0.02	4.4	0.04	0.40
Manganese, Dissolved	DETSC 2306	0.22	ug/l	0.74	0.27	19	0.47	1.7
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.02	0.07	< 0.01	0.01	< 0.01
Molybdenum, Dissolved	DETSC 2306	1.1	ug/l	10	95	11	19	< 1.1
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	0.5	< 0.5	< 0.5
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	51	7.3	5.2	3.0	1.5
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	4.5	5.7	< 1.3	3.2
Inorganics								
pH	DETSC 2008		pH	11.3	12.2	8.5	8.2	11.9
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015	< 0.015	< 0.015	0.41	0.025
Chloride	DETSC 2055	0.1	mg/l	2.9	9.3	3.5	2.8	2.0
Sulphate as SO4	DETSC 2055	0.1	mg/l	13	9.5	240	8.0	21

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Summary of Chemical Analysis

Leachate Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1695466	1695467	1695468	1695469	1695470
				MPA_AUK_TP	MPA_AUK_TP	MPA_AUK_TP	MPA_AUK_TP	MPA_AUK_TP
			Sample ID	123	121	124	119	115
			Depth	1	0.8	0.8	1	0.6
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	07/07/2020	07/07/2020	07/07/2020	07/07/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
PAHs								
Naphthalene	DETSC 3304	0.05	ug/l	85	0.09	< 0.05	0.11	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	0.19	< 0.01	< 0.01	0.03	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	2.4	< 0.01	< 0.01	0.04	0.26
Fluorene	DETSC 3304	0.01	ug/l	0.66	< 0.01	< 0.01	0.03	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.46	0.07	0.03	0.32	0.46
Anthracene	DETSC 3304	0.01	ug/l	0.38	0.02	0.01	0.07	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.07	0.01	0.04	0.54	0.09
Pyrene	DETSC 3304	0.01	ug/l	0.06	< 0.01	0.03	0.45	0.05
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.04	< 0.01	0.02	0.30	0.02
Chrysene	DETSC 3304	0.01	ug/l	0.03	< 0.01	0.03	0.45	0.03
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.03	< 0.01	0.03	0.74	0.05
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.01	0.24	0.02
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	0.02	0.56	0.04
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.01	0.40	0.03
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.11	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.02	0.50	0.04
PAH Total	DETSC 3304	0.2	ug/l	90	0.23	0.30	4.9	1.2
Phenols								
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	< 100	< 100	< 100

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

				Lab No	1696142	1696143	1699081	1705069	1705070
				Sample ID	MPA_AUK_TP106	MPA_AUK_TP117	MPA_AUK_TP111	MPA_AUK_TP103	MPA_AUK_TP108
				Depth	1	0.6	1.2	0.8	1
				Other ID	3	3	3	3	3
				Sample Type	ES	ES	ES	ES	ES
				Sampling Date	08/07/2020	08/07/2020	10/07/2020	09/07/2020	08/07/2020
				Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
Leachate 2:1 250g Non-WAC	DETSC 1009*				Y	Y	Y	Y	Y
Metals									
Antimony, Dissolved	DETSC 2306	0.17	ug/l		0.52	0.28	0.31	0.29	< 0.17
Arsenic, Dissolved	DETSC 2306	0.16	ug/l		1.3	0.17	0.33	0.37	0.35
Barium, Dissolved	DETSC 2306	0.26	ug/l		22	18	560	250	290
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l		190	130	< 12	< 12	80
Cadmium, Dissolved	DETSC 2306	0.03	ug/l		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l		1.1	4.0	7.8	3.6	6.6
Chromium, Hexavalent	DETSC 2203	7	ug/l		< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l		2.8	7.4	13	12	9.0
Iron, Dissolved	DETSC 2306	5.5	ug/l		< 5.5	< 5.5	5.5	350	34
Lead, Dissolved	DETSC 2306	0.09	ug/l		< 0.09	< 0.09	11	2.2	0.37
Magnesium, Dissolved	DETSC 2306	0.02	mg/l		0.49	0.07	0.05	0.23	0.23
Manganese, Dissolved	DETSC 2306	0.22	ug/l		0.92	0.26	0.40	0.62	0.50
Mercury, Dissolved	DETSC 2306	0.01	ug/l		< 0.01	< 0.01	0.04	< 0.01	< 0.01
Molybdenum, Dissolved	DETSC 2306	1.1	ug/l		1.4	3.2	25	1.8	1.8
Nickel, Dissolved	DETSC 2306	0.5	ug/l		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vanadium, Dissolved	DETSC 2306	0.6	ug/l		39	10	1.2	2.4	3.4
Zinc, Dissolved	DETSC 2306	1.3	ug/l		< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
Inorganics									
pH	DETSC 2008		pH		9.6	11.4	12.3	11.3	11.8
Cyanide, Total	DETSC 2130	40	ug/l		< 40	< 40	< 40	< 40	< 40
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l		0.067	0.024	< 0.015	< 0.015	< 0.015
Chloride	DETSC 2055	0.1	mg/l		3.7	4.0	4.6	2.8	11
Sulphate as SO4	DETSC 2055	0.1	mg/l		22	6.7	3.3	5.1	7.7

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Summary of Chemical Analysis

Leachate Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,2
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

			Lab No	1696142	1696143	1699081	1705069	1705070
			Sample ID	MPA_AUK_TP106	MPA_AUK_TP117	MPA_AUK_TP111	MPA_AUK_TP103	MPA_AUK_TP108
			Depth	1	0.6	1.2	0.8	1
			Other ID	3	3	3	3	3
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	08/07/2020	08/07/2020	10/07/2020	09/07/2020	08/07/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
PAHs								
Naphthalene	DETSC 3304	0.05	ug/l	0.33	< 0.05	0.06	< 0.05	0.19
Acenaphthylene	DETSC 3304	0.01	ug/l	0.30	< 0.01	< 0.01	< 0.01	0.02
Acenaphthene	DETSC 3304	0.01	ug/l	0.11	< 0.01	< 0.01	0.13	0.02
Fluorene	DETSC 3304	0.01	ug/l	0.11	< 0.01	< 0.01	0.03	0.01
Phenanthrene	DETSC 3304	0.01	ug/l	1.5	0.02	0.02	0.08	0.04
Anthracene	DETSC 3304	0.01	ug/l	0.46	< 0.01	< 0.01	< 0.01	0.04
Fluoranthene	DETSC 3304	0.01	ug/l	2.5	0.02	0.01	0.01	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	1.9	0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	1.8	0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	2.2	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	3.3	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	1.0	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	2.3	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	2.1	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	0.45	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	2.2	0.02	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	23	< 0.20	< 0.20	0.32	0.34
Phenols								
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	< 100	< 100	< 100

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

Lab No	Sample ID	Sample Location	Material Type	Result	Comment*	Analyst
1694833	MPA_AUK_TP119 3 1	MPA_AUK_TP119_SO_0100	SOIL	NAD	none	Jordan Eadington
1694834	MPA_AUK_TP114 2A 0.8	MPA_AUK_TP114_SO_0080	SOIL	NAD	none	Jordan Eadington
1694835	MPA_AUK_TP109 3 0.9	MPA_AUK_TP109_SO_0090	SOIL	NAD	none	Jordan Eadington
1694836	MPA_AUK_TP116 3 0.8	MPA_AUK_TP116_SO_0080	SOIL	NAD	none	Jordan Eadington
1694837	MPA_AUK_TP115 3 0.6	MPA_AUK_TP115_SO_0060	SOIL	NAD	none	Jordan Eadington
1695460	MPA_AUK_TP123 3 1	MPA_AUK_TP123_SO_0100	SOIL	NAD	none	Colin Patrick
1695461	MPA_AUK_TP120 3 0.8	MPA_AUK_TP120_SO_0080	SOIL	NAD	none	Colin Patrick
1695462	MPA_AUK_TP121 3 0.8	MPA_AUK_TP121_SO_0080	SOIL	NAD	none	Colin Patrick
1695463	MPA_AUK_TP122 3 0.7	MPA_AUK_TP122_SO_0070	SOIL	NAD	none	Colin Patrick
1695464	MPA_AUK_TP124 3 0.8	MPA_AUK_TP124_SO_0080	SOIL	NAD	none	Colin Patrick
1695465	MPA_AUK_TP125 3 0.8	MPA_AUK_TP125_SO_0080	SOIL	NAD	none	Colin Patrick
1696136	MPA_AUK_TP106 3 1	MPA_AUK_TP106_SO_0100	SOIL	NAD	none	Joanne Luscombe
1696137	MPA_AUK_TP107 3 0.9	MPA_AUK_TP107_SO_0090	SOIL	NAD	none	Joanne Luscombe
1696138	MPA_AUK_TP112 3 0.9	MPA_AUK_TP112_SO_0090	SOIL	NAD	none	Joanne Luscombe
1696139	MPA_AUK_TP113 3 0.9	MPA_AUK_TP113_SO_0090	SOIL	NAD	none	Joanne Luscombe
1696140	MPA_AUK_TP117 3 0.6	MPA_AUK_TP117_SO_0060	SOIL	NAD	none	Joanne Luscombe
1696141	MPA_AUK_TP118 3 0.8	MPA_AUK_TP118_SO_0080	SOIL	NAD	none	Joanne Luscombe
1699073	MPA_AUK_TP126 3 0.8	MPA_AUK_TP126_SO_0080	SOIL	NAD	none	Jordan Eadington
1699074	MPA_AUK_TP127 3 0.9	MPA_AUK_TP127_SO_0090	SOIL	NAD	none	Jordan Eadington
1699075	MPA_AUK_TP128 3 0.9	MPA_AUK_TP128_SO_0090	SOIL	NAD	none	Jordan Eadington
1699076	MPA_AUK_TP129 3 1.1	MPA_AUK_TP129_SO_0110	SOIL	NAD	none	Jordan Eadington
1699077	MPA_AUK_TP130 3 0.6	MPA_AUK_TP130_SO_0060	SOIL	Chrysotile	Small Bundles of Chrysotile Present	Jordan Eadington
1699078	MPA_AUK_TP102A 3 1	MPA_AUK_TP102A_SO_0100	SOIL	Chrysotile	Large bundle of Chrysotile present	Jordan Eadington
1699079	MPA_AUK_TP110 3 1	MPA_AUK_TP110_SO_0100	SOIL	NAD	none	Jordan Eadington
1699080	MPA_AUK_TP111 3 1.2	MPA_AUK_TP111_SO_0120	SOIL	NAD	none	Jordan Eadington
1705062	MPA_AUK_TP101 3 0.9	MPA_AUK_TP101_SO_0090	SOIL	NAD	none	Joanne Luscombe
1705063	MPA_AUK_TP101 9 3.5	MPA_AUK_TP101_SO_0350	SOIL	Chrysotile	small bundles of Chrysotile present	Joanne Luscombe
1705064	MPA_AUK_TP102 3 0.6	MPA_AUK_TP102_SO_0060	SOIL	NAD	none	Joanne Luscombe

Summary of Asbestos Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

Lab No	Sample ID	Sample Location	Material Type	Result	Comment*	Analyst
1705065	MPA_AUK_TP103 3 0.8	MPA_AUK_TP103_SO_0080	SOIL	NAD	none	Joanne Luscombe
1705066	MPA_AUK_TP104 3 1	MPA_AUK_TP104_SO_0100	SOIL	NAD	none	Joanne Luscombe
1705067	MPA_AUK_TP105 3 1	MPA_AUK_TP105_SO_0100	SOIL	NAD	none	Joanne Luscombe
1705068	MPA_AUK_TP108 3 1	MPA_AUK_TP108_SO_0100	SOIL	NAD	none	Joanne Luscombe
1740101	SSA A 0.00	Stockpile_45440:522750_ Sample A	SOIL	NAD	none	Jordan Eadington
1740102	SSD D 0.00	Stockpile_45440:522750_ Sample D	SOIL	NAD	none	Jordan Eadington
1740103	SSC C 0.00	Stockpile_45440:522750_ Sample C	SOIL	NAD	none	Jordan Eadington
1740104	SSE E 0.00	Stockpile_45440:522750_ Sample E	SOIL	NAD	none	Jordan Eadington
1740105	SSB B 0.00	Stockpile_45440:522750_ Sample B	SOIL	NAD	none	Jordan Eadington

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Title Metal Processing Area Shallow Soils Investigation

		Lab No	1705063	1699077	1699078
		Sample ID	MPA_AUK_TP101	MPA_AUK_TP130	MPA_AUK_TP102A
		Depth	3.5	0.6	1
		Other ID	9	3	3
		Sample Type	SOIL	SOIL	SOIL
		Sampling Date	09/07/2020	10/07/2020	13/07/2020
		Sampling Time			
Test	**Method**	**Units**			
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.003**	**0.002**	**0.002**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.003	0.002	0.002
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na
Breakdown of Gravimetric Analysis (a)					
Mass of Sample		g	1310.76	1869.61	868.03
ACMs present*		type			
Mass of ACM in sample		g			
% ACM by mass		%			
% asbestos in ACM		%			
% asbestos in sample		%			
Breakdown of Detailed Gravimetric Analysis (b)					
% Amphibole bundles in sample		Mass %	na	na	na
% Chrysotile bundles in sample		Mass %	0.003	0.002	0.002
Breakdown of PCOM Analysis (c)					
% Amphibole fibres in sample		Mass %	na	na	na
% Chrysotile fibres in sample		Mass %	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)					
Amphibole fibres		Fibres/g	na	na	na
Chrysotile fibres		Fibres/g	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Metal Processing Area Shallow Soils Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1694833	MPA_AUK_TP119 1 SOIL	06/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1694834	MPA_AUK_TP114 0.8 SOIL	06/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1694835	MPA_AUK_TP109 0.9 SOIL	06/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1694836	MPA_AUK_TP116 0.8 SOIL	06/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1694837	MPA_AUK_TP115 0.6 SOIL	06/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695460	MPA_AUK_TP123 1 SOIL	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695461	MPA_AUK_TP120 0.8 SOIL	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695462	MPA_AUK_TP121 0.8 SOIL	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695463	MPA_AUK_TP122 0.7 SOIL	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695464	MPA_AUK_TP124 0.8 SOIL	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695465	MPA_AUK_TP125 0.8 SOIL	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695466	MPA_AUK_TP123 1 LEACHATE	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695467	MPA_AUK_TP121 0.8 LEACHATE	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695468	MPA_AUK_TP124 0.8 LEACHATE	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695469	MPA_AUK_TP119 1 LEACHATE	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695470	MPA_AUK_TP115 0.6 LEACHATE	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1696136	MPA_AUK_TP106 1 SOIL	08/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1696137	MPA_AUK_TP107 0.9 SOIL	08/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1696138	MPA_AUK_TP112 0.9 SOIL	08/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1696139	MPA_AUK_TP113 0.9 SOIL	08/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1696140	MPA_AUK_TP117 0.6 SOIL	08/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1696141	MPA_AUK_TP118 0.8 SOIL	08/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1696142	MPA_AUK_TP106 1 LEACHATE	08/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1696143	MPA_AUK_TP117 0.6 LEACHATE	08/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1699073	MPA_AUK_TP126 0.8 SOIL	13/07/20	GJ 250ml x2, GJ 60ml x2, PT 500ml x2		
1699074	MPA_AUK_TP127 0.9 SOIL	10/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1699075	MPA_AUK_TP128 0.9 SOIL	10/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1699076	MPA_AUK_TP129 1.1 SOIL	13/07/20	GJ 250ml x2, GJ 60ml x2, PT 500ml x2		
1699077	MPA_AUK_TP130 0.6 SOIL	10/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1699078	MPA_AUK_TP102A 1 SOIL	13/07/20	GJ 250ml x2, GJ 60ml x2, PT 500ml x2		
1699079	MPA_AUK_TP110 1 SOIL	13/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1699080	MPA_AUK_TP111 1.2 SOIL	10/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1699081	MPA_AUK_TP111 1.2 LEACHATE	10/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1705062	MPA_AUK_TP101 0.9 SOIL	09/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Sulphur (free) (7 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days)	

Information in Support of the Analytical Results

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Metal Processing Area Shallow Soils Investigation

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1705063	MPA_AUK_TP101 3.5 SOIL	09/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Sulphur (free) (7 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days)	
1705064	MPA_AUK_TP102 0.6 SOIL	09/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Sulphur (free) (7 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days)	
1705065	MPA_AUK_TP103 0.8 SOIL	09/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Sulphur (free) (7 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), SVOC (14 days)	
1705066	MPA_AUK_TP104 1 SOIL	09/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Sulphur (free) (7 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days)	
1705067	MPA_AUK_TP105 1 SOIL	09/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Sulphur (free) (7 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days)	
1705068	MPA_AUK_TP108 1 SOIL	08/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Sulphur (free) (7 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), SVOC (14 days)	
1705069	MPA_AUK_TP103 0.8 LEACHATE	09/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1705070	MPA_AUK_TP108 1 LEACHATE	08/07/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1740101	SSA 0.00 SOIL	02/10/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1740102	SSD 0.00 SOIL	02/10/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1740103	SSC 0.00 SOIL	02/10/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1740104	SSE 0.00 SOIL	02/10/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1740105	SSB 0.00 SOIL	02/10/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Information in Support of the Analytical Results

Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
Client Ref 4291
Contract Metal Processing Area Shallow Soils Investigation

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Quality Control

Quality Systems.

Derwentside Environmental Testing Services employs numerous measures to ensure high levels of confidence in the results produced. Our laboratory has been accredited by the United Kingdom Accreditation Service (UKAS) since its inception and operates in full compliance with the internationally recognised standard ISO17025 and the Environment Agency's MCERTS (Monitoring & Certification Scheme) standard for soils and waters, which provides greater assurance to all parties of the reliability of data from chemical analysis.

To obtain a copy of our full UKAS schedule visit the UKAS website at www.ukas.org and search for our laboratory number 2139.

2139

Proficiency Testing Schemes.

DETS participates in seven external proficiency testing schemes in order to monitor and ensure the continuing quality of analysis. These schemes are:

Aquacheck LGC Contest WEPAL

RTC AIMS AIHS pt:a

Internal Quality Control.

DETS runs a strict internal quality control system. A minimum of 5% of all samples that undergo analysis in our laboratories are quality control samples. This way we can ensure a high level of confidence in all of the analytical data produced. In addition, MCERTS accredited tests must meet strict, ongoing limits for precision and bias in order to maintain their accreditation status.

SAMPLE HOLDING TIME INFORMATION

Soil

Analyte	Container type	Minimum sample required	Reference	Maximum holding time from sampling	
				pre drying/extraction[1]	post drying/extraction[2]
Ammonium	Glass or plastic	20g	BS ISO18512:2007	1 week	
Anions	Glass or plastic	20g	BS ISO18512:2007	1 month	3 years
BTEX	60ml glass jar	Full container	EPA 8260	2 weeks	N/A
Conductivity	Glass or plastic	20g	BS ISO18512:2007	1 week	3 years
Cyanide	Glass or plastic	20g	EPA 9010B/9012	2 weeks	
Heavy metals	Glass or plastic	10g	BS ISO18512:2007	6 months	30 years
Hexavalent chromium	Glass or plastic	20g	BS ISO18512:2007	1 month	
Loss on ignition	Glass or plastic	10g	BS ISO18512:2007	1 month	
OCP	Glass	20g	BS ISO18512:2007	1 month	
Oil & grease	Glass	20g	EPA 9070/1	1 month	
Organic matter/TOC	Glass or plastic	20g	BS ISO18512:2007	1 month	
PAH	Glass	20g	EPA 8100/8270	2 weeks	6 weeks
PCB	Glass	20g	BS ISO18512:2007	1 month	
pH	Glass or plastic	20g	BS ISO18512:2007	1 week	3 years
Phenols	Glass	20g	EPA 8270	2 weeks	6 weeks
PRO	60ml glass jar	Full container	EPA 8015	2 weeks	N/A
Sulphide	Glass or plastic	20g	BRE SD1	3 weeks	1 month
SVOC	Glass	20g	EPA 8270	2 weeks	6 weeks
TEM/CEM	Glass	20g	EPA 418.1	2 weeks	6 weeks
Thiocyanate	Glass or plastic	20g	EPA 9251	No special requirement	
Total sulphur	Glass or plastic	20g	BS ISO18512:2007	1 month	3 years
TPH (C10-C40)	Glass	20g	EPA 418.1	2 weeks	6 weeks
VOC	60ml glass jar	Full container	EPA 8260	2 weeks	N/A

Sample storage environment 5°C

1. From sampling to extraction
2. Once extracted

Waters

Analyte	Container type	Min sample required (ml)	Reference	Preservative required	Max holding time until extraction
Alkalinity	Glass or plastic	100	EPA 310.2	none	2 weeks
Ammonium	Glass or plastic	20	ISO 5667 3:2012	Sulphuric acid	3 weeks
BOD	Glass or plastic	500	EPA 405.1 5120B	none	2 days
BTEX	Glass vial	Full container	Lab validation	none	2 weeks
Chloride	Glass or plastic	20	ISO 5667 3:2012	none	1 month
COD	Glass or plastic	20	ISO 5667 3:2012	Sulphuric acid	1 month
Conductivity/TDS	Glass or plastic	100	EPA 160.1	none	1 week
Cyanide	Plastic	50	EPA 9012/335.3	Sodium hydroxide	2 weeks
Hexavalent chromium	Glass or plastic	20	ISO 5667 3:2012	none	4 days
Metals	Glass or plastic	20	ISO 5667 3:2012	Nitric acid	1 month
Nitrate	Glass or plastic	20	EPA 353.2	none	2 days
Nitrite	Glass or plastic	20	EPA 600/4 079-020	none	2 days
OCP	Glass	500	EPA 8081A/608	none	1 week
Oil & grease	Glass	500	ISO 5667 3:2012	Hydrochloric acid	1 month
PAH	Glass	500	ISO 5667 3:2012	none	1 week
pH	Glass or plastic	50	Lab validation	none	1 week
PCB	Glass	500	EPA 8082A	none	6 weeks
Phenols	Glass	500	ISO 5667 3:2012	Sulphuric acid	3 weeks
Phosphate	Glass or plastic	20	ISO 5667 3:2012	Sulphuric acid	1 month
PRO	Glass vial	Full container	EPA 8015	none	2 weeks
Sulphate	Glass or plastic	20	ISO 5667 3:2012	none	1 month
Sulphide	Plastic	50	ISO 5667 3:2012	NaOH/Zinc acetate	1 week
Suspended solids	Glass or plastic	100	EPA 160.2 2540D	none	1 week
SVOC	Glass	500	EPA 8270/625	none	1 week
TOC	Glass or plastic	20	ISO 5667 3:2012	Sulphuric/Phosphoric acid	1 week
TON	Glass or plastic	20	EPA 353.2	none	1 month
TPH/EPH	Glass	500	Lab validation	none	1 weeks
VOC	Glass vial	Full container	Lab validation	none	1 week

Sample storage environment 3°C ± 2°C

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETS 036	**Leachate Preparation** **(NRA Method and BS EN 12457 Parts 1-3)**	Leachates are prepared as per the NRA (1994) method and as per BS EN 12457 Parts 1 - 3 one and two stage leachate preparation.	Leaching Test Method for the Assessment of Contaminated Land, Interim Guidance, NRA(1994) BS EN 12457 Part 1,2 & 3	n/a	Not Accredited
DETS 073	**Acid Neutralisation Capacity of Soils and Other Solids**	ANC is a measure of the buffering capacity of soils and other waste materials. The analysis measures the amount of acid required to bring the sample to a fixed pH. The initial pH of the sample extract must be measured before analysis begins. Analysis is performed by the addition of acid in conjunction with pH measurement by pH meter until the specified pH has been reached as indicated by the meter. The result is expressed in mol/kg (dry wt).	Annex B (Preliminary determination of the acid/base consumption) – CEN/TC 292 – WI 292046 – Characterization of waste – Leaching behaviour tests – Acid and Base neutralization capacity test	1.0 mol/kg	Not Accredited
DETS 074	**Low Level PAH by HPLC Fluorescence**	PAH is extracted from one litre of filtered water sample by solid phase extraction. PAH is eluted from the SPE column with DCM evaporated to dryness under nitrogen and redissolved in acetonitrile. Analysis of samples is carried out by HPLC fluorescence.	EPA Method 550 The Analyst 2001, 126:1336-1331 Phenomonex Strata X Application Note for PAH by SPE	0.01ug/L each 5.0 ug/L Total	Not Accredited

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 1001	**Sample Pre-Treatment and Preparation of Solids**	Solid samples are classified and identified. Samples requiring analysis for unstable or volatile determinands are analysed as received. Samples requiring analysis for stable and non-volatile determinands are dried at <30◦C or 50◦C, depending on requirements, for a minimum of 16hrs (overnight). Dried samples are crushed in a jaw crusher, if necessary, and then ground using a mechanical mixer mill and sieved through a 250µm sieve to ensure they are homogenous.	BS1377:1990 – Soils for Civil Engineering Purposes The preparation and pre-treatment of potentially contaminated soils prior to chemical analysis – MEWAM – 2006 – Environment Agency (Updated procedure under preparation)	n/a	Not Accredited
DETSC 1002	**Description of Soil Sample Type**	This method outlines the procedure used to describe soil samples with respect to basic type, predominant colour and inclusions. The procedure is carried out during the sample preparation stage.	BS 5930:Section 6:1999	n/a	Not Accredited
DETSC 1003	**Stone and Glass / Metal / Plastic Content of Soil**	This method outlines the procedure used to determine the Stone and Glass/Metal/Plastic content of soil samples. The procedure is carried out during the sample preparation stage.	BS 3882:2007 BS 1377:1990	0.1%	Not Accredited
DETSC 1004	**Moisture Content/Loss on Drying of Soil**	Loss on drying is determined by loss of mass on drying in an oven set at 28ºC or 50ºC. Moisture content is determined by loss of mass on drying in an oven set at 105ºC. The procedure is carried out during the sample preparation stage.	Practical Environmental Analysis. Radojevic & Bashkin. RSC 1999 BS 1377: Part 2:1990 DETS drying time study	0.1%	Not Accredited
DETSC 1101	**Asbestos - Bulk Analysis**	Samples are examined visually for the presence of asbestos containing materials or asbestos fibres. Suspect fibres are removed from the sample and examined using polarised light microscopy to determine whether they are asbestos fibres. If no asbestos fibres are identified by the method after an adequate length of examination time, and after at least two small pinch samples have been examined, then the sample may be reported as 'NAD' (no asbestos detected).	HSG 248 Asbestos: The Analysis Guide for Sampling, Analysis and Clearance Procedures. 2005 McCrone W.C., Asbestos Identification (Second Edition), The McCrone Research Institute, 1987 LAB 30, Application of ISO/IEC17025 for Asbestos Sampling and Testing, UKAS, Edition 2, April 2008	n/a	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 1102	**Quantification of asbestos in soils, loose aggregates and ballast**	The method of quantification is divided into three procedures: Gravimetric analysis, detailed gravimetric analysis and PCOM analysis. The analysis may be affected by the client's requirements as determined by contract review, and by the nature of the asbestos found in the sample, e.g. whether ACMs are present, and whether fibre bundles large enough to pick out using tweezers are have been found in the sample.	HSG 248 Asbestos: The Analysis Guide for Sampling, Analysis and Clearance Procedures. 2005 HSG264 Asbestos: The survey guide. HSE Books, 2010. Davies, L. S.T., Wetherill, G. Z., McIntosh, C., McGonagle, C., Addison, J. 1996. Development and validation of an analytical method to determine the amount of asbestos in soils and loose aggregates. HSE Contract Research Report N0. 83/1996. HSE Books	Gravimetric Analysis: 0.01% for 1kg sample Detailed Gravimetric Analysis: 0.001% for 50g sample PCOM Analysis: 0.001%	UKAS
DETSC 1103	**Asbestos Water Absorption Test**	This test involves a sample of the asbestos product being dried and weighed before being immersed in water for a period of time. The sample is then removed from the water and re-weighed. If the amount of water absorbed is <30% by weight, then the sample should be reported as 'Not Licensed'. If ≥30% water is absorbed then the sample should be reported as being 'Licensed', i.e. an asbestos material for which a licence is required to work on.	Work with Materials Containing Asbestos: Approved Code of Practice and Guidance. HSE Books, 2006.	n/a	UKAS
DETSC 2002	**Organic matter content of soil**	The procedure is based upon Walkley and Black's method. Organic matter in soil is oxidised with potassium dichromate in the presence of concentrated sulphuric acid. The excess dichromate is titrated with ferrous sulphate using diphenylamine as an external indicator. The organic matter content is calculated from the amount of dichromate used during the oxidation process based on an empirical relationship.	BS1377 : Part 3 : 1990 Method 3 BS1377 : Part 1 : 1990 BS 3882:2007	0.1%	UKAS MCERTS(Soils)

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

DETSC 2003	**Loss On Ignition**	Soil is ignited at 440C and the amount of sample lost on ignition is determined gravimetrically. Other specified temperatures may be used but are not accredited.	BS1377 : Part 3 : 1990 Method 4 BS1377 : Part 1 : 1990	0.01%	UKAS MCERTS(Soils)
Method Number	**Title**	**Description**	**Reference**	**LOD**	**Accreditation Status**
DETSC 2004	**Sulphate Content of Soil and Water**	The sulphate in the soil is dissolved in dilute hydrochloric acid, or in an aqueous extract having a water:soil ratio of 2:1 and the insoluble residue is removed by filtration. Waters are also filtered prior to analysis. The sulphate in the filtrate is precipitated as barium sulphate which is then filtered, ignited and weighed.	BS1377 : Part 3 : 1990 Method 5 BS1377 : Part 1 : 1990 BRE SD1: 2005 Concrete in Aggressive Ground	**Acid Soluble:** 0.01% **Water Soluble** 100mg/l **Waters** 10mg/l	UKAS MCERTS(Soils)
DETSC 2005	**Carbonate content of soil by Rapid Titration**	The carbonate present in the soil reacts with a known excess of hydrochloric acid liberating carbon dioxide. The acid remaining after the reaction is determined by titration against sodium hydroxide. The result is calculated in terms of the equivalent proportion of carbon dioxide.	BS 1377: Part 1: 1990. BS 1377: Part 3: 1990: Method 5	1%	UKAS
DETSC 2006	**Water Soluble Chloride Content of Soil & Chloride Content of Water**	The chloride in the soil is dissolved in water and the insoluble material is removed by filtration. Waters are filtered before analysis. The chloride is analysed by Mohr's method. The chloride in a neutral solution is titrated against standard silver nitrate using potassium chromate as an indicator. The colour change is from yellow to brick red.	BS1377 : Part 3 : 1990 Method 7.2 BS1377: Part 1: 1990	**Soil:** 0.01% **Water:** 10mg/l	UKAS MCERTS(Soils)
DETSC 2007	**Acid Soluble Chloride Content of Soil and Concrete**	The chloride in the sample is dissolved in nitric acid and the insoluble material is removed by filtration. The dissolved chloride is analysed by Volhard's method. The chloride in solution is precipitated with a known excess of standard silver nitrate. The excess silver nitrate is titrated against standard ammonium thiocyanate using ferric alum as an indicator. The colour change is white to red.	BS1377 : Part 3 : 1990 Method 7.3 BS1377: Part 1: 1990 BS 1881-124:1988	0.01%	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2008	**pH Value of Soil and Water**	The pH value of a soil suspension in water or a groundwater sample is determined electrometrically using a glass electrode.	BS1377: Part 3: 1990 – Soils for Civil Engineering Purposes – Chemical and Electrochemical Methods	n/a	UKAS (Soils + Waters) MCERTS (Soils + Waters-Trade Effluent only)
DETSC 2009	**Electrical Conductivity of Soil & Water**	The electrical conductance of a soil suspension in water or of a water sample is determined by voltammetry using a conductivity meter. In some cases, the soil may need to be extracted with an aqueous solution of an inorganic salt e.g. the conductivity of topsoil is determined by preparing a suspension of the soil in saturated calcium sulphate.	Standard Methods for the Examination of water and Wastewater Part 2510B 21st Edition 2005 APHA, AWWA, WEF BS3882:2007 Specification for Topsoil	1uS/cm	UKAS
DETSC 2019	**Loose Packed Dry Soil Density**	Dried, ground soil is transferred to a dry, tared measuring cylinder and the volume recorded. The cylinder and its contents are then weighed and the density of the soil calculated.	BS3882:2007 Specification for Topsoil	n/a	Not Accredited

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2024	**Sulphide in Soil and Water by Iodometry**	Hydrogen sulphide is liberated by acidification of the sample with hydrochloric acid in a steam distillation unit. The hydrogen sulphide produced is carried over with the steam and is absorbed in alkaline zinc acetate. The zinc sulphide produced reacts with iodine formed when iodate-iodide is acidified and the excess iodine titrated with standard thiosulphate.	In House Method based on: Environment Agency The determination of easily liberated sulphide in soils and similar matrices (2010) - Blue Book 228 Method D - The determination of easily liberated sulphide in as received or air-dried samples following acid steam distillation with iodometric titration. Environment Agency The determination of sulphide in waters and associated materials (2007) Draft Method D - The determination of easily liberated sulphide in as received or air-dried samples following phosphoric acid steam distillation with iodometric titration.	**Soils:** 10mg/kg . **Waters:** 250ug/l	**Soils:** UKAS MCERTS(Soils) **Waters:** Not Accredited
DETSC 2030	**Alkalinity in Water**	Alkalinity of a water sample is determined by indicator end point titration with a strong acid from sample pH to pH8.3 (where applicable) and then to pH4.5. From the titres obtained the total alkalinity and concentrations and types of alkalinity present can be calculated.	SCA Method ISBN 0 11 751601 5 The Determination of Alkalinity and Acidity in Water 1981 Instruction Manual for Skalar SP50 Robotic Analyser	20mg/l as CaCO3	UKAS MCERTS(Waters) Trade Effluent only
DETSC 2031	**5 Day Biochemical Oxygen Demand**	The sample, either diluted or undiluted, is placed in a BOD bottle and the initial dissolved oxygen content of the sample is measured using a dissolved oxygen meter. The bottle is placed in an incubator at 20ºC in the dark for 5 days. After this time the bottle is removed and the residual dissolved oxygen content of the sample is measured. The BOD of the sample is calculated from the reduction in the concentration of dissolved oxygen over 5 days.	SCA Method ISBN 0 117522120 5 Day Biochemical Oxygen Demand (BOD5) Second Edition 1988	1 mg/l	UKAS MCERTS(Waters)- Trade Effluent only

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2032	**Chemical Oxygen Demand**	Oxidisable substances react with sulphuric acid – potassium dichromate solution in the presence of silver sulphate as a catalyst. Chloride is masked by mercury sulphate. The reduction in the yellow colouration of Cr6+ is evaluated using a spectrophotometer for the low range tubes (LCK 314) whilst the green colouration of Cr3+ is evaluated for the medium and high range tubes (LCK 014 and LCK 114).	Environment Agency The determination of chemical oxygen demand in waters and effluents (2007) Methods for the Examination of Waters and Associated Materials	10 mg/l	UKAS MCERTS(Waters)-Trade Effluent only
DETSC 2033	**Total and Dissolved Organic Carbon in Water**	The term TOC (Total Organic Carbon) is used to describe the total content of organically bound carbon in dissolved and undissolved compounds. The TOC content is expressed in mg/l. If DOC (Dissolved Organic Carbon) is required, samples are filtered through a 0.45µm filter paper prior to analysis. Inorganic carbon is expelled by acidification of the sample. TOC is then determined by digestion of the sample with sulphuric acid and peroxodisulphate. Carbon containing compounds are transformed into carbon dioxide. The carbon dioxide evolves and reacts with an indicator solution. The colour change is measured using a spectrophotometer.	Hach-Lange Technical Instructions: LCK 385, LCK 386, LCK 387	2 mg/l	UKAS
DETSC 2034	**Suspended and Settleable Solids in Water**	Suspended matter is removed from a measured volume of sample by filtration under reduced pressure through a pre-treated, pre-weighed glass fibre filter paper. The paper is washed with deionised water to remove dissolved salts and the total suspended matter is determined gravimetrically after drying at 105 ±5°C Settleable solids are determined by subtracting the solids left in suspension after settlement for 1 hour (or other agreed time) from the total suspended matter in the sample.	SCA Method ISBN 011 751957 X Suspended, Settleable and Total Dissolved Solids in Waters and Effluents 1980	5 mg/l	**Suspended Solids:** UKAS MCERTS(Waters)-Trade Effluent only **Settleable Solids:** Not Accredited

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2035	**Total Dissolved Solids in Water**	Water samples are pre-filtered to remove any suspended solids and evaporated in an oven at 180°C. The amount of residual dissolved solids is determined gravimetrically. An estimate of the total dissolved solids can be obtained by measuring the conductivity of the sample. This method is not accredited.	SCA Method ISBN 011 751957 X Suspended, Settleable and Total Dissolved Solids in Waters and Effluents 1980 BS1377: Part 3 : 1990 Section 8	5 mg/l	UKAS
DETSC 2047	**Formaldehyde in Water**	Formaldehyde in soil is extracted in water, with a water to soil ratio of 10:1. The insoluble residue is removed by filtration prior to analysis. Waters are filtered prior to analysis to remove any particulates in suspension. Formaldehyde in the extract or water sample reacts with chromatropic acid-sulphuric acid solution to form a purple coloured complex. The absorbance of the coloured solution is read at 580nm using a suitable visible spectrophotometer.	Formaldehyde by visible absorption spectrophotometry – Method 3500, Issue 2 – NIOSH Manual of Analytical Methods, Fourth edition, August 1994	**Soil:** 0.2mg/kg **Water:** 20µg/l	Not Accredited
DETSC 2048	**Dissolved Oxygen Content of Water**	The dissolved oxygen content of the sample is measured using a dissolved oxygen meter either electrochemically or by fluorescence, or by the titrimetric method developed by Winkler.	SCA Method ISBN 0.11 751442X Dissolved Oxygen in Natural and Waste Waters 1979	0.1 mg/l	Not Accredited
DETSC 2055	**Anions in Water and Aqueous Soil Extracts by Ion Chromatography**	Liquid samples and aqueous soil extracts are filtered through a 0.22µm syringe filter prior to analysis. The filtered samples are injected into an Ion Chromatograph. The anions of interest are separated on the basis of their affinity for the active sites of the column packing material. The separated anions are converted into their highly conductive acid forms and measured by conductivity. The anions are identified on the basis of retention time as compared to standards and quantisation is by measurement of peak area.	Standard Methods for the Examination of Water and Wastewater Section 4110 21st Edition 2005 APHA, AWWA, WEF	**Soil:** 1.0 mg/kg **Water:** 0.1 mg/L	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2076	**Sulphate and Magnesium Content of 2:1 Aqueous Extract of Soil by ICP-OES**	The sulphate and magnesium in the soil are extracted in an aqueous extract having water: soil ratio of 2:1 and the insoluble material is removed by filtration. The concentrations of sulphate and magnesium in the filtrate are determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). The wavelengths used for identification and quantification are 181.972nm for sulphate and 285.213nm for magnesium.	BS1377 : Part 3: 1990 Method 5 BS1377 : Part 1: 1990 TRL 447 Sulphate Specification for Structural Backfills 2005 BRE SD1:2005 Concrete in Aggressive Ground 2005	10mg/L	**Sulphate:** UKAS MCERTS(Soils) **Magnesium:** Not Accredited
DETSC 2084	**Total Organic Carbon by PrimacATC Analyser**	Soil samples are treated with phosphoric acid to expel any inorganic carbonates. The samples are then heated at high temperature in a continuous flow of air so that any organic carbon is oxidised to carbon dioxide. The gas is then allowed to cool and analysed by an infra-red detector.	PrimacsATC Analyser – User Manual, Skalar	0.47%	MCERTS(Soils)
DETSC 2085	**Total and Dissolved Organic Carbon in Water**	**Direct TOC Analysis** The sample is acidified, stirred and purged to remove the IC before the sample is injected and handled as in the TC Analysis. The sample is filtered before acidification for DOC. **TC Analysis** The sample is injected by an automated septum less rotary port into a high temperature reactor. In the reactor, at a temperature of 750 - 950°C all organic and inorganic carbon is oxidized to the gaseous carbon dioxide (CO2). The catalyst that is present in the reactor catalysis the oxidation to completion. A flow of air transports these oxidation products to the detectors. The oxygen required for reaction is taken from the airflow. The products are led into the non-dispersive infrared detector where the carbon dioxide is determined. The carbon dioxide is measured at a wavelength of 4.2 µm by NDIR detection.	Standard Methods for the Examination of Water and Wastewater Section 5310 B 21st Edition 2005 APHA, AWWA, WEF HMSO Methods for the Examination of Waters and Associated Materials – The Instrumental Determination of Total Organic Carbon and Related Determinands 1995	lmg/l as C	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2119	**Exchangeable Ammonia in Soil**	An intense blue-green complex, related to indophenol blue, is formed by the reaction of ammonia with hypochlorite and sodium salicylate, with sodium nitroprusside acting as a catalyst. The complex is measured at 655nm and is related to the ammonia concentration by means of a calibration curve. Sodium citrate is added to overcome interfering ions.	MAFF/ADAS Reference Book 427 – the Analysis of Agricultural Materials – Method 53, Ammonium, Nitrate and Nitrite-Nitrogen, Potassium Chloride Extractable	0.5mg/kg	UKAS MCERTS(Soils)
DETSC 2120	**Ammonia in Water by Spectrophotometry**	An intense blue-green complex, related to indophenol blue, is formed by the reaction of ammonia with hypochlorite and sodium salicylate, with sodium nitroprusside acting as a catalyst. The complex is measured at 655nm and is related to the ammonia concentration by means of a calibration curve. Sodium citrate is added to overcome interfering ions.	Environment Agency Ammonia in Waters 1981 ISBN 0117516139 Methods for the Examination of Waters and Associated Materials	20µg/l	UKAS
DETSC 2121	**Total Kjeldahl Nitrogen Content of Soils and Waters**	The sample is digested with sulphuric acid and a mixture of catalysts to convert organic nitrogen to ammonia. The sample is then distilled under alkaline conditions, and the distilled ammonia is absorbed in sulphuric acid. The ammonia content of the distillate is then determined colorimetrically either using the UV/vis spectrophotometer or the Konelab 60i. Ammonia reacts with hypochlorite ions generated by the alkaline hydrolysis of sodium dichloroisocyanurate to form monochloramine. Monochloramine reacts with salicylate ions in the presence of sodium nitroprusside at around pH 12.6 to form a blue compound. The absorbance of this compound is measured spectrophotometrically at wavelength 660nm	The Analysis of Agricultural Materials – MAFF/ADAS Reference Book 427 – HMSO BS 3882: 2007 Specification for topsoil Standard Methods for the Examination of Water and Wastewater Part 4500-N. 21st Edition 2005 APHA, WWA, WEF	**Soil:** 0.01% **Water:** 2mg/l	Not Accredited
DETSC 2123	**Water Soluble Boron in Soil & Boron in Water**	Boron in soil is extracted in boiling saline water. Waters are filtered prior to analysis to remove any particulates in suspension. The water soluble boron in the extract or filtrate reacts with azomethine–H to produce a yellow coloured complex. The resulting colour absorbance is measured at 420nm using a suitable visible spectrophotometer.	SecondSite Property (now National Grid Property Holdings) - Guidance for assessing and managing potential contamination on former gasworks and associated sites (Part I) (Version 3) Method 17.12 The analysis of Agricultural materials MAFF/ADAS – reference book 427	**Soil:** 0.2mg/kg **Water:** 100ug/L	UKAS MCERTS(Soils)

			HMSO		

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2130	**Cyanides & Monohydric Phenols by Skalar**	Water samples are filtered through a 0.45µm syringe filter and solid samples are extracted with 1M caustic soda prior to analysis on the automated flow analyser. The method determines total cyanide, easily liberated cyanide, complex cyanide, thiocyanate and monohydric phenols	Skalar methods: I295-001 w/r+P7 I295-002 w/r+P7 293-902 w/r+P7 497-001	**Soils mg/kg:** Total & Free CN=0.1, Thio=0.6, Phenol=0.3 **Waters ug/L:** Total CN=40, Free CN=20, Thio=20, Phenol=100	UKAS MCERTS(Soils)
DETSC 2140	**Sugar in Mixing Water for Cement**	Waters are filtered prior to analysis to remove any particulates in suspension. The sugar in the filtrate reacts with phenol and sulphuric acid to produce a yellow-orange coloured complex. The resulting colour absorbance is measured at 490nm using a suitable visible spectrophotometer.	Colorimetric Method for Determination of Sugars and Related Substances MICHEL DUBOIS, K. A. GILLES, J. K. HAMILTON, P. A. REBERS, and FRED SMITH - Division of Biochemistry, University of Minnesota, St. Paul, Minnesota.	10mg/l	Not Accredited
DETSC 2201	**Nitrite in Waters and Leachates by Konelab 60i**	Nitrite is determined colorimetrically using the Konelab60i autoanalyser. The nitrite colour reaction occurs at pH 2.0 to 2.5 by coupling diazotized Sulphanilamide with N-1-naphthyl-ethylenediamine. The absorbance of this compound is measured spectrophotometrically at 520nm.	Standard Methods for the Examination of Water and Wastewater Part 4500-NO2 B – 21st Edition 2005 APHA, AWWA, WEF Aquakem Method Nitrite in Waters Iss No 2 Methods for the Examination of Water and Associated Materials Oxidised Nitrogen in Waters 1981.	0.04mg/l (as N)	UKAS

			EPA Method 354.1 Nitrite, spectrophotometric (Approved at 40 CFR Part 136, not approved at Part 141)		

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2202	**Total Oxidised Nitrogen in Waters and Leachates by Konelab 60i**	Nitrate is reduced to nitrite by hydrazine under alkaline conditions. The total nitrite ions are then reacted with sulphanilamide and N-1-naphthylethylenediamine dihydrochloride under acidic conditions to form a reddish purple azo-dye. The absorbance of this compound is measured spectrophotometrically at 540 nm using the Konelab 60i autoanalyser.	Standard Methods for the Examination of Water and Wastewater Part 4500-NO2 B and Part 4500-NO3 H – 21st Edition 2005 APHA, AWWA, WEF Aquakem Method Total Oxidised Nitrogen. Methods for the Examination of Water and Associated Materials Oxidised Nitrogen in Waters 1981. EPA Method 353.1 Nitrate, Nitrite Colorimetric Automated Hydrazine Reduction (Approved at 40 CFR Part 136, Not approved at Part 141)	0.7mg/l (as N)	UKAS
DETSC 2203	**Hexavalent Chromium in Waters and Leachates by Konelab 60i**	Hexavalent Chromium is determined colorimetrically using the Konelab 60i autoanalyser. Hexavalent chromium reacts with diphenylcarbizide in acid solution and produces a red-violet colour. The absorbance of this compound is measured spectrophotometrically at 540nm.	Standard Methods for the Examination of Water and Wastewater Part 3500-Cr – 21st Edition 2005 APHA, AWWA, WEF USEPA 7196-A Aquakem Method. Hexavalent Chromium	10µg/l	UKAS
DETSC 2204	**Hexavalent Chromium in Soil by Konelab 60i**	Hexavalent Chromium is determined colorimetrically using the Konelab 60i autoanalyser. Hexavalent chromium reacts with diphenylcarbizide in acid solution and produces a red-violet colour. The absorbance of this compound is measured spectrophotometrically at 540nm.	Aquakem Method. Hexavalent Chromium	1mg/kg	Not Accredited

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2205	**Reactive & Total Phosphorus in Waters and Leachates by Konelab 60i**	Phosphate is determined colorimetrically using the Konelab60i autoanalyser. The orthophosphate ion reacts with ammonium molybdate and antimony potassium tartrate under acidic conditions to form a 12-molybdophosphoric acid complex. The complex is then reduced with ascorbic acid to form a blue heteropoly compound. The absorbance of this compound is measured spectrophotometrically at wavelength 880nm.	Standard Methods for the Examination of Water and Wastewater Part 4500-P E– 21st Edition 2005 APHA, AWWA, WEF Aquakem Method. Phosphate in Waters Issue 2	0.01mg/l	**Reactive Phosphorus:** UKAS MCERTS (Waters-Trade Effluent only) **Total Phosphorus:** Not Accredited
DETSC 2206	**High Level Ammonia in Waters and Leachates by Konelab 60i**	Ammonia is determined colorimetrically using the Konelab60i autoanalyser. Ammonia reacts with hypochlorite ions generated by the alkaline hydrolysis of sodium dichloroisocyanurate to form monochloramine. Monochloramine reacts with salicylate ions in the presence of sodium nitroprusside at around pH 12.6 to form a blue compound. The absorbance of this compound is measured spectrophotometrically at wavelength 660nm.	Methods for the Examination of Waters and Associated Materials Ammonia in Waters 1981 ISBN 0117516139. Aquakem Method. Ammonia in Waters Issue 2	0.8mg/l	UKAS
DETSC 2207	**Low Level Ammonia in Waters and Leachates by Konelab 60i**	Ammonia is determined colorimetrically using the Konelab60i autoanalyser. Ammonia reacts with hypochlorite ions generated by the alkaline hydrolysis of sodium dichloroisocyanurate to form monochloramine. Monochloramine reacts with salicylate ions in the presence of sodium nitroprusside at around pH 12.6 to form a blue compound. The absorbance of this compound is measured spectrophotometrically at wavelength 660nm.	Methods for the Examination of Waters and Associated Materials Ammonia in Waters 1981 ISBN 0117516139. Aquakem Method. Ammonia in Waters Issue 2	0.015mg/l	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2208	**Sulphide in Waters and Leachates by Konelab 60i**	Sulphide is determined colorimetrically using the Konelab60i autoanalyser. Potassium Dichromate converts N-N-Diethyl-p-phenylenediamine to the free radical which reacts rapidly with sulphide to produce the coloured 'DPD Blue' or 'Ethylene Blue'. The absorbance can then be measured at wavelength 660nm.	The determination of sulphide in waters and associated materials (2007) - SCA - Draft (March 2007) Aquakem Method. Sulphide SP001 Issue 2 Standard Methods for the Examination of Water and Wastewater, 21st Edition 2005, Part 4500. ISBN0-87553-223-3	10µg/l	UKAS
DETSC 2210	**Ferrous Iron in Waters and Leachates by Konelab 60i**	Three molecules of phenanthroline chelate with each atom of ferrous iron to form an orange/red complex. The intensity of the coloured solution is stable between pH3 to pH9. Rapid colour development occurs between pH2.9 and pH3.5 in the presence of excess phenanthroline. The resulting colour absorbance is measured at 510nm	Aquakem Method Ferrous Iron FIR001 Issue 2	0.1mg/l	Not Accredited
DETSC 2211	**Silicate in Waters and Leachates by Konelab 60i**	Reactive forms of silicon in acid solution, below pH2, react with ammonium molybdate ions to form a yellow silicomolybdate. Ascorbic acid reduces the yellow silicomolybdate to produce a blue silicomolybdate complex. Oxalic acid is added to destroy any molybdophosphoric acid formed.	ASTM D7126 - 10 Standard Test Method for On-Line Colorimetric Measurement of Silica Aquakem Method Silica SIL Issue 2	0.1mg/l	Not Accredited
DETSC 2301	**Metals in Soil by ICP-OES** As, Ba, Be, Cd, Cr, Co, Cu, Fe, Mn, Mo, Ni, Pb, Se, V, Zn	Metals in soil are extracted using aqua regia and their concentrations are determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Any metals not listed can be determined but are not accredited under UKAS or MCERTS for soils.	Standard Methods for the Examination of Water and Wastewater Part 3120 B – 21st Edition 2005, AWWA, WEF	**mg/kg:** As, Be Cu, Ni =0.2, Ba=1.5, Cd=0.1, Cr=0.15, Co=0.7, Mn=20, Mo=0.4, Pb=0.3, Fe=1200, Se=0.5, V=0.8, Zn=1.0	UKAS (all listed) MCERTS (All soils listed except Fe)

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2302	**Metals in Waters by ICP-OES** Al, As, Ca, Cd, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, Se, Zn	Concentrations of metals in water are determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Any metals not listed can be determined but are not accredited under UKAS or MCERTS for waters	Standard Methods for the Examination of Water and Wastewater Part 3120 B – 21st Edition 2005 APHA, AWWA, WEF	**µg/l:** Al=6.5, As= 7.1, Ca=100, Cd=0.3, Cr=0.75, Cu=0.75, Fe=70, K=20, Mg=5, Na=12, Ni=2.7, Pb=4, Se=11.3, Zn=3.8	**Dissolved:** UKAS (all listed) MCERTS(Waters)-Trade Effluent only (Al, Cd, Cr, Cu, Ni, Pb, Zn) **Total:** Not Accredited
DETSC 2303	**Total Hardness (By Calculation)**	The concentrations of calcium and magnesium are determined using the appropriate methodologies. The hardness is a measure of the sum of the calcium and magnesium concentration expressed as calcium carbonate.	Standard Methods for the Examination of Water and Wastewater Part 3120 B – 21st Edition 2005 APHA, AWWA, WEF	n/a	UKAS
DETSC 2304	**Zinc Equivalent in Soil (By Calculation)**	The concentrations of copper, nickel and zinc concentrations are determined using the appropriate methodologies. The zinc equivalent is a measure of the combined toxicity of the three metals, relative to the toxicity of zinc.	n/a	n/a	Not Accredited
DETSC 2306	**Metals in Waters by ICP-MS** Ag, Al, As, Ba, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Sn, V, Zn	Concentrations of metals in water are determined by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS). Any metals not listed can be determined but are not accredited under UKAS.	Standard Methods for the Examination of Water and Wastewater Part 3125 B – 21st Edition 2005 APHA, AWWA, WEF	**µg/l:** Ag=0.13, Al=10.0, As=0.16, Ba=0.26, Ca=90, Cd=0.03, Co=0.16, Cr=0.25, Cu=0.40, Fe=5.50, Hg=0.01, K=80, Mg=20, Mn=0.22, Mo=1.1, Na=70, Ni=0.50, P=18.0, Pb=0.09, Sb=0.17, Se=0.25, Sn=0.40, V=0.60, Zn=1.3	**Dissolved:** UKAS (all listed) **Total:** Not Accredited

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2320	**Total Sulphur in Soil by ICP**	Sulphur compounds in soil are extracted using aqua regia and the insoluble residue is removed by filtration. The concentration of sulphur in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Loss of sulphur as H2S is prevented by oxidation of the sulphur compounds to sulphate by the aqua regia.	TRL 447 Sulphate Specification for Structural Backfills 2005 BRE SD1 Concrete in Aggressive Ground 2005	0.01%	UKAS
DETSC 2321	**Total Sulphate content of Soil by ICP-OES**	The sulphate in the soil is extracted in dilute hydrochloric acid and the insoluble residue is removed by filtration. The filtrate is made up to volume and the concentration of sulphate in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES).	BS1377 : Part 3: 1990 Method 5 BS1377 : Part 1 : 1990	0.01%	UKAS MCERTS(Soils)
DETSC 2322	**Total Potential Sulfate and Total Oxidisable Sulphur (By Calculation)**	Sulphur compounds in soil are extracted using aqua regia and the insoluble residue is removed by filtration. The concentration of sulphur in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Loss of sulphur as H2S is prevented by oxidation of the sulphur compounds to sulphate by the aqua regia. The wavelength used for identification and quantification of sulphate is 181.972nm. The sulphate in the soil is extracted in dilute hydrochloric acid and the insoluble residue is removed by filtration. The filtrate is made up to volume and the concentration of sulphate in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). The wavelength used for identification and quantification of sulphate is 181.972nm. The two results obtained from the above tests may then be combined to calculate the Total Potential Sulphate and Total Oxidisable Sulphur content	BS1377 : Part 3: 1990 Method 5 BS1377 : Part 1 : 1990	0.01%	Not Accredited

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2324	**Mercury in Waters by Atomic Fluorescence Spectroscopy**	Waters and aqueous samples are preserved by fixing with concentrated nitric acid. Treatment with tin (II) chloride reduces mercury (II) to mercury (0) vapour which is detected using atomic fluorescence spectrometry.	Standard Methods for the Examination of Water and Wastewater Part 3112 B – 21st Edition 2005 APHA, AWWA, WEF PSA Method – Millennium Merlin Method for Total Mercury in Drinking, Surface, Ground, Industrial and Domestic Wastewaters and Saline Waters	0.05µg/l	UKAS
DETSC 2325	**Mercury in Soil Atomic Fluorescence Spectroscopy**	The mercury is extracted from soil in aqua regia with gentle refluxing. The extract is filtered to remove particulates and diluted to volume. Treatment with tin (II) chloride reduces mercury (II) to mercury (0) vapour which is detected using atomic fluorescence spectrometry.	PSA Method – Millennium Merlin Method for Mercury in Sludge, Soils and Sediments	0.05 mg/kg	UKAS MCERTS(Soils)
DETSC 2332	**Inorganic and Methyl Mercury Speciation**	Soils are air-dried and crushed before being subjected to a two-stage microwave extraction procedure for Inorganic (Hg(II)) and Methyl (MeHg) mercury. Waters and aqueous samples are filtered to remove particulates. An aliquot is separated via HPLC before treatment with bromate-bromide and tin (II) chloride to generate mercury and the mercury is determined by atomic fluorescence spectroscopy.	USEPA Method 3200 – Mercury Species Fractionation and Quantification by Microwave Assisted Extraction. PSA Application Note 053 – Mercury Speciation Using The Millenium Merlin Speciation System	**Soil:** 100µg/kg **Water:** 1µg/l	Not Accredited
DETSC 2333	**Elemental Mercury Speciation**	Soils, waters and aqueous samples are tested on an as-received bases. A known quantity of sample is extracted using argon and the released elemental mercury is trapped. The trapped mercury is released upon heating in a scarifier module and determined by atomic fluorescence spectroscopy.		**Soil:** 0.6µg/kg **Water:** 1µg/l	Not Accredited

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2400	**Unified Barge Bioaccessible Metals in Soils**	The Unified BARGE Method (UBM) is a an in vitro method for simulating the human digestive system. Synthetic digestive fluids are used to simulate the fluids present in the body. Both inorganic solutions (Containing inorganic salts such as KCl, NaCletc), and organic solutions (Containing organic compounds such as Urea, Glucose etc) are mixed with enzymes to produce 4 Synthetic digestive fluids saliva (S), Gastric fluid (G), duodenal fluid (D) and bile (B). These solutions are then used to mimic the effect of a sample passing through a human gastro intestinal tract by shaking portions of the sample at 37^0C, human body temperature (17.4).	EPA 9200.2-86 April 2012- Standard Operating Procedure for an In Vitro Bioaccessibility Assay for Lead in Soil BGS Chemical& Biological Hazards Programme Open Report OR/07/027 - Inter-laboratory Trial of a Unified Bioaccessibility Procedure	V = 1.0mg/kg Cr = 5.0mg/kg Co = 1.0mg/kg Ni = 5.0mg/kg As = 0.5mg/kg Se = 0.5mg/kg Cd = 0.5mg/kg Pb = 1.0mg/kg	Not Accredited
DETSC 3001	**Solvent Extractable Matter in Soil**	Soil samples are extracted with a water-immiscible solvent and filtered to remove the water. The solvent is evaporated and the amount of extractable matter in the sample is determined gravimetrically.	In-house method based on:- Problems Arising from the Redevelopment of Gas Works and Similar Sites - AERE Harwell Laboratory 1981. Environmental Agency The Determination of Material Extractable by Carbon Tetrachloride and of Certain Hydrocarbon Oil and Grease Components in sewage Sludge – 1978	40mg/kg	**Toluene & Cyclohexane:** UKAS **Other Solvents:** Not Accredited
DETSC 3002	**Oil & Grease/Solvent Extractable Matter in Waters**	A known volume of sample is acidified to pH<2 and extracted three times with an organic solvent, such as n-Hexane, in a separating funnel. The solvent is removed by evaporation and the amount of extractable matter in the sample is determined gravimetrically.	APHA 21st Edition, 2005 – Method 5520 B. Oil & Grease - Partition Gravimetric Method USEPA Method 1664, Revision A: n-Hexane Extractable Material (HEM: Oil & Grease) and Silica Treated N-Hexane Extractable Material (SGT-HEM; Non Polar Material) by Extraction and Gravimetry.	1mg/l for 500ml sample	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 3049	**Elemental Sulphur in Soils and Waters by HPLC**	Soils are extracted in dichloromethane (DCM) by sonication. The elemental sulphur concentration is determined by high performance liquid chromatography (HPLC) with UV detection using a C_{18} (e.g. 250mm x 4.6mm) column and a mobile phase composed of 95% methanol and 5% water. Waters and aqueous extracts of soils are extracted using DCM in a separating funnel, filtered, and the concentration determined using HPLC.	National Grid Property Holdings Limited, Methods for the Collection and Analysis of Samples from National Grid Sites, Version 1, September 2006. Section 3.12 Soil Analysis: Elemental Sulphur.	**Soil:** 0.75mg/kg **Waters:** 90ug/l	**Soil:** UKAS MCERTS(Soils) **Water:** UKAS
DETSC 3072	**Aliphatic / Aromatic TPH by GC-FID**	Aliphatic and aromatic petroleum hydrocarbons (C_{10}-C_{35}) are extracted from soil and water using n-Hexane. The fractions are separated by solid phase extraction using silica columns, whereby the aliphatic fraction is eluted first with n-Hexane and the aromatic portion is eluted second with dichloromethane. The total, aliphatic, and aromatic concentrations are determined by gas chromatography flame ionisation detection (GC-FID) using a capillary column and hydrogen as the carrier gas. The chromatographic data is further characterized by subdivision into approximate boiling point/carbon number ranges with respect to n-alkane retention time markers.	National Grid Property Holdings Limited, Methods for the Collection and Analysis of Samples from National Grid Sites, Version 1, September 2006. Section 3.12 Soil Analysis: Draft TNRCC Method 1006	**Soil mg/kg:** AL10-12 =1.5 AL12-16 =1.2 AL16-21 =1.5 AL21-35 =3.4 AR10-12 =0.9 AR12-16 =0.5 AR16-21 =0.6 AR21-35 =1.4 **Water:** 1ug/l	**Soil:** UKAS MCERTS(Soils) (C10-C35 only) **Water:** Not Accredited
DETSC 3301	**PAH in Soil by GC-FID**	Soils and associated materials are extracted in dichloromethane (DCM) using sonication. The PAH concentration is recorded both as "Total PAH" and as "Speciated PAH", specified in terms of the 16 US EPA "Priority Pollutant" Polycyclic Aromatic Hydrocarbons. Concentrations are determined by gas chromatography using a BPX 50 (30m; 0.25µm ID; 0.25µm film) capillary column (or equivalent).	In-house method based on US EPA Method 8100, Polynuclear Aromatic Hydrocarbons	0.5 mg/kg each 1.6 mg/kg Total PAH	UKAS (16 PAH's only)
DETSC 3302	**Hexane / Acetone Extracted PAH in Soil by GC-FID**	Soils are extracted into hexane: acetone by shaking. The PAH concentration is recorded both as "Total PAH" and as "Speciated PAH", specified in terms of the 16 US EPA "Priority Pollutant" Polycyclic Aromatic Hydrocarbons. Concentrations are determined by gas chromatography using a BPX 50 (30m; 0.25µm ID; 0.25µm film) capillary column (or equivalent).	In-house method based on US EPA Method 8100, Polynuclear Aromatic Hydrocarbons	0.1 mg/kg each 1.6 mg/kg Total PAH	Not Accredited

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 3303	**Polyaromatic Hydrocarbons in Soils by GC-MS**	The PAHs in the soil sample are extracted into hexane: acetone by shaking. The PAHs in the extract are separated by gas chromatography and identified by the mass selective detector. The concentration of each PAH is determined by referencing individual mass peak areas to the appropriate internal standard mass peak area. Quantification is carried out within the instrument software.	In-house method based on EPA Method 8270- US EPA Method 8270, Revision C, Semivolatile Organic Compounds by Gas Chromatography – Mass Spectrometry (GC/MS)	0.03 mg/kg each 0.10 mg/kg Total PAH	UKAS (All 16 PAH's) MCERTS (not Fluorene, Anthracene, Chrysene or Total)
DETSC 3304	**Polyaromatic Hydrocarbons in Waters by GC-MS**	The PAHs in the water sample are extracted into dichloromethane by shaking. The PAHs in the extract are separated by gas chromatography and identified by the mass selective detector. The concentration of each PAH is determined by referencing individual mass peak areas to the appropriate internal standard mass peak area. Quantification is carried out within the Instrument software.	In-house method based on EPA Method 8270- US EPA Method 8270, Revision 3, Semivolatile Organic Compounds by Gas Chromatography – Mass Spectrometry (GC/MS) In-house method based on EPA Method 3510C- EPA Method 3510C, Revision 3, Separatory Funnel Liquid-Liquid Extraction	10 ng/l each	UKAS (16 PAH's only)
DETSC 3311	**Extractable Petroleum Hydrocarbons (EPH) in Soil, Ballast and Water**	This method is designed to determine total concentrations of extractable petroleum hydrocarbons (EPH) in solid and aqueous matrices. This method uses a dichloromethane (DCM) extraction followed by quantification using gas chromatography/flame ionisation detection (GC-FID) analysis using a 1:1 mixture of diesel and mineral oil as calibration standards and n-alkane markers to establish the boiling point ranges. This method is used for the quantitative analysis of "Total EPH" (C10-C40) and as "Speciated EPH", specified in terms of the "diesel range" (C10-C24), and "mineral oil range" (C24-C40).	USEPA Method 3550C – Ultrasonic Extraction USEPA Method 8015B – Non-Halogenated Organics Using GC/FID	**Soil:** 10 mg/kg **Ballast:** 10mg/kg **Water:** 10µg/l	**Soil:** UKAS MCERTS(Soils) **Water:** UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 3312	**Hexane Extractable Petroleum Hydrocarbons (HPH)**	This method is designed to determine total concentrations of extractable petroleum hydrocarbons (EPH) in solid matrices. This method uses a hexane: acetone (9.4) extraction followed by quantification using gas chromatography/flame ionisation detection (GC-FID) analysis using a 1:1 mixture of diesel and mineral oil as calibration standards and n-alkane markers to establish the boiling point ranges. This method is used for the quantitative analysis of "Total EPH" (C10-C40) and as "Speciated EPH", specified in terms of the "diesel range" (C10- C24) and "mineral oil range" (C24-C40).	USEPA Method 8015B – Non-Halogenated Organics Using GC/FID	**Soil:** 5 mg/kg	Not Accredited
DETSC 3321	**BTEX, MTBE & PRO in Soils by Headspace GC-FID**	BTEX, MTBE and PRO in soils are determined via Headspace GC-FID. Individual aromatic compounds are quantified by external calibration against known standards. PRO range is banded using alkane markers to define retention time windows.	EPA Methods 5021 and 8015D	0.01 mg/kg	UKAS MCERTS(Soils) Not accredited for PRO range (C5-10)
DETSC 3322	**BTEX, MTBE & PRO in Waters & Leachates by Headspace GC-FID**	BTEX, MTBE and PRO in soils are determined via Headspace GC-FID. Individual aromatic compounds are quantified by external calibration against known standards. PRO range is banded using alkane markers to define retention time windows.	EPA Methods 5021 and 8015D	1 µg/l	UKAS
DETSC 3401	**PCBs in Soils by GC-MS**	An as-received soil sample is extracted in Hexane:Acetone (1:2) using sonication methodology. The sample is separated by gas chromatography and identified by mass selective detector. Quantification is carried out within the instrument software.	EPA Method 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography.	**µg/kg** PCB 28=1.25 PCB 52=1.12 PCB 101=1.32 PCB 118=1.43 PCB 153=2.08 PCB 138=1.35 PCB 180=1.42	UKAS MCERTS(Soils)

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 3402	**Polychlorinated Biphenols in Waters by GC/MS**	The water sample is extracted in DCM on a reciprocal shaker. The sample is separated by gas chromatography and identified by mass selective detector. Quantification is carried out within the GC-MS software using an internal standard.	EPA Method 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography.	**ng/l** PCB 28=208 PCB 52=161 PCB 101=211 PCB 118+123=513 PCB 153=163 PCB 138=107 PCB 180=132 PCB 105=133 PCB 114=253 PCB 126=399 PCB 156=253 PCB 157=119 PCB 167=248 PCB 169=181 PCB 189=271 PCB 77=202 PCB 81=186	UKAS
DETSC 3432	**Volatile Organic Compounds in Waters by Headspace GC-MS**	The method covers the range of volatile organic compounds with boiling points up to 220°C. Water samples are heated and agitated in a crimp cap vial. This drives the volatile components in to the headspace. An aliquot of the headspace is taken and injected in to a gas chromatograph with mass selective detection (GC-MS).The detector operates in full scan mode and is calibrated with standards containing known concentrations of the compounds of interest.	USEPA Method 8260B Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 2, December 1996	1 ug/l except: DCM (27), 2,2-Dichloropropane (2), Bromochloromethane (4), Bromodichloromethane (4), m+p-Xylene (2), 1,3-Dichlorobenzene (2)	UKAS except: Trichlorofluoromethane, Methylene Chloride, 1,1,1-Trichloroethane,

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 3433	**Semi-Volatile Organic Compounds in Soils by GCMS**	The SVOCs in the soil sample are extracted into DCM: Acetone by shaking. The SVOCs in the extract are separated by gas chromatography and identified by the mass selective detector. The concentration of each SVOC is determined by referencing individual mass peak areas to the appropriate internal standard mass peak area. Quantification is carried out within the instrument software.	In-house method based on EPA Method 8270- US EPA Method 8270, Revision 3, Semi volatile Organic Compounds by Gas Chromatography – Mass Spectrometry (GC/MS)	Individual SVOCs 0.1 mg/kg	UKAS
DETSC 5001	**Ash Content of Coal**	The ash content of the sample is determined gravimetrically. A known weight of the sample is placed in a prepared ash crucible and placed in a furnace. The furnace is heated to 750ºC ±10ºC where the temperature is maintained. Following combustion the crucible and sample are removed, cooled and reweighed.	ASTM D3174-11 BS 1016-104.4 1998 ISO 1171: 2010	0.1%	UKAS
DETSC 5002	**Ash & LOI Content of Solid Biomass & Solid Recovered Fuels**	The ash and LOI content of the sample is determined gravimetrically. A known weight of the sample is placed in a prepared ash crucible and placed in a furnace. The furnace is heated to 550ºC ±10ºC where the temperature is maintained. Following combustion the crucible and sample are removed, cooled and reweighed.	BS EN 14775:2009 BS EN 15403:2011	0.1%	UKAS
DETSC 5003	**Volatile Matter Content of Solid Biomass, Solid Recovered Fuels and Coal**	A known weight of the sample produced for volatile matter determination is placed in a suitable crucible fitted with a lid. The crucible and sample is weighed and heated in a furnace with a limited air through put at a temperature of 900ºC ±10ºC for 7 minutes. The sample and crucible are re-weighed and the volatile matter content determined by difference.	BSEN15148:2009 – Solid Biofuels Determination of the Content of Volatile Matter BS EN 15402:2011 - Solid Recovered Fuels - Determination of the Content of Volatile Matter	0.1%	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5004	**Total Moisture / Dry Solids Content of Solid Biomass & Solid Recovered Fuels & Coal**	The sample produced for general analysis is placed into a suitable prepared and weighed tray and reweighed. The sample is dried at 105ºC to constant weight and the total moisture / dry solids content is calculated from the reduction in weight.	BSEN 14774 Parts 1 & 2 2009 DD CEN/TS 15414 Parts 1 & 2: 2010	0.1%	UKAS
DETSC 5005	**Analysis Moisture Content of Solid Biomass, Solid Recovered Fuels & Coal**	The sample produced for total moisture determination in accordance with DETSC 5009 or DETSC 5010 is placed in a suitable pre-weighed tray and reweighed. The sample is then dried at 105°C ±2°C to constant weight and then weighed again. The analysis moisture content is calculated from the reduction in weight.	BS EN 14774-3 2009 BS EN 15414-3 2011 BS 1016-104.1 -1999 ISO 11722 – 1999	n/a	UKAS
DETSC 5007	**Calorific Value of Solid Biomass, Solid Recovered Fuels & Coal**	Calorific value of a material is determined in an Isoperbol calorimeter by burning it in pure oxygen in a combustion bomb. A known amount of sample is placed in a combustion bomb which is then pressurised to 30bar with oxygen. A calorimeter bucket is filled with a known amount of deionised water which is placed in the calorimeter and the bomb placed in the bucket. The system is allowed to equilibrate and the bomb fired by electrical connection. The difference in temperature of the water in the calorimeter bucket caused by the ignition of the material in the bomb is measured and the calorific value calculated	BS EN 14918: Solid biofuels – Determination of calorific value BS EN 15400: Solid recovered fuels - Determination of calorific value	1MJ/kg	UKAS
DETSC 5008	**Calorific Value of Soil**	A known amount of sample material is burnt in a combustion bomb that is immersed in water in a calorimeter and the difference in the water temperature before and after ignition measured. The calorific value of the sample material is calculated making any necessary corrections for heat generation not associated with the combusting sample. A gelatine capsule will be required to assist combustion which is also corrected for in the final calculations.	BS 1016-105 1992 ISO 19208 ASTM 5865	1MJ/kg	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5009	**Sample Preparation of Solid Biomass & Solid Recovered Fuels**	If analysis is required on the original material (i.e. Bulk Density) a sub-sample will be taken after initial mixing after which the sample is then reduced by cutting/chopping oversized pieces of material. The material is then mixed and subdivided by manual means during which process representative samples are taken for analysis i.e. total moisture. The remainder of the sample is dried and then reduced to <1mm and again mixed and subdivided to produce the sample for laboratory analysis.	BS EN 14780:2011 BS EN 15413:2011	n/a	Not Accredited
DETSC 5010	**Sample Preparation of Coal**	If required the sample received is first mixed and a sample taken for bulk density or bulk density is carried out on the whole initial sample. The remaining sample or the whole sample used for bulk density is then reduced to <10mm preferably by jaw crushing. The material is then mixed and subdivided by mechanical or manual means during which process representative samples are taken for any analysis required at this stage i.e. total moisture, The remainder of the sample is again mixed and subdivided to produce the sample for laboratory analysis which may require drying prior to crushing to <212 microns. If there is excessive water content a pre- drying stage of the whole sample may have to be carried out before sample blending and subdivision commences.	BS ISO 13909-4: 2001	n/a	Not Accredited
DETSC 5011	**Calculation of Fixed Carbon Content of Coal, SRF and Solid Biomass Fuels**	The total moisture, analysis moisture, ash and volatile matter content are determined by approved methods. The values obtained are deducted from 100 and this gives the fixed carbon value of the fuel.	DD CENT/S 15296:2006 BS 1016.100:1994 BS ISO 17246:2005	0.1%	Not Accredited

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5012	**Determination of Biomass Content of SRF**	Approximately 5g of the sample is dissolved in 150ml of 78% Sulphuric Acid for 16 hours ±2 hours after which 35ml of 30% Hydrogen Peroxide is added and the sample left for an additional 5 hours ±1 hour. At the end of this period 300ml of deionised water is added to the sample and the residue remaining filtered off using a glass fibre filter paper, washing the residue with an additional 300ml of deionised water. The filter paper and residue are placed in a pre-weighed crucible and dried at 1500C until completely dry. The filter paper is reweighed after drying and the non biomass residue determined. Corrections for carbonates content is made by determining the ash content of the original sample and the non biomass residue remaining. The result can also be expressed by percentage calorific value by performing a calorific valve on the solid captured on the filter paper.	BS EN 15440 Solid recovered fuels - Methods for the determination of biomass content	n/a	UKAS
DETSC 5013	**Determination Of Carbon, Hydrogen, Nitrogen & Oxygen In Solid Biomass, Solid Recovered Fuels & Coal**	A known mass of fuel is weighed into tin capsules which are dropped sequentially into the combustion reactor prior to the arrival of oxygen. The sample and tin capsule react with oxygen and combust at temperatures of 1700-1800 °C and the sample is broken down into its elemental components N2, CO2, and H2O. High performance copper wires absorb the excess oxygen not used for sample combustion. The gases flow through the gas chromatographic (GC) separation column which is kept at a constant temperature. As they pass through the GC column, the gases are separated and are detected sequentially by the thermal conductivity detector (TCD). The TCD generates a signal, which is proportional to the amount of element in the sample. The instrument software compares the elemental peak to a known standard material (after calibration) and generates a report for each element on a weight basis. The oxygen is calculated by deducting these quantities from 100 along with the moisture, ash, sulphur & chlorine contents determined by other methods.	BS EN 15104:2011 Solid biofuels - Determination of total content of carbon, hydrogen and nitrogen - Instrumental methods BS EN 15407:2011 Solid recovered fuels - Methods for the determination of carbon (C), hydrogen (H) and nitrogen(N) content BS EN 15296:2011 Solid biofuels - Conversion of analytical results from one basis to another	Carbon 0.10% Nitrogen 0.30% Hydrogen 0.30% Oxygen 3.55%	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5014	**Metals in Coal, SRF and Biomass by ICP**	Metals in coal, solid recovered fuel (SRF) and biomass samples are extracted by microwave using Hydrogen Peroxide (to oxidise and break down organic matter) and Aqua Regia (to dissolve the matrix and hold the metals in solution). Their concentrations are determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES).	BS EN 15410 - Solid recovered fuels - Methods for the determination of the content of major elements (Al, Ca, Fe, K, Mg, Na, P, Si, Ti) BS EN 15411 - Solid recovered fuels - Methods for the determination of the content of trace elements (As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mo, Mn, Ni, Pb, Sb, Se, Tl, V and Zn) BS EN 15290 - Solid biofuels - Determination of major elements - Al, Ca, Fe, Mg, P, K, Si, Na and Ti BS EN 15297 - Solid biofuels - Determination of minor elements - As, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, V and Zn	**0.1 mg/kg:** As, Be, Cd, Co, Mn, Ni, P, Pb, Sb, Se, Sn, Ti, V, Zn **0.2mg/kg:** Cr, Cu, Tl **0.5mg/kg:** Mo **1mg/kg:** Al, Fe, K, Mg **5mg/kg:** Ca **10mg/kg:** Ag, Ba, Rh, Sr, Te	UKAS: Al, As (SRF only), Ca, Cd, Co, Cr, Cu, K, Mg, Mn, Na (SRF only), Ni, P, Pb, Se, Sn, Tl, V, Zn All other metals not accredited
DETSC 5015	**Mercury in Coal, SRF and Biomass by Atomic Fluorescence Spectroscopy**	The mercury is extracted from coal, SRF and biomass in aqua regia with gentle refluxing. The extract is filtered to remove particulates and diluted to volume. Treatment of the resulting solution with tin (II) chloride reduces mercury (II) to mercury (0) vapour which is then quantitatively detected using atomic fluorescence spectrometry.	PSA Method – Millennium Merlin Method for Mercury in Sludge, Soils and Sediments.	0.055mg/kg	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5016	**Total Sulphur Content Of Coal, SRF And Biomass**	Sulphur compounds in SRF and biomass are extracted using aqua regia / hydrogen peroxide and the insoluble residue is removed by filtration. The concentration of sulphur in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Loss of sulphur as H2S is prevented by oxidation of the sulphur compounds to sulphate by the aqua regia. The use of hydrogen peroxide enhances the oxidation properties of nitric acid especially in the digestion of organics. Sulphur compounds in coal are determined by ICP-OES from the aqueous washings of the combustion products after firing in a bomb calorimeter.	TRL Report TRL447 (Updated) - Sulphate specification for structural backfills 2005	0.001mg/kg	UKAS
DETSC 5017	**Sulphur, Chlorine, Fluorine & Bromine Content of Solid Biomass, Solid Recovered Fuels and Coal by IC**	A known weight of fuel is burnt in a pressurised bomb in pure oxygen. After firing of the bomb, it is stood for a minimum of five minutes to allow the combustion products to settle then the oxygen is slowly released over a period of at least three minutes. The bomb is then taken apart and the bomb electrodes rinsed with deionised water into the inside of the bomb. These washings are then decanted into a 50ml volumetric flask. The inside of the bomb is rinsed with deionised water and the washings added to those in the volumetric flask. The contents of the volumetric flask are made up to volume with deionised water and stored for the analysis of sulphur, chloride, fluoride and bromide by ion chromatography.	Operating Instruction Manual No. 442M 6200 Parr Oxygen Bomb Calorimeter Operating Instruction Manual No. 205M 1108 Oxygen Combustion Bomb Operating Instruction Manual No. 454M 6510 Water Handling System	0.01% Chlorine 0.01% Fluorine 0.01% Bromine 0.04% Sulphur (Coal only)	UKAS

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5018	**XRF Analysis of Coal, Biomass, SRF and Cement**	When X-rays are targeted at a material they will cause electrons to be ejected from the component atoms (Ionisation). The ejection of electrons will cause the electronic structure of the component atoms to become unstable resulting in electrons from the higher energy outer orbitals "falling" into the inner orbitals to compensate. This causes a release of energy in the form of a photon equal to the energy difference between the two orbitals involved. Thus the material emits radiation which has energy characteristics of the atoms present. In energy dispersive X-ray fluorescence the fluorescent X-rays emitted are directed to a detector from which the data is processed by a multichannel analyser, producing a digital spectrum which is processed to obtain analytical data. The instrument analytical parameters are set up for the matrix type. A sample cell is prepared by placing a piece of prolene film over the outer cell and then inserting the inner cell. This gives a complete cell with a clear prolene base. A portion of the sample is placed into the cell and then analysed.	Rigaku NEX CG EDXRF instruction manual	**Cement:** 0.01% BaO, Cr_2O_3, CuO, PbO, Rb_2O, SrO, ZnO 0.02% Cl, V_2O_5 0.05% TiO_2 0.1% Mn_2O_3, P_2O_5, SO_3 0.5% K_2O 1% Al_2O_3, CaO, CdO, Co_2O_3, Fe_2O_3, MgO, Na_2O, NiO, SiO_2, Y_2O_3 **Fuel:** 0.01% Co, Cr, Cu, I, Li, Mn, Ni, P, Pb, Sn, Ti, V, Zn 0.02% Al, Ba, S, Si 0.1% Mg 0.2% Ca 0.5% As, Cd, Hg, Mo, Na, Sb, Se, Th, Tl 1% Ag	UKAS Al, As, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, P, Sb, Si, Sn, Tl, Ti, V, Zn Al2O3, BaO, CaO, Cl, Cr2O3, CuO, Fe2O3, K2O, MgO, Mn2O3, Na2O, P2O5, PbO, Rb2O, SiO2, SO3, SrO, TiO2, V2O5, ZnO All other testing not accredited
DETSC 5019	**Determination of Biodegradable Municipal Waste Content (Compositional Analysis)**	The method is based on handpicking the BMW fraction from the municipal waste sample, and then weighing the amount of BMW sorted and expressing this as a percentage on a wet weight basis of the weight of the whole municipal waste sample.	ENVIRONMENT AGENCY: Guidance on monitoring of MBT and other treatment processes for the landfill allowances schemes (LATS and LAS) for England and Wales	n/a	Not Accredited
DETSC 5020	**Determination of Bulk Density in Solid Biomass and Solid Recovered Fuels**	The test portion is filled into a standard container of a given size and shape and weighed afterwards. Bulk density is calculated from the net weight per standard volume and reported for the moisture content.	BS EN 15103:2009 Solid Biofuels- Determination of bulk density BS EN 15401:2010 Solid Recovered Fuels- Determination of bulk density	0.5kg/m^3	Not Accredited

DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5021	**Auto Ignition Temperature**	A quantity of the sample is placed into a metal tray or crucible and placed into an oven or furnace. The temperature of the oven / furnace is increased in predefined increments and the temperature in which the sample ignites is noted.	None	25°C	Not Accredited

APPENDIX D

Slag Analysis Report – BG0G05-09 - AEG Ltd - MPA Redcar - Phase I-III Oct 2020 - RP2

TRS REPORT

Report Ref: BG0G/AEG/MPR/TRS/10/20/RP2
Date Issued: 11 September 2020
TRS Sample Refs: BG0G05-09
Order No: Job 4291

EXAMINATION OF FIVE SAMPLES

FROM

4291 MPA SITE, REDCAR

FOR

ALLIED EXPLORATION & GEOTECHNICS LTD

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EXAMINATION OF FIVE SAMPLES
FROM
4291 MPA SITE, REDCAR
FOR
ALLIED EXPLORATION & GEOTECHNICS LTD

1. BACKGROUND

Five bulk samples were received from the above site on 31st July 2020. Each sample was weighed and allocated a unique TRS reference number, the details of which are recorded below:-

TRS Ref	Site Ref	Depth/m	Mass/kg
BG0G05	TP101 B5	1.9	19.5
BG0G06	TP107 B5	1.5	18.9
BG0G07	TP119 B6	2.0	17.9
BG0G08	TP120 B9	3.8	11.0
BG0G09	TP122 B9	3.8	12.0

There was a delay in processing these samples due to the Coronovirus lockdown.

The purpose of the exercise was to identify the range and relative concentrations of any iron and steelmaking slags present in the samples, and whether there was any potential for volumetric instability from the materials.

2. SAMPLE PREPARATION & PROGRAMME OF ANALYSIS

The samples were primary crushed to reduce particle size down to <50mm, portions then being selected and dried at low temperature to constant weight. The dried material was subjected to a regime of stage crushing and quartering to further reduce particle size down to <5mm. Portions of this <5mm material

were made up into resin bound blocks, one face of which was ground flat and polished using diamond pastes. Further portions of the <5mm material were milled to a fine powder. Fractions of material were extracted throughout the preparation procedure to provide the materials necessary for the further tests and analyses required in the programme.

A petrological examination was made of the polished blocks using reflected light microscopy, the complete findings of which are recorded in appendix A. The results of this examination were discussed in our report of 11th September 2020. On the basis of that report, and after discussions with the client, the following tests and analyses were carried out on the samples:-

Samples BG0G09 was subjected to the following tests & analyses to assess the potential for expansion of the blast furnace slag.

- Water soluble sulphate (table 1)
- Acid soluble sulphate (table 1)
- Total sulphur (table 1)
- Thermal analysis (table 3)
- TRS accelerated expansion test (table 4)

Samples BG0G05 & 07 were subjected to the following tests & analyses to assess the potential for expansion of the basic steel slag.

- Free CaO (table 2)
- Free MgO (table 2)
- Thermal analysis (table 3)
- TRS accelerated expansion test (table 4)

3. DISCUSSION OF RESULTS

3.1 Petrology

A petrological examination was made of the five samples using reflected light microscopy. The complete findings of this examination are recorded in appendix A.

Blast furnace slag was present in all five samples, with substantial quantities present in samples BG0G 06, 08 & 09 and small amounts in samples BG0G 05 & 07. The blast furnace slag was predominantly crystalline with only minor amounts of glassy material seen. Secondary alteration due to weathering was moderate, consisting mainly of pore infill and surface rinds. Products of alteration included calcite and gypsum, with other products being difficult to identify specifically under the microscope. Old weathered blast furnace slag may occasionally contain pockets of potentially expansive material (see appendix B). This potential can only be assessed by direct expansion testing (see sections 3.2-3.5). The unaltered slag consisted predominantly of melilite, along with more minor amounts of spinel, metallic iron and sulphides.

Basic steel slag was present in four of the five samples. Samples BG0G 05 & 07 contained very large amounts, with samples BG0G 08 & 09 containing small amounts. The slag was extensively altered due to weathering, the secondary phases being difficult to identify specifically under the microscope. The unaltered basic steel slag consisted largely of dicalcium silicate, along with more minor amounts of RO & R_3O_4 phase, CaF phase, lime phase and periclase. The mineralogy of the basic steel slag would suggest that it may have significant potential for expansion (see appendix B). This potential can only be assessed by direct expansion testing (see sections 3.3 to 3.5).

A small amount of basic refractory material was seen in sample BG0G 09. This material, even in minor amounts, can have significant potential for expansion (see appendix B).

Other constituents seen in the samples, generally in minor concentrations, included alumino-silicate brick, quartz, iron ore, metal, coal and coke. A cementitious material often bound the smaller particles together. This material appeared similar to the slag alteration products.

3.2 Sulphur Species

The following range of analyses were performed on samples BG0G09 (this sample contained significant amounts of blast furnace slag). The results are recorded in table 1:-

- Water soluble sulphate
- Acid soluble sulphate
- Total sulphur

Total sulphur recorded was 0.77 percent. Acid soluble sulphate was 0.85 percent, with a corresponding water soluble sulphate of 0.57 g/l. These sulphate and sulphur values were fairly typical for blast furnace slag. However, care should be taken when specifying concrete that may come into contact with the slag. Calculations show that 44 percent of the available sulphur is present as sulphate.

3.3 Thermal Analysis

Simultaneous differential thermal analysis (DTA) and thermo-gravimetric analysis (TGA) were performed on samples BG0G05, 07 & 09. The results are recorded in table three.

No ettringite or gypsum was seen in any of the samples.

Calcium hydroxide was recorded in samples BG0G05 & 07 at trace and 0.6 percent. Magnesium hydroxide was measured in the same samples both at trace level. These values were used to correct the free CaO and free MgO analyses recorded in table 2.

Calcite was present in all three samples examined at between 0.2 and 3.4 percent. This product is an indicator as to the weathered state of the slag.

3.4 Free CaO & Free MgO

Free CaO & free MgO analyses were carried out on samples BG0G05 & 07 (These samples contained significant mounts of basic steel slag). The results are recorded in table 2. Both original and corrected values are recorded. The original values include both the oxide (CaO and MgO) and the hydroxide ($(Ca(OH)_2$ and $Mg(OH)_2)$) contents. The corrected values report only the oxide content (CaO and MgO) after correction using the hydroxide values from the thermal analyses. These corrected values are the more significant, as it is only the oxides that are still free to hydrate, i.e. expand.

Free lime was recorded in the samples at 1.4 and 0.8 percent. Free magnesia was recorded at 0.9 percent. These corrected free lime and free magnesia levels record oxides that are potentially still free to hydrate (i.e. expand).

3.5 TRS Accelerated Expansion Test

The TRS accelerated expansion test was performed on samples BG0G05, 07 & 09. The results are recorded in table four. Note that the test measures potential for future expansion, and is not a measure of expansion that may have taken place in the past.

Sample BG0G09 (consisting predominantly of blast furnace slag, with minor amounts of basic steel slag and basic refractory material) recorded an expansion result of 0.29 percent. The samples containing significant basic steel slag recorded expansion results of 0.76 and 0.90 percent.

4. CONCLUSIONS

The following conclusions can be drawn:-

- Blast furnace slag was a dominant constituent in three of the samples (BG0G 06, 08 & 09) and a minor constituent in the remaining two. The slag was mainly crystalline although minor amounts of glassy material were seen. The slag showed some alteration due to weathering. Old weathered blast furnace slag may occasionally contain pockets of potentially expansive material.
- Further testing of sample BG0G09 consisting predominantly of blast furnace slag (with minor basic steel slag & basic refractory) recorded an expansion result of 0.29 percent. The sulphate values should be taken into consideration when specifying concrete that may come into contact with the slag.
- Basic steel slag was the dominant constituent in samples BG0G 05 and 07. It was also present in small amounts in samples 08 & 09. This material is likely to present a significant risk of expansion.

- Expansion testing of samples (BG0G05 & 07) consisting mainly of basic steel slag recorded expansion results of 0.76 and 0.90 percent.
- Minor amounts of basic refractory material were seen in sample BG0G 09. This product can be a significant source of expansion, even when present in relatively small amounts.
- Other products were seen in the samples in minor amounts including alumino-silicate brick, quartz, iron ore, metal, coal and coke.

Note

These conclusions apply only to the samples tested and may not represent the bulk of the material on the site from which they were taken.

Ian D. Thomas

Ian D Thomas BSc(Hons) 21 October 2020

TABLE 1 SULPHUR SPECIES ANALYSES

TRS Ref	Site Ref	Water Sol. SO_3 (g/l)	Acid Sol. SO_3 (%)	Total S (%)
BG0G05	TP101 B5	-	-	-
BG0G07	TP119 B6	-	-	-
BG0G09	TP122 B9	0.57	0.85	0.77

TABLE 2 ANALYSIS FOR FREE CaO AND FREE MgO

TRS Ref	Site Ref	Free CaO Original (%)	Free CaO Corrected (%)	Free MgO Original (%)	Free MgO Corrected (%)
BG0G05	TP101 B5	1.4	1.4	0.9	0.9
BG0G07	TP119 B6	1.3	0.8	0.9	0.9
BG0G09	TP122 B9	-	-	-	-

TABLE 3 RESULTS FROM THERMAL ANALYSIS

TRS Ref	Site Ref	Mass % by Thermal Analysis						
		L.O.I.	Ettringite	Gypsum	Calcite	$Ca(OH)_2$	$Mg(OH)_2$	Others
BG0G05	TP101 B5	1.42	0.0	0.0	1.1	trace	0.0	-
BG0G07	TP119 B6	0.97	0.0	0.0	0.2	0.6	trace	-
BG0G09	TP122 B9	6.44	0.0	0.0	3.4	0.0	trace	-

TABLE 4 TRS ACCELERATED EXPANSION TEST

TRS Ref	Site Ref	7 day (%)	14 day (%)	21 day (%)	28 day (%)
BG0G05	TP101 B5	0.55	0.69	0.74	0.76
BG0G07	TP119 B6	0.42	0.72	0.83	0.90
BG0G09	TP122 B9	0.17	0.28	0.29	0.29

APPENDIX A

PETROLOGICAL REPORT ON SAMPLES BG0G 05-09

A petrological examination has been carried out of five samples BG0G 05 to 09.

Polished blocks were prepared using particulate material crushed to a nominal size of –5mm. Representative material was made up into resin-bonded blocks. One face of each of these was ground flat and polished using diamond pastes. In addition, the surfaces were selectively etched with water and 0.1%N HCl in order to help with the phase identification.

The detailed results are given in the accompanying Table.

Samples 06, 08 and 09 consist largely of blast furnace slag and its alteration products.

Samples 05 & 07 are mainly basic steel slag. Very little basic refractory material was seen.

Blast furnace slag
The unaltered blast furnace slag consists mainly of crystalline melilite (Ca,Mg,Al silicate). Also, some spinel ($MgAl_2O_4$) occurs as a primary phase. The matrix, the space between the melilite crystals, is partly occupied by silicate glass and partly with other silicates. The slag contains minor amounts of iron metal occurring as tiny globules and prills and, also, dendritic crystals of Ca,Mn sulphide. Secondary alteration is moderate. It is mainly restricted to pore infill and the formation of thin rinds, especially the larnite. The secondary products are mostly finely granular and are difficult to identify specifically under the microscope. Minor amounts of calcite ($CaCO_3$) and well-crystallised gypsum ($CaSO_4.2H_2O$) are present.

Basic steel slag
The unaltered basic steel slag consists mainly of dicalcium silicate, RO and R_3O_4 phases (FeO and Fe_3O_4 with some Al, Mn, Mg and Ca in solid solution) and CaF phases (complex Ca alumino-ferrites). Individual particles vary considerably in composition. Lime phase (CaO with some Fe, Mn and Mg in solid solution) is present in minor amounts. It occurs mainly as granular particles up to about 0.1 mm in size. Periclase (MgO with some Fe in solid solution) is more common. Some metal is present as prills. The slag is extensively altered to secondary products that are difficult to identify specifically and are, probably, mainly hydrated silicates.

Other constituents
These include quartz, iron ore and coke. The particles are bonded together by cementitious material that is similar to the slag alteration products but probably also includes some clay. It consists mostly of complex hydrates difficult to identify under the optical microscope.

TRS SAMPLES BG0G 05-09

	5	**6**	**7**	**8**	**9**
BLAST FURNACE SLAG					
Amount	***s***	***L***	***s***	***L***	***l***
Phases present:-					
Melilite	l	L	L	L	L
Matrix & other silicates	s	s	s	s	s
Ca sulphide	-	vs	-	vs	vs
Metallic iron	-	s	-	s	vs
Spinel	s	s	-	s	vs
Glassy slag	-	s	-	-	-
Alteration products	s	s	s	m	s
Calcite	-	-	s	-	-
Gypsum	-	-	-	s	-
BASIC STEEL SLAG					
Amount	***L***	***-***	***L***	***s***	***s***
Phases present:-					
Dicalcium silicate	l	-	l	l	m
Tricalcium silicate	s	-	-	-	-
Unetched silicate	-	-	s	-	-
RO phase	m	-	m	m	m
CaF phase	s	-	s	s	s
R3O4 phase	s	-	s	s	-
Metal & rust	s	-	vs	-	vs
Lime phase	vs	-	vs	-	-
Periclase	s	-	s	s	s
Alteration products	m	-	s	l	l
BASIC REFRACTORIES					
Amount	***-***	***-***	***-***	***-***	***s***
OTHER CONSTITUENTS					
Alumino-silicate brick	-	s	-	-	-
Quartz, etc.	s	vs	vs	-	vs
Intermediate slag	s		-	-	-
Metal, rust, scale, etc.	s	-	vs	vs	s
Iron ore, ironstone, etc.	-	-	-	-	vs
Shale, etc.	m	-	-	-	-
Coke	s	-	-	-	vs
Coal & char	-	s	-	-	-
Cementitious alteration products	s	vs	s	s	s

L = very large, l = large, m = medium, s = small and vs = very small amounts

GENERAL EXPLANATION

L = very large, l = large, m = medium, s = small and vs = very small amounts.

Blast furnace slag. When present this consists mainly of melilite (Ca,Mg,Al silicate ranging in composition between $Ca_2Al_2SiO_7$ and $Ca_2MgSi_2O_7$). Other common phases are merwinite ($Ca_3MgSi_2O_8$), The matrix often consists of some of the above phases, especially melilite, but may also contain other phases such as wollastonite ($CaSiO_3$), anorthite ($CaAl_2Si_2O_8$) and pyroxene ($(CaMg)SiO_3$). Spinel ($MgAl_2O_4$) may be present. Sulphides and metal usually occur and are mostly finely dispersed, but the metal sometimes occurs as prills and may contain some graphite and Ti carbo-nitride (TiCN). Material reported as ceramic in appearance is very finely crystalline. The alteration products often include calcite and gypsum but are mostly silicate and/or sulpho-aluminate hydrates that are difficult to identify specifically under the microscope.

Basic steel slag. When present this consists mainly of dicalcium silicate, mostly the ß-form (larnite) but sometimes the alpha form. Phosphoric slags may contain nagelschmidtite (Ca_2SiO_4 with $Ca_3P_2O_8$ in solid solution). Other silicate often present in small amounts, unetched by dilute HCl, is probably melilite. RO, R_3O_4 and RF phases are typically present and are mainly FeO and Fe_3O_4 with some Mg, Mn, Ca, etc. in solid solution and complex Ca alumino-ferrites. There may also be some Fe_2O_3 and spinel ($(Mg,Fe)Al_2O_4$). The slag typically carries minor amounts of periclase (MgO with some Fe in solid solution) and lime phase (CaO with some Fe, Mn & Mg in solid solution). Other possible minor constituents include fluorite (CaF_2) and apatite (Ca fluoro-phosphate), the last present in phosphoric slags. The alteration products are, again, difficult to identify specifically but are probably, mainly, hydrated silicates. Portlandite ($Ca(OH)_2$) may be present.

Basic refractory material. When present, this is mainly magnesian and consists of granular periclase (MgO) with interstitial silicates. Sometimes samples contain chrome-magnesia material with chromite present in addition to the other phases. Hot face material (from close to the furnace) may also occur. The periclase and interstitial silicates show secondary alteration similar to that of the basic steel slag. Brucite ($Mg(OH)_2$ is likely.

Acid steel slag. When present this consists mainly of fayalite ($(Fe,Mn)_2SiO_4$), Fe,Mn oxides and cristobalite (high temperature SiO_2).

Other slags. The 'intermediate slag' (probably primary flush slags from steel furnaces) has a variable phase assemblage, being mainly formed of silicates, particularly dicalcium silicate, melilite, merwinite and a complex olivine phase together with spinel and wustite (FeO). Sometimes it contains significant amounts of periclase, well embedded in the slag. The 'ferrous slag' (probably from foundry operations) has similar silicates but much more substantial content of iron oxides, usually wustite. It is often associated with scale (iron oxides formed on the surface of steel during reheating/cooling). When present, the 'cindery slag' consists of various silicates and silicate glass with Fe oxides, hercynite ($FeAl_2O_4$) and, sometimes, corundum (Al_2O_3). It is usually derived from heating furnaces and is often associated with burnt shale. When present, the 'siliceous clinker' is similar but devoid of iron oxides.

Other constituents The alumino-silicate brick includes a range of refractory firebrick, common brick and alumina-rich refractories. The 'quartz, sandstone, etc.' may include used silica refractory material consisting of quartz and its high temperature forms. Sometimes there is a distinct granular texture and it is derived from silcrete, a kind of chert. Cementitious material may bond the finer particles together. It is similar to the other alteration products consisting mostly of complex hydrates difficult to identify under the microscope Sometimes some is used Portland cement recognised by the relict textures of the clinker and the embedded quartz sand.

APPENDIX B

MECHANISMS OF VOLUMETRIC INSTABILITY IN IRON AND STEEL INDUSTRY SLAGS

Volumetric change with time can occur in some types of iron and steel industry slags. These mechanisms are briefly described in this section.

Blast Furnace Slags

Fresh-make air-cooled, i.e. crystalline, blast furnace slags are almost always volumetrically stable after cooling. The two mechanisms for volumetric instability listed in BS1047:1983 – "Air Cooled Blast furnace Slag for use in Construction" are:-

a) Beta to gamma inversion of dicalcium silicate.

b) Iron unsoundness.

a) Research by G H Thomas on this phase transformation has shown the transformation to be athermal rather than isothermal. In practical terms this means that inversion, and the expansion associated with it, can only occur during the cooling cycle. In fully cooled material there would appear to be no further risk of instability from this mechanism.

b) Iron unsoundness is a very rare form of instability frequently associated with operating problems in the blast furnace. TRS know of only one instance in over 40 years. The mechanism, which is a hydrolysis reaction, is immediately triggered off by the presence of water. Once water has initiated the reaction, the mechanism proceeds to completion. It is impossible to arrest the process once started; at least by methods operating in normal ambient conditions.

It follows that the risk of late expansion from either of these mechanisms in blast furnace slag is remote.

c) Sulphoaluminate Type Activity

Some years ago, G. H. Thomas discovered a third mechanism that may give rise to volumetric instability. The process is possible only in some old blast furnace slag altered

by weathering. When the sulphide sulphur in the blast furnace slags is oxidised during weathering to sulphate, under some circumstances reactions can take place within the slag to produce an 'ettringite' type product. The process is somewhat analogous to sulphatic attack on concrete and has a similar result - expansion of the mass and associated disruption.

For the mechanism to have any significance, the slag needs to have residual potential for this reaction. Evidence of past activity does not necessarily indicate further reaction is possible.

The TRS accelerated expansion test is, we believe, uniquely capable of identifying such slags, as well as instability attributable to free CaO and free MgO in steel slag & etc.

Basic Steel Slags

Basic steel slags commonly contain significant quantities of free CaO and free MgO. These free oxides are well known for the massive expansion associated with their hydration. In practical terms, it is impossible to forecast when hydration will take place, but it can be up to decades after the material was cooled – or placed. The reasons are complex, but include the varying density of the oxides, due to the variation in temperatures at which the products have been held in the furnace. Other factors influencing rate of hydration include:-

- the protection of slags by a reaction product at the oxide interface with the slag.
- the presence of the oxides as lime or magnesia rich solid solutions instead of the pure oxide.

The result is potential future volumetric instability but at an unforeseeable date. Periclase, i.e. free MgO, is relatively much slower than free CaO to hydrate.

Scrap High Magnesia Refractories

These are particularly undesirable components in fill as they commonly result in high concentrations of free MgO. The problems associated with these concentrations are similar to those where periclase is found in basic steel slag.

APPENDIX E

GQRA – Summary of Soil Screen

Table E1: Soil GAC Protective of Human Health

Contaminant of Concern	MDL	Units	Human Health (Commercial Worker)	GAC Source	Maximum Concentration Measured	Maximum Concentration Measured (Made Ground - Slag)	Maximum Concentration Measured (Granular Made Ground)
Test	**LOD**	**Units**					
Metals							
Aluminium	1	mg/kg			50,000	50,000	19,000
Antimony	1	mg/kg	470	USEPA	13	13	13
Arsenic	0.2	mg/kg	640	S4UL	230	230	220
Barium	2	mg/kg	19,000	Arcadis	890	800	890
Beryllium	0.2	mg/kg	12	S4UL	5	5	2
Boron, Water Soluble	0.2	mg/kg	240,000	S4UL	28	28	18
Cadmium	0.1	mg/kg	190	S4UL	8	2	8
Chromium	0.15	mg/kg	8,600	S4UL	740	740	710
Chromium, Hexavalent	1	mg/kg	33	S4UL	0	0	0
Copper	0.2	mg/kg	68,000	S4UL	1,500	1,500	250
Iron	25	mg/kg			510,000	440,000	510,000
Lead	0.3	mg/kg	2,300	C4SL	550	550	480
Magnesium	1	mg/kg			67,000	67,000	34,000
Manganese	20	mg/kg			65,000	65,000	32,000
Mercury	0.05	mg/kg	*58**	S4UL	1.9	0.2	1.9
Molybdenum	0.4	mg/kg	5,540	Arcadis	68	62	68
Nickel	1	mg/kg	980	S4UL	150	150	100
Silicon	10	mg/kg			130,000	130,000	63,000
Vanadium	0.8	mg/kg	9,000	S4UL	2,500	2,500	800
Zinc	1	mg/kg	730,000	S4UL	1,600	650	1,600
Inorganics							
Loss on Ignition at 440oC	0.01	%		-			
pH		pH		-	12.9	12.9	12.5
Calorific Value	1	MJ/kg		-			
Cyanide, Total	0.1	mg/kg		-	20.0	7.4	20.0
Cyanide, Free	0.1	mg/kg	66	DQRA	0.0	0.0	0.0
Thiocyanate	0.6	mg/kg	230	USEPA	1.8	1.8	0.0
Organic matter	0.1	%		-	4.2	4.0	4.2
Sulphate Aqueous Extract as SO4	10	mg/l		-	1,500	1,500	630
Sulphur (free)	0.75	mg/kg		-	35	30	35
Petroleum Hydrocarbons							
Aliphatic C5-C6	0.01	mg/kg	*3200***	S4UL	0.0	0.0	0.0
Aliphatic C6-C8	0.01	mg/kg	*7800***	S4UL	0.0	0.0	0.0
Aliphatic C8-C10	0.01	mg/kg	*2000***	S4UL	0.0	0.0	0.0
Aliphatic C10-C12	1.5	mg/kg	*9700***	S4UL	2.9	2.9	2.1
Aliphatic C12-C16	1.2	mg/kg	*59000***	S4UL	15.0	15.0	4.6
Aliphatic C16-C21	1.5	mg/kg	1,600,000	S4UL	34	34	17
Aliphatic C21-C35	3.4	mg/kg	1,600,000	S4UL	890	890	350
Aliphatic C5-C35	10	mg/kg		na	940	940	370
Aromatic C5-C7	0.01	mg/kg	*26000***	S4UL	0.0	0.0	0.0
Aromatic C7-C8	0.01	mg/kg	*56000***	S4UL	0.0	0.0	0.0
Aromatic C8-C10	0.01	mg/kg	*3500***	S4UL	0.0	0.0	0.0
Aromatic C10-C12	0.9	mg/kg	*16000***	S4UL	0.0	0.0	0.0
Aromatic C12-C16	0.5	mg/kg	*36000***	S4UL	7.7	4.1	7.7
Aromatic C16-C21	0.6	mg/kg	28,000	S4UL	26	16	26
Aromatic C21-C35	1.4	mg/kg	28,000	S4UL	190	100	190
Aromatic C5-C35	10	mg/kg		na	220	110	220
TPH Ali/Aro Total	10	mg/kg		na	1,000	1,000	560
EPH (C10-C40)	10	mg/kg		na			
PAHs							
Naphthalene	0.03	mg/kg	*1,900*	Wood	0.42	0.04	0.42
Acenaphthylene	0.03	mg/kg	*83000***	S4UL	0.39	0.00	0.39
Acenaphthene	0.03	mg/kg	*84000***	S4UL	0.66	0.13	0.66
Fluorene	0.03	mg/kg	*63000***	S4UL	0.25	0.00	0.25
Phenanthrene	0.03	mg/kg	22,000	S4UL	1.80	1.00	1.80
Anthracene	0.03	mg/kg	520,000	S4UL	0.87	0.17	0.87
Fluoranthene	0.03	mg/kg	23,000	S4UL	7.60	1.20	7.60
Pyrene	0.03	mg/kg	54,000	S4UL	4.80	0.78	4.80
Benzo(a)anthracene	0.03	mg/kg	170	S4UL	2.50	0.23	2.50
Chrysene	0.03	mg/kg	350	S4UL	2.70	0.35	2.70
Benzo(b)fluoranthene	0.03	mg/kg	44	S4UL	4.60	0.34	4.60
Benzo(k)fluoranthene	0.03	mg/kg	1,200	S4UL	1.50	0.13	1.50
Benzo(a)pyrene	0.03	mg/kg	77	Wood	4.20	0.16	4.20
Indeno(1,2,3-c,d)pyrene	0.03	mg/kg	500	S4UL	2.50	0.10	2.50
Dibenzo(a,h)anthracene	0.03	mg/kg	3.5	S4UL	0.55	0.00	0.55
Benzo(g,h,i)perylene	0.03	mg/kg	3,900	S4UL	3.50	0.10	3.50
PAH - USEPA 16, Total	0.1	mg/kg		na	39	4.40	39.00
PCBs							
PCB 28 + PCB 31	0.01	mg/kg		-	0.00	0.00	0.00
PCB 52	0.01	mg/kg		-	0.00	0.00	0.00
PCB 101	0.01	mg/kg		-	0.00	0.00	0.00
PCB 118	0.01	mg/kg		-	0.00	0.00	0.00
PCB 153	0.01	mg/kg		-	0.00	0.00	0.00
PCB 138	0.01	mg/kg		-	0.00	0.00	0.00
PCB 180	0.01	mg/kg		-	0.00	0.00	0.00
PCB 7 Total	0.01	mg/kg		na	0.00	0.00	0.00
Phenols							
Phenol - Monohydric	0.3	mg/kg	760	S4UL	0	0.00	0.00

The following GACs have been used in order of availablity:

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C4SL: (Commerical End Use)	Department for Environment, Food and Rural Affairs (DEFRA) (2014) SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document, December 2014
Arcadis	Where published criteria above are not available, Arcadis has derived GAC based on EA guidance and assumptions in line with current industry standards and standard CLEA inputs for a commerical land use.
USEPA	GAC based on US Environmental Protection Agency (USEPA) Regional Screening Levels (RSL). Available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Wood derived GAC based on CLEA v1.07 were presented in the Wood 2019 report for benzo(a)pyrene and naphthalene. It is understood that these values were acceptable to the regulator for this site and as such they have been retained here.

Notes

GAC	Generic Assessment Criteria
na	Comprises multiple contaminant, no applicable GAC
*123**	S4UL exceeds the vapour saturation limit
*123***	S4UL exceeds the solubility saturation limit
-	No applicable GAC readily available
	Elements present naturally in soil with typically low toxicity
<0.1	Concentration less then the method detection limit
-	Not analysed
	Contaminant of Concern in excess of Human Health GAC

Table E2: Soil GAC Protective of Human Health

Contaminant of Concern	MDL	Units	Human Health (Commercial Worker)	GAC Source	Maximum Concentration Measured
VOCs					
Vinyl Chloride	0.01	mg/kg	0.059	S4UL	0.0
1,1 Dichloroethylene	0.01	mg/kg	1,000	USEPA	0.0
Trans-1,2-dichloroethylene	0.01	mg/kg	23,000	USEPA	0.0
1,1-dichloroethane	0.01	mg/kg	16	USEPA	0.0
Cis-1,2-dichloroethylene	0.01	mg/kg	2,300	USEPA	0.0
2,2-dichloropropane	0.01	mg/kg	-		0.0
Bromochloromethane	0.01	mg/kg	630	USEPA	0.0
Chloroform	0.01	mg/kg	99	S4UL	0.0
1,1,1-trichloroethane	0.01	mg/kg	660	S4UL	0.0
1,1-dichloropropene	0.01	mg/kg	-		0.0
Carbon tetrachloride	0.01	mg/kg	2.9	S4UL	0.0
Benzene	0.01	mg/kg	27	S4UL	0.0
1,2-dichloroethane	0.01	mg/kg	0.67	S4UL	0.0
Trichloroethylene	0.01	mg/kg	1.2	S4UL	0.0
1,2-dichloropropane	0.01	mg/kg	11.0	USEPA	0.0
Dibromomethane	0.01	mg/kg	99.0	USEPA	0.0
Bromodichloromethane	0.01	mg/kg	1.3	USEPA	0.0
cis-1,3-dichloropropene	0.01	mg/kg	8.2	USEPA	0.0
Toluene	0.01	mg/kg	56,000	S4UL	0.0
trans-1,3-dichloropropene	0.01	mg/kg	8.2	USEPA	0.0
1,1,2-trichloroethane	0.01	mg/kg	5	USEPA	0.0
Tetrachloroethylene	0.01	mg/kg	19	S4UL	0.0
1,3-dichloropropane	0.01	mg/kg	23,000	USEPA	0.0
Dibromochloromethane	0.01	mg/kg	39	USEPA	0.0
1,2-dibromoethane	0.01	mg/kg	0.16	USEPA	0.0
Chlorobenzene	0.01	mg/kg	56	S4UL	0.0
1,1,1,2-tetrachloroethane	0.01	mg/kg	110	S4UL	0.0
Ethylbenzene	0.01	mg/kg	5,700	S4UL	0.0
m+p-Xylene	0.01	mg/kg	5,900	S4UL	0.0
o-Xylene	0.01	mg/kg	6,600	S4UL	0.0
Styrene	0.01	mg/kg	35,000	USEPA	0.0
Bromoform	0.01	mg/kg	86	USEPA	0.0
Isopropylbenzene	0.01	mg/kg	-		0.0
Bromobenzene	0.01	mg/kg	1,800	USEPA	0.0
1,2,3-trichloropropane	0.01	mg/kg	0.11	USEPA	0.0
n-propylbenzene	0.01	mg/kg	-		0.0
2-chlorotoluene	0.01	mg/kg	23,000	USEPA	0.0
1,3,5-trimethylbenzene	0.01	mg/kg	1,500	USEPA	0.0
4-chlorotoluene	0.01	mg/kg	23,000	USEPA	0.0
Tert-butylbenzene	0.01	mg/kg	120,000	USEPA	0.0
1,2,4-trimethylbenzene	0.01	mg/kg	1,800	USEPA	0.0
sec-butylbenzene	0.01	mg/kg	120,000	USEPA	0.0
p-isopropyltoluene	0.01	mg/kg	-		0.0
1,3-dichlorobenzene	0.01	mg/kg	30	S4UL	0.0
1,4-dichlorobenzene	0.01	mg/kg	4,400	S4UL	0.0
n-butylbenzene	0.01	mg/kg	58,000	USEPA	0.0
1,2-dichlorobenzene	0.01	mg/kg	2,000	S4UL	0.0
1,2-dibromo-3-chloropropane	0.01	mg/kg	0.06	USEPA	0.0
1,2,4-trichlorobenzene	0.01	mg/kg	220	S4UL	0.0
Hexachlorobutadiene	0.01	mg/kg	31	S4UL	0.0
1,2,3-trichlorobenzene	0.01	mg/kg	102	S4UL	0.0
MTBE	0.01	mg/kg	210	USEPA	0.0

The following GACs have been used in order of availablity:

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USEPA	GAC based on US Environmental Protection Agency (USEPA) Regional Screening Levels (RSL). Available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Notes

GAC	Generic Assessment Criteria
na	Comprises multiple contaminant, no applicable GAC
*123**	S4UL exceeds the vapour saturation limit
*123***	S4UL exceeds the solubility saturation limit
-	No applicable GAC readily available
	Elements present naturally in soil with typically low toxicity
<0.1	Concentration less then the method detection limit
-	Not analysed
	Contaminant of Concern in excess of Human Health GAC

Table F3: Soil GAC Protective of Human Health

Contaminant of Concern	MDL	Units	Human Health (Commercial Worker)	GAC Source	Maximum Concentration Measured
3&4-Methylphenol	0.1	mg/kg	82,000	USEPA	0.0
2,4-Dimethylphenol	0.1	mg/kg	16,000	USEPA	0.0
Bis-(dichloroethoxy)methane	0.1	mg/kg	-		0.0
2,4-Dichlorophenol	0.1	mg/kg	2,500	USEPA	0.0
1,2,4-Trichlorobenzene	0.1	mg/kg	110	USEPA	0.0
4-Chloro-3-methylphenol	0.1	mg/kg	82,000	USEPA	0.0
2-Methylnaphthalene	0.1	mg/kg	3,000	USEPA	0.1
Hexachlorocyclopentadiene	0.1	mg/kg	8	USEPA	0.0
2,4,6-Trichlorophenol	0.1	mg/kg	210	USEPA	0.0
2,4,5-Trichlorophenol	0.1	mg/kg	82,000	USEPA	0.0
2-Chloronaphthalene	0.1	mg/kg	60,000	USEPA	0.0
2-Nitroaniline	0.1	mg/kg	8,000	USEPA	0.0
2,4-Dinitrotoluene	0.1	mg/kg	7.4	USEPA	0.0
3-Nitroaniline	0.1	mg/kg	-		0.0
4-Nitrophenol	0.1	mg/kg	-		0.0
Dibenzofuran	0.1	mg/kg	1,000	USEPA	0.1
2,6-Dinitrotoluene	0.1	mg/kg	1.50	USEPA	0.0
2,3,4,6-Tetrachlorophenol	0.1	mg/kg	25,000	USEPA	0.0
Diethylphthalate	0.1	mg/kg	660,000	USEPA	0.0
4-Chlorophenylphenylether	0.1	mg/kg	-		0.0
4-Nitroaniline	0.1	mg/kg	110	USEPA	0.0
2-Methyl-4,6-Dinitrophenol	0.1	mg/kg	-		0.0
Diphenylamine	0.1	mg/kg	82,000	USEPA	0.0
4-Bromophenylphenylether	0.1	mg/kg	-		0.0
Hexachlorobenzene	0.1	mg/kg	110	S4UL	0.0
Pentachlorophenol	0.1	mg/kg	400	S4UL	0.0
Di-n-butylphthalate	0.1	mg/kg	-		0.0
Butylbenzylphthalate	0.1	mg/kg	1,200	USEPA	0.0
Bis(2-ethylhexyl)phthalate	0.1	mg/kg	160	USEPA	0.0
Di-n-octylphthalate	0.1	mg/kg	8,200	USEPA	0.0
1,4-Dinitrobenzene	0.1	mg/kg	82	USEPA	0.0
Dimethylphthalate	0.1	mg/kg	-		0.0
1,3-Dinitrobenzene	0.1	mg/kg	82	USEPA	0.0
1,2-Dinitrobenzene	0.1	mg/kg	82	USEPA	0.0
2,3,5,6-Tetrachlorophenol	0.1	mg/kg	-		0.0
Azobenzene	0.1	mg/kg	26	USEPA	0.0
Carbazole	0.1	mg/kg	-		0.0

The following GACs have been used in order of availablity:

S4UL: (Commercial End Use, 1% SOM)	LQM / CIEH (2015) The LQM / CIEH S4ULs for Human Health Risk Assessment. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3223.
C4SL: (Commerical End Use)	Department for Environment, Food and Rural Affairs (DEFRA) (2014) SP1010: Development of
Arcadis	Where published criteria above are not available, Arcadis has derived GAC based on EA
USEPA	GAC based on US Environmental Protection Agency (USEPA) Regional Screening Levels

Notes

GAC	Generic Assessment Criteria
na	Comprises multiple contaminant, no applicable GAC
*123**	S4UL exceeds the vapour saturation limit
*123***	S4UL exceeds the solubility saturation limit
-	No applicable GAC readily available
	Elements present naturally in soil with typically low toxicity
<0.1	Concentration less then the method detection limit
-	Not analysed
	Contaminant of Concern in excess of Human Health GAC

APPENDIX F

GQRA – Summary of Soil Leachate Screen

Table F1: Leachate GAC Protective of Human Health and Water Resources

Contaminant of Concern	MDL	Units	Human Health Inhalation GAC (On-site Commerical Worker)	EQS (Estuaries and Coastal Waters)	DWS	Maximum Concentration Measured
Metals						
Antimony, Dissolved	0.17	ug/l	NVP	-	5	0.68
Arsenic, Dissolved	0.16	ug/l	NVP	25	10	**23**
Barium, Dissolved	0.26	ug/l	NVP	-	700	560
Beryllium, Dissolved	0.1	ug/l	NVP	-	-	0.0
Boron, Dissolved	12	ug/l	NVP	7000	1000	190
Cadmium, Dissolved	0.03	ug/l	NVP	0.2	5	0.04
Chromium, Dissolved	0.25	ug/l	NVP	-	50	8.3
Chromium, Hexavalent	7	ug/l	-	0.6		0.0
Copper, Dissolved	0.4	ug/l	NVP	3.76	2000	13
Iron, Dissolved	5.5	ug/l	NVP	1000	200	350
Lead, Dissolved	0.09	ug/l	NVP	1.3	10	61
Magnesium, Dissolved	0.02	mg/l	NVP	-	-	4.4
Manganese, Dissolved	0.22	ug/l	NVP	-	50	19
Mercury, Dissolved	0.01	ug/l	NVP	0.07	1	0.07
Molybdenum, Dissolved	1.1	ug/l	-	-	70	**95**
Nickel, Dissolved	0.5	ug/l	NVP	8.6	20	0.5
Vanadium, Dissolved	0.6	ug/l	NVP	100	-	51
Zinc, Dissolved	1.3	ug/l	NVP	7.9	3000	5.7
Inorganics						
pH	-	pH	-	6 - 8.5	-	12.3
Cyanide, Total	40	ug/l	-	1	50	0.0
Ammoniacal Nitrogen as N	0.015	mg/l	-	-	0.5	0.41
Chloride	0.1	mg/l	-	-	-	11
Sulphate as SO4	0.1	mg/l	-	-	-	240
Petroleum Hydrocarbons						
Aliphatic C5-C6	0.1	ug/l	>SOL	#	#	0.0
Aliphatic C6-C8	0.1	ug/l	>SOL	#	#	0.0
Aliphatic C8-C10	0.1	ug/l	>SOL	#	#	0.0
Aliphatic C10-C12	1	ug/l	>SOL	#	#	0.0
Aliphatic C12-C16	1	ug/l	>SOL	#	#	0.0
Aliphatic C16-C21	1	ug/l	NR	#	#	0.0
Aliphatic C21-C35	1	ug/l	NR			0.0
Aromatic C5-C7	0.1	ug/l	57000	8	1	0.0
Aromatic C7-C8	0.1	ug/l	>SOL	74	700	0.0
Aromatic C8-C10	0.1	ug/l	>SOL	#	#	0.0
Aromatic C10-C12	1	ug/l	>SOL	#	#	0.0
Aromatic C12-C16	1	ug/l	>SOL	#	#	0.0
Aromatic C16-C21	1	ug/l	NR	#	#	0.0
Aromatic C21-C35	1	ug/l	NR	#	#	0.0
TPH Ali/Aro Total	10	ug/l	na	50*	10**	0.0
PAHs						
Naphthalene	0.05	ug/l	>SOL	2	2	85
Acenaphthylene	0.01	ug/l	>SOL	-	-	0.3
Acenaphthene	0.01	ug/l	>SOL	-	-	2.4
Fluorene	0.01	ug/l	>SOL	-	-	0.66
Phenanthrene	0.01	ug/l	>SOL	-	-	1.5
Anthracene	0.01	ug/l	>SOL	0.1	-	0.46
Fluoranthene	0.01	ug/l	>SOL	0.0063	-	2.5
Pyrene	0.01	ug/l	>SOL	-	-	1.9
Benzo(a)anthracene	0.01	ug/l	>SOL	-	-	1.8
Chrysene	0.01	ug/l	>SOL	-	-	2.2
Benzo(b)fluoranthene	0.01	ug/l	>SOL	0.017	0.025	3.3
Benzo(k)fluoranthene	0.01	ug/l	>SOL	0.017	0.025	1
Benzo(a)pyrene	0.01	ug/l	>SOL	0.027	0.01	2.3
Indeno(1,2,3-c,d)pyrene	0.01	ug/l	>SOL	-	0.025	2.1
Dibenzo(a,h)anthracene	0.01	ug/l	>SOL	-	-	0.45
Benzo(g,h,i)perylene	0.01	ug/l	>SOL	0.00082	0.025	2.2
PAH Total	0.2	ug/l	>SOL	na		90
Phenols						
Phenol - Monohydric	100	ug/l	>SOL	7.7	7.7	0

The following GACs have been used:

Arcadis

Where published criteria above are not available, Arcadis has derived GAC based on EA guidance and assumptions in line with current industry standards and standard CLEA inputs for a commerical land use.

Notes

GAC	Generic Assessment Criteria
DWS	Drinking Water Standard
EQS	Environmental Quality Standard (Estuaries and Coastal Waters)
NVP	Contaminant has low vapour phase in groundwater
>SOL	Target acceptable risk not exceeded at the theoretical solubility concentration
NR	No appropriate inhalation reference dose identified during review of toxicological data
na	Comprises multiple contaminant, no applicable GAC
-	No water quality standard identified as suitable for deriving generic assessment criteria
#	No GAC for individua TPH fractions given that the compliacne criteria is for sum TPH
<0.1	Concentration less then the method detection limit
	Contaminant of Concern in excess of Human Health GAC
1.23	Contaminant of Concern in excess of DWS
1.23	Contaminant of Concern in excess of EQS
1.23	Contaminant of Concern in excess of DWS and EQS
*	EC Surface Water Directive, 1975
**	Water Supply (Water Quality) Regulation, 1989

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