Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768699	768700	768701	768702	768703	768704
			Sample ID	S7	S8	S9	S10	S11	S12
			Depth	3.00	0.80	0.50	2.00	3.00	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 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	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 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	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.09	0.04	0.06	0.11	0.06	0.09
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.11	0.05	0.10	0.18	0.07	0.14
Pyrene	DETSC 3303#	0.03	mg/kg	0.09	0.04	0.09	0.15	0.06	0.11
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	0.04	0.07	< 0.03	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	0.06	0.09	< 0.03	0.07
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	0.07	0.10	< 0.03	0.08
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.05	0.06	< 0.03	0.05
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 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	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.43	0.14	0.47	0.85	0.19	0.60
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.3	< 0.3	< 0.3	2.2	< 0.3

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768705	768706	768707	768708	768709	768710
			Sample ID	S13	S14	S15	S16	S17	S18
			Depth	2.30	3.00	2.00	3.00	0.30	1.30
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	10	3.9	4.4	3.9	4.9	19
Antimony	DETSC 2301*	1	mg/kg	1.7	6.3	2.3	2.0	2.7	1.7
Beryllium	DETSC 2301#	0.2	mg/kg	0.7	0.8	0.8	0.8	0.9	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.3	1.1	1.6	1.4	1.2	1.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.7	0.5	0.4	0.5	0.5	1.2
Chromium	DETSC 2301#	0.15	mg/kg	24	17	24	20	29	25
Chromium III	DETSC 2301*	0.15	mg/kg	24	17	24	20	29	25
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	17	15	19	16	16	47
Lead	DETSC 2301#	0.3	mg/kg	26	11	8.4	27	25	130
Manganese	DETSC 2301#	20	mg/kg	700	940	810	760	770	820
Mercury	DETSC 2325#	0.05	mg/kg	0.05	< 0.05	0.13	0.27	0.08	0.13
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.9	0.9	0.7	0.9	0.9
Nickel	DETSC 2301#	1	mg/kg	20	23	27	19	25	26
Selenium	DETSC 2301#	0.5	mg/kg	1.0	1.0	0.6	0.7	0.6	2.8
Zinc	DETSC 2301#	1	mg/kg	77	72	51	56	64	1200
Inorganics									
pH	DETSC 2008#			8.6	8.5	10.3	10.5	8.8	8.0
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1
Organic matter	DETSC 2002#	0.1	%	2.4	2.7	2.0	4.5	2.0	4.9
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.07	0.08	0.16	0.27	0.07	0.07
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.06	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	0.01	0.14	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.12	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	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 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	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 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	0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.07	0.01	0.12	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 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	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 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	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768705	768706	768707	768708	768709	768710
			Sample ID	S13	S14	S15	S16	S17	S18
			Depth	2.30	3.00	2.00	3.00	0.30	1.30
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 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	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 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	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	0.13	0.04	0.31	0.09	0.06
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.07	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	0.20	0.05	0.43	0.11	0.12
Pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.16	0.04	0.36	0.09	0.09
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	< 0.03	0.16	0.04	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.04	0.08	< 0.03	0.19	0.05	0.08
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	0.08	< 0.03	0.19	0.05	0.08
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.08	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03	0.13	< 0.03	0.04
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.09	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.08	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.24	0.77	0.14	2.1	0.42	0.54
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.3	0.5	0.6	0.7	0.6	0.6

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768711	768712	768713	768714	768715	768716
			Sample ID	S19	S20	S21	S22	S23	S24
			Depth	2.80	0.50	1.30	2.50	0.50	1.40
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	< 0.2	9.1	11	9.8	15	7.0
Antimony	DETSC 2301*	1	mg/kg	2.3	2.0	2.2	2.0	2.1	1.3
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.8	0.9	0.9	0.8	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.2	1.4	1.6	1.4	1.5	1.3
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	1.0	0.8	1.0	0.8	1.1
Chromium	DETSC 2301#	0.15	mg/kg	< 0.15	21	25	36	17	22
Chromium III	DETSC 2301*	0.15	mg/kg	< 0.15	21	25	36	17	22
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	< 0.2	25	25	40	40	19
Lead	DETSC 2301#	0.3	mg/kg	< 0.3	51	35	52	34	48
Manganese	DETSC 2301#	20	mg/kg	760	1100	780	1300	1100	1000
Mercury	DETSC 2325#	0.05	mg/kg	0.17	0.05	0.08	< 0.05	0.07	0.06
Molybdenum	DETSC 2301#	0.4	mg/kg	0.9	0.9	1.4	1.2	0.8	0.8
Nickel	DETSC 2301#	1	mg/kg	< 1.0	21	24	28	22	18
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.7	< 0.5	< 0.5	0.8
Zinc	DETSC 2301#	1	mg/kg	< 1.0	100	91	180	110	110
Inorganics									
pH	DETSC 2008#			10.2	8.4	9.8	9.7	8.5	10.6
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.2	2.7	3.5	2.6	2.3	2.2
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.15	0.06	0.12	0.11	0.05	0.17
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 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	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 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	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 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	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 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	0.02	< 0.01	0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.04	< 0.01	0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 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	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 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	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768711	768712	768713	768714	768715	768716
			Sample ID	S19	S20	S21	S22	S23	S24
			Depth	2.80	0.50	1.30	2.50	0.50	1.40
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 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	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 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	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.50	0.05	0.09	0.06	0.04	0.16
Anthracene	DETSC 3303	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	1.2	0.10	0.11	0.07	0.09	0.21
Pyrene	DETSC 3303#	0.03	mg/kg	0.86	0.08	0.09	0.06	0.08	0.19
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.38	0.04	0.05	< 0.03	0.05	0.08
Chrysene	DETSC 3303	0.03	mg/kg	0.41	0.06	0.04	0.04	0.07	0.09
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.31	0.06	0.05	0.04	0.07	0.10
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.22	< 0.03	0.04	< 0.03	0.04	0.07
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03	0.04	0.04
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	4.3	0.38	0.47	0.27	0.48	1.1
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.5	0.5	0.4	0.6	0.6

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	768717
Sample ID	S25
Depth	2.50
Other ID	
Sample Type	SOIL
Sampling Date	12/02/15
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	7.5
Antimony	DETSC 2301*	1	mg/kg	2.1
Beryllium	DETSC 2301#	0.2	mg/kg	0.5
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.6
Cadmium	DETSC 2301#	0.1	mg/kg	1.0
Chromium	DETSC 2301#	0.15	mg/kg	24
Chromium III	DETSC 2301*	0.15	mg/kg	24
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	27
Lead	DETSC 2301#	0.3	mg/kg	63
Manganese	DETSC 2301#	20	mg/kg	720
Mercury	DETSC 2325#	0.05	mg/kg	0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	1.1
Nickel	DETSC 2301#	1	mg/kg	21
Selenium	DETSC 2301#	0.5	mg/kg	0.6
Zinc	DETSC 2301#	1	mg/kg	95
Inorganics				
pH	DETSC 2008#			10.7
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.2
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.18
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	30
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	30
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	53
Aromatic C5-C35	DETSC 3072*	10	mg/kg	53
TPH Ali/Aro	DETSC 3072*	10	mg/kg	83

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

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	768717
Sample ID	S25
Depth	2.50
Other ID	
Sample Type	SOIL
Sampling Date	12/02/15
Sampling Time	n/s

Test	Method	LOD	Units	
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.08
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.13
Pyrene	DETSC 3303#	0.03	mg/kg	0.12
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05
Chrysene	DETSC 3303	0.03	mg/kg	0.05
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.05
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.05
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.04
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.65
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.5

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785692	785693	785694	785695	785696	785697
			Sample ID	S1	S2	S3	S4	S5	S6
			Depth	0.50	1.70	3.00	2.00	3.00	0.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.51	0.50	0.38	0.42	0.65	0.30
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.32	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	5	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Hexavalent Chromium	DETSC 2203	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.3	1.3	1.6	1.2	1.2	0.9
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.28	0.33	0.17	0.26	0.16	0.12
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.0	0.81	0.53	0.46	0.64	0.36
Zinc, Dissolved	DETSC 2306	1.25	ug/l	2.14	1.44	1.30	1.89	1.29	1.47
Inorganics									
pH	DETSC 2008			8.2	7.9	7.8	7.8	7.7	7.6
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	0.73	0.79	1.3	1.3	1.3	0.79
Fluoride	DETSC 2055	0.1	mg/l	0.22	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.7	6.2	13	9.0	11	4.4
Total Organic Carbon	DETSC 2085	1	mg/l	1.7	1.5	2.2	1.8	2.3	2.3
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 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	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 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	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785692	785693	785694	785695	785696	785697
			Sample ID	S1	S2	S3	S4	S5	S6
			Depth	0.50	1.70	3.00	2.00	3.00	0.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785698	785699	785700	785701	785702	785703
			Sample ID	S7	S8	S9	S10	S11	S12
			Depth	3.00	0.80	0.50	2.00	3.00	0.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.43	0.51	0.85	0.52	1.3	0.44
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	0.36	0.38	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	5	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Hexavalent Chromium	DETSC 2203	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.0	0.8	1.5	1.3	1.4	1.0
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.22	0.23	1.0	0.33	0.29	0.24
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.36	0.31	0.32	0.41	0.47	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	1.59	1.43	2.12	2.26	< 1.25	1.53
Inorganics									
pH	DETSC 2008			7.7	7.6	7.6	7.6	7.5	7.5
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.2	1.3	1.0	1.4	1.2	0.79
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	13	12	6.1	9.2	11	3.9
Total Organic Carbon	DETSC 2085	1	mg/l	2.5	3.8	3.2	3.9	3.2	2.5
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 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	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 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	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785698	785699	785700	785701	785702	785703
			Sample ID	S7	S8	S9	S10	S11	S12
			Depth	3.00	0.80	0.50	2.00	3.00	0.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785704	785705	785706	785707	785708	785709
			Sample ID	S13	S14	S15	S16	S17	S18
			Depth	2.30	3.00	2.00	3.00	0.30	1.30
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.45	0.55	0.53	0.43	0.34	1.0
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.53	< 0.25	< 0.25	< 0.25	0.46	0.66
Chromium III Dissolved	DETSC 2302*	5	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Hexavalent Chromium	DETSC 2203	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.0	1.3	1.6	1.2	0.9	2.3
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.32	0.45	0.34	0.24	0.29	0.51
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	0.03	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.8	< 0.5	< 0.5	< 0.5	< 0.5	0.8
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	2.5
Zinc, Dissolved	DETSC 2306	1.25	ug/l	1.41	1.50	2.05	1.52	3.89	2.67
Inorganics									
pH	DETSC 2008			7.5	7.5	7.4	7.4	7.4	7.4
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.4	0.95	1.1	1.4	0.69	1.6
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	12	4.9	9.1	13	8.0	10
Total Organic Carbon	DETSC 2085	1	mg/l	2.4	1.9	2.7	3.1	1.6	5.4
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 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	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 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	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785704	785705	785706	785707	785708	785709
			Sample ID	S13	S14	S15	S16	S17	S18
			Depth	2.30	3.00	2.00	3.00	0.30	1.30
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785710	785711	785712	785713	785714	785715
			Sample ID	S19	S20	S21	S22	S23	S24
			Depth	2.80	0.50	1.30	2.50	0.50	1.40
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.9	0.76	1.7	1.1	0.68	2.4
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.93	0.30	0.55	< 0.25	0.26	0.97
Chromium III Dissolved	DETSC 2302*	5	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Hexavalent Chromium	DETSC 2203	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.9	1.3	5.1	1.8	1.5	4.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	1.0	0.37	0.25	0.21	0.18	0.51
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.7	< 0.5	1.0	< 0.5	< 0.5	0.9
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.7	0.85	1.7	0.78	0.49	1.8
Zinc, Dissolved	DETSC 2306	1.25	ug/l	2.41	2.11	< 1.25	< 1.25	1.40	1.73
Inorganics									
pH	DETSC 2008			8.1	7.9	9.6	8.9	8.5	8.3
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.2	0.88	1.6	2.3	2.9	1.7
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	0.16	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	13	9.4	4.0	9.5	6.7	5.2
Total Organic Carbon	DETSC 2085	1	mg/l	4.5	2.5	4.2	3.4	2.7	2.8
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 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	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 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	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 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	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785710	785711	785712	785713	785714	785715
			Sample ID	S19	S20	S21	S22	S23	S24
			Depth	2.80	0.50	1.30	2.50	0.50	1.40
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	0.02	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	785716
Sample ID	S25
Depth	2.50
Other ID	
Sample Type	LEACHATE
Sampling Date	12/02/15
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
NRA Leachate Preparation	DETS 036*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.82
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.99
Chromium III Dissolved	DETSC 2302*	5	ug/l	< 5.0
Hexavalent Chromium	DETSC 2203	10	ug/l	< 10
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.7
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.89
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25
Inorganics				
pH	DETSC 2008			10.1
Cyanide total	DETSC 2130	40	ug/l	< 40
Chloride	DETSC 2055	0.1	mg/l	2.4
Fluoride	DETSC 2055	0.1	mg/l	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	5.9
Total Organic Carbon	DETSC 2085	1	mg/l	3.6
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	785716
Sample ID	S25
Depth	2.50
Other ID	
Sample Type	LEACHATE
Sampling Date	12/02/15
Sampling Time	n/s

Test	Method	LOD	Units	
PAHs				
Naphthalene	DETS 074*	0.01	ug/l	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20
Phenols				
Phenol	*	0.5	ug/l	< 0.50

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

Summary of Asbestos Analysis
Bulk & Soil Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	Sample ID	Sample Location	Material Type*	Result	Comment*	Analyst
768693	S1 0.50		SOIL	NAD	none	Andrew Little
768694	S2 1.70		SOIL	NAD	none	Andrew Little
768695	S3 3.00		SOIL	NAD	none	Andrew Little
768696	S4 2.00		SOIL	NAD	none	Andrew Little
768697	S5 3.00		SOIL	NAD	none	Andrew Little
768698	S6 0.50		SOIL	Chrysotile	Clumps of Chrysotile fibres present	Andrew Little
768699	S7 3.00		SOIL	Chrysotile	Bundle of chrysotile fibre present	Andrew Little
768700	S8 0.80		SOIL	NAD	none	Andrew Little
768701	S9 0.50		SOIL	NAD	none	Andrew Little
768702	S10 2.00		SOIL	NAD	none	Andrew Little
768703	S11 3.00		SOIL	Chrysotile	Small bundles of chrysotile fibres present	Andrew Little
768704	S12 0.50		SOIL	Amosite	Free Amosite fibres present	Andrew Little
768705	S13 2.30		SOIL	Amosite Chrysotile	Clump of Amosite/Chrysotile present	Andrew Little
768706	S14 3.00		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768707	S15 2.00		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768708	S16 3.00		SOIL	Chrysotile	Bundle of chrysotile fibre present	Andrew Little
768709	S17 0.30		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768710	S18 1.30		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768711	S19 2.80		SOIL	Chrysotile	Free Chrysotile fibres present	Andrew Little
768712	S20 0.50		SOIL	Chrysotile	Bundles of Chrysotile fibres present	Andrew Little
768713	S21 1.30		SOIL	Chrysotile	Bundle of chrysotile fibre present	Andrew Little
768714	S22 2.50		SOIL	Chrysotile	Bundles of Chrysotile fibres present	Andrew Little
768715	S23 0.50		SOIL	Chrysotile	Free Chrysotile fibres present	Andrew Little
768716	S24 1.40		SOIL	NAD	none	Andrew Little
768717	S25 2.50		SOIL	Chrysotile	Bundles of Chrysotile fibres present	Andrew Little
768718	S16A 3.00		Cement	Chrysotile	none	Andrew Little

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 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768698	768699	768703	768704
		Sample ID	S6	S7	S11	S12
		Depth	0.50	3.00	3.00	0.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.001	<0.001	<0.001	na
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	< 0.001
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	645.18	1061.41	748.41	1157.84
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	na
% Serpentine bundles in sample		Mass %	0.001	<0.001	<0.001	na
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	<0.001
% Serpentine fibres in sample		Mass %	na	na	na	<0.001
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	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

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768705	768706	768707	768708
		Sample ID	S13	S14	S15	S16
		Depth	2.30	3.00	2.00	3.00
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.024**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.024	<0.001	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	1226.44	1188.37	1497.67	838.56
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 %	0.024	na	na	na
% Serpentine bundles in sample		Mass %	na	<0.001	<0.001	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	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

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768709	768710	768711	768712
		Sample ID	S17	S18	S19	S20
		Depth	0.30	1.30	2.80	0.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001	na	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	< 0.001	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	1345.77	840.34	683.00	1038.48
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	na
% Serpentine bundles in sample		Mass %	<0.001	<0.001	na	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	<0.001	na
% Serpentine fibres in sample		Mass %	na	na	<0.001	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	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

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768713	768714	768715	768717
		Sample ID	S21	S22	S23	S25
		Depth	1.30	2.50	0.50	2.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001	na	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	< 0.001	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	960.31	964.16	1039.32	1100.66
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	na
% Serpentine bundles in sample		Mass %	<0.001	<0.001	na	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	<0.001	na
% Serpentine fibres in sample		Mass %	na	na	<0.001	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	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 15-27313-2
Client Ref 12032-SP1
Contract Herbet Road Stockpile - Round 1

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
768693	S1 0.50 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768694	S2 1.70 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768695	S3 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768696	S4 2.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768697	S5 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768698	S6 0.50 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768699	S7 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768700	S8 0.80 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768701	S9 0.50 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768702	S10 2.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768703	S11 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768704	S12 0.50 SOIL	12/02/15	GJ 250ml, PT 1L		
768705	S13 2.30 SOIL	12/02/15	GJ 250ml, PT 1L		
768706	S14 3.00 SOIL	12/02/15	GJ 250ml, PT 1L		
768707	S15 2.00 SOIL	12/02/15	GJ 250ml x2, PT 1L		
768708	S16 3.00 SOIL	12/02/15	GJ 250ml x2, PT 1L		
768709	S17 0.30 SOIL	12/02/15	GJ 250ml, PT 1L x2		
768710	S18 1.30 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768711	S19 2.80 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768712	S20 0.50 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768713	S21 1.30 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768714	S22 2.50 SOIL	12/02/15	GJ 1L, GJ 250ml, PT 1L x2		
768715	S23 0.50 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768716	S24 1.40 SOIL	12/02/15	GJ 250ml, PT 1L x2		
768717	S25 2.50 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768718	S16A 3.00 MISC	12/02/15	PT 1L x2		
785692	S1 0.50 LEACHATE	12/02/15	GJ 1L (1L)		
785693	S2 1.70 LEACHATE	12/02/15	GJ 1L (1L)		
785694	S3 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785695	S4 2.00 LEACHATE	12/02/15	GJ 1L (1L)		
785696	S5 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785697	S6 0.50 LEACHATE	12/02/15	GJ 1L (1L)		
785698	S7 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785699	S8 0.80 LEACHATE	12/02/15	GJ 1L (1L)		
785700	S9 0.50 LEACHATE	12/02/15	GJ 1L (1L)		
785701	S10 2.00 LEACHATE	12/02/15	GJ 1L (1L)		
785702	S11 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785703	S12 0.50 LEACHATE	12/02/15	GJ 1L (1L)		
785704	S13 2.30 LEACHATE	12/02/15	GJ 1L (1L)		
785705	S14 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785706	S15 2.00 LEACHATE	12/02/15	GJ 1L (1L)		
785707	S16 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785708	S17 0.30 LEACHATE	12/02/15	GJ 1L (1L)		
785709	S18 1.30 LEACHATE	12/02/15	GJ 1L (1L)		
785710	S19 2.80 LEACHATE	12/02/15	GJ 1L (1L)		
785711	S20 0.50 LEACHATE	12/02/15	GJ 1L (1L)		
785712	S21 1.30 LEACHATE	12/02/15	GJ 1L (1L)		
785713	S22 2.50 LEACHATE	12/02/15	GJ 1L (1L)		
785714	S23 0.50 LEACHATE	12/02/15	GJ 1L (1L)		

Information in Support of the Analytical Results

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Herbet Road Stockpile - Round 1

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
785715	S24 1.40 LEACHATE	12/02/15	GJ 1L (1L)		
785716	S25 2.50 LEACHATE	12/02/15	GJ 1L (1L)		

Key: G-Glass P-Plastic J-Jar V-Vial 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 and/or inappropriate containers 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.

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.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-27519-2

19-Jun-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference	15-27519-2
Client Reference	12032-SP1
Contract Title	Herbert Road Stockpile - Round 1
Description	11 Soil samples, 11 Leachate samples.
Date Received	17-Feb-15
Date Started	17-Feb-15
Date Completed	19-Jun-15
Test Procedures	Identified by prefix DETSn (details on request).

Notes **This report supersedes 15-27519. Extra testing.**

Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

Sample ID	Lab No	Completed	Matrix Description
S26	769704	10/06/2015	Dark brown gravelly sandy CLAY with odd rootlets
S27	769705	10/06/2015	Dark brown gravelly sandy CLAY
S28	769706	10/06/2015	Dark brown gravelly sandy CLAY with odd rootlets (Made Ground includes brick)
S29	769707	10/06/2015	Dark brown gravelly sandy CLAY with odd rootlets
S30	769708	10/06/2015	Dark brown gravelly sandy CLAY
S31	769709	10/06/2015	Dark brown gravelly sandy CLAY
S32	769710	10/06/2015	Dark brown gravelly sandy CLAY with odd rootlets
S33	769711	10/06/2015	Dark brown gravelly sandy CLAY
S34	769712	10/06/2015	Dark grey gravelly sandy CLAY
S35	769713	10/06/2015	Dark gravelly sandy CLAY
S36	769714	10/06/2015	Brown gravelly sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769704	769705	769706	769707	769708	769709	769710
			Sample ID	S26	S27	S28	S29	S30	S31	S32
			Depth							
			Other ID							
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	8.2	8.4	7.4	9.0	8.5	9.2	7.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.5	1.4	0.6	0.6	2.0	0.6
Chromium	DETSC 2301#	0.15	mg/kg	21	19	21	25	19	21	22
Chromium III	DETSC 2301*	0.15	mg/kg	21	19	21	25	19	21	22
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	26	21	31	27	25	21	23
Lead	DETSC 2301#	0.3	mg/kg	40	38	78	41	42	82	33
Mercury	DETSC 2325#	0.05	mg/kg	0.07	< 0.05	0.12	0.10	0.07	0.10	0.09
Nickel	DETSC 2301#	1	mg/kg	24	21	21	25	19	20	26
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	120	80	130	92	80	140	74
Inorganics										
pH	DETSC 2008#			8.7	9.3	9.5	8.6	8.7	11.3	8.8
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.1	0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.1
Organic matter	DETSC 2002#	0.1	%	3.1	2.6	2.1	3.8	3.1	2.5	2.8
Chloride	DETSC 2055	1	mg/kg	I/S	I/S	I/S	I/S	I/S	I/S	I/S
Fluoride	DETSC 2055	1	mg/kg	I/S	I/S	I/S	I/S	I/S	I/S	I/S
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.07	0.07	0.08	0.16	0.27	0.07	0.07
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 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	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 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	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 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	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	15	< 3.4	< 3.4	< 3.4	9.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	15	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 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	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 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	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 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	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	8.5	10
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	15	< 10	< 10	< 10	18	10

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769704	769705	769706	769707	769708	769709	769710
			Sample ID	S26	S27	S28	S29	S30	S31	S32
			Depth							
			Other ID							
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 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	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 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	0.04	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	0.06	0.06	0.06	0.12	0.17	0.06
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.05	0.04	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	0.10	0.12	0.09	0.25	0.12	0.08
Pyrene	DETSC 3303#	0.03	mg/kg	0.07	0.09	0.10	0.07	0.22	0.10	0.07
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.04	0.04	0.05	< 0.03	0.11	0.04	0.04
Chrysene	DETSC 3303	0.03	mg/kg	0.05	0.06	0.06	0.05	0.12	0.06	0.04
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	0.06	0.06	0.04	0.13	0.05	0.04
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.05	< 0.03	0.09	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.06	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.05	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.33	0.45	0.50	0.30	1.2	0.61	0.33
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.4	< 0.3	< 0.3	0.4	0.4	< 0.3

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769711	769712	769713	769714
			Sample ID	S33	S34	S35	S36
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	6.5	4.7	8.5	4.8
Cadmium	DETSC 2301#	0.1	mg/kg	1.2	0.6	0.6	1.0
Chromium	DETSC 2301#	0.15	mg/kg	14	21	15	18
Chromium III	DETSC 2301*	0.15	mg/kg	14	21	15	18
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	14	11	20	13
Lead	DETSC 2301#	0.3	mg/kg	39	21	26	41
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	16	12	20	16
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	97	48	63	85
Inorganics							
pH	DETSC 2008#			11.5	10.9	9.0	11.5
Cyanide Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.7	4.5	1.9	1.0
Chloride	DETSC 2055	1	mg/kg	I/S	I/S	I/S	I/S
Fluoride	DETSC 2055	1	mg/kg	I/S	I/S	I/S	I/S
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.15	0.06	0.12	0.11
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 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
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 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
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	7.1	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	15	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	9.8	150	17	19
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	180	17	19
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	0.03	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	0.10	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 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
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	2.5	14	< 0.6	0.8
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	19	260	< 1.4	15
Aromatic C5-C35	DETSC 3072*	10	mg/kg	22	270	< 10	16
TPH Ali/Aro	DETSC 3072*	10	mg/kg	32	450	17	34

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

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769711	769712	769713	769714
			Sample ID	S33	S34	S35	S36
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.21	0.22	< 0.03	0.10
Anthracene	DETSC 3303	0.03	mg/kg	0.07	0.04	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.41	0.17	0.07	0.20
Pyrene	DETSC 3303#	0.03	mg/kg	0.36	0.17	0.06	0.18
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.18	0.08	< 0.03	0.09
Chrysene	DETSC 3303	0.03	mg/kg	0.20	0.20	< 0.03	0.10
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.22	0.13	0.04	0.12
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	0.04	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.19	0.08	< 0.03	0.09
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.11	0.08	< 0.03	0.06
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.10	0.05	< 0.03	0.05
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	2.1	1.3	0.17	1.1
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.3	< 0.3	< 0.3

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	824969	824970	824971	824972	824973	824974	824975
			Sample ID	S26	S27	S28	S29	S30	S31	S32
			Depth							
			Other ID							
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Preparation										
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y	Y
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.78	0.87	1.7	0.63	0.65	1.2	0.56
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.27	< 0.25	0.31	< 0.25	0.26	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.7	1.3	2.1	0.9	1.1	1.2	1.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.20	0.20	0.81	0.24	0.32	0.33	0.25
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.27	0.28	0.47	< 0.25	< 0.25	0.34	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	3.89	1.41	1.76	< 1.25	< 1.25	< 1.25	< 1.25
Inorganics										
pH	DETSC 2008			6.6	6.5	6.5	6.5	6.5	6.6	8.9
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.0	1.2	1.2	0.83	1.0	2.5	0.97
Fluoride	DETSC 2055	0.1	mg/l	0.11	0.12	< 0.10	0.11	0.10	0.12	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	7.9	11	15	8.8	6.6	10	7.6
Total Organic Carbon	DETSC 2085	1	mg/l	4.1	3.0	4.4	2.1	2.8	4.4	2.2
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 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	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 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	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 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	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	1.0	< 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	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 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	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 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	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	824969	824970	824971	824972	824973	824974	824975
			Sample ID	S26	S27	S28	S29	S30	S31	S32
			Depth							
			Other ID							
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
PAHs										
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
PAH	DETSC 3304	0.04	ug/l	1.4	0.79	0.92	0.57	1.9	0.76	0.58
Phenols										
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	824976	824977	824978	824979
			Sample ID	S33	S34	S35	S36
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.8	6.5	1.2	1.2
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	2.9	1.4	0.53	3.1
Chromium III Dissolved	DETSC 2302*	1	ug/l	2.9	1.4	< 1.0	3.1
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	7.9	11	1.5	9.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.37	0.94	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.8	2.5	< 0.5	1.7
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.75	1.5	< 0.25	0.61
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25	3.42	< 1.25
Inorganics							
pH	DETSC 2008			8.8	8.6	7.8	9.9
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	3.5	2.5	1.1	3.9
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	0.11	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	11	15	12	5.8
Total Organic Carbon	DETSC 2085	1	mg/l	3.6	7.6	3.0	3.0
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 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
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 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
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	824976	824977	824978	824979
			Sample ID	S33	S34	S35	S36
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20
PAH	DETSC 3304	0.04	ug/l	0.19	1.3	0.81	0.24
Phenols							
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50

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

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
769704	S26	SOIL	NAD	none	Jeff Cruddas
769705	S27	SOIL	NAD	none	Jeff Cruddas
769706	S28	SOIL	NAD	none	Jeff Cruddas
769707	S29	SOIL	NAD	none	Jeff Cruddas
769708	S30	SOIL	NAD	none	Jeff Cruddas
769709	S31	SOIL	NAD	none	Jeff Cruddas
769710	S32	SOIL	Amosite	Amosite present as fibre bundles	Jeff Cruddas
769711	S33	SOIL	NAD	none	Jeff Cruddas
769712	S34	SOIL	NAD	none	Jeff Cruddas
769713	S35	SOIL	NAD	none	Jeff Cruddas
769714	S36	SOIL	NAD	none	Jeff Cruddas

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 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

Lab No	769710
Sample ID	S32
Depth	
Other ID	
Sample Type	SOIL
Sampling Date	16/02/15
Sampling Time	

Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	946.82
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 %	<0.001
% Serpentine bundles in sample		Mass %	na
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Serpentine fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	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 15-27519-2
Client Ref 12032-SP1
Contract Herbert Road Stockpile - Round 1

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
769704	S26 SOIL	16/02/15	GJ 1L, GJ 60ml, PT 1L x2		
769705	S27 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769706	S28 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769707	S29 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769708	S30 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769709	S31 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769710	S32 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769711	S33 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769712	S34 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769713	S35 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769714	S36 SOIL	16/02/15	GJ 250ml x2, PT 1L x2		
824969	S26 LEACHATE	16/02/15	GJ 1L		
824970	S27 LEACHATE	16/02/15	GJ 1L		
824971	S28 LEACHATE	16/02/15	GJ 1L		
824972	S29 LEACHATE	16/02/15	GJ 1L		
824973	S30 LEACHATE	16/02/15	GJ 1L		
824974	S31 LEACHATE	16/02/15	GJ 1L		
824975	S32 LEACHATE	16/02/15	GJ 1L		
824976	S33 LEACHATE	16/02/15	GJ 1L		
824977	S34 LEACHATE	16/02/15	GJ 1L		
824978	S35 LEACHATE	16/02/15	GJ 1L		
824979	S36 LEACHATE	16/02/15	GJ 1L		

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 and/or inappropriate containers 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.

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.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-46635

11-Oct-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-46635

Client Reference 12032ASP

Contract Title ABERBARGOED

Description 4 Soil samples, 4 Leachate samples.

Date Received 02-Oct-15

Date Started 02-Oct-15

Date Completed 11-Oct-15

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

Sample ID	Lab No	Completed	Matrix Description
AS1	878344	11/10/2015	Dark brown gravelly sandy CLAY (made ground includes brick)
AS2	878345	11/10/2015	Dark brown gravelly sandy CLAY (made ground includes brick)
AS3	878346	11/10/2015	Dark brown gravelly sandy CLAY (made ground includes brick)
AS4	878347	11/10/2015	Dark brown gravelly sandy CLAY (made ground includes brick)

Summary of Chemical Analysis
Soil Samples

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

			Lab No	878344	878345	878346	878347
			Sample ID	AS1	AS2	AS3	AS4
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	30/09/15	30/09/15	30/09/15	30/09/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
Moisture Content	DETSC 1004*	0.1	%	13	17	8.2	13
Metals							
Antimony	DETSC 2301*	1	mg/kg	1.9	2.4	1.6	2.5
Arsenic	DETSC 2301#	0.2	mg/kg	9.8	13	12	16
Beryllium	DETSC 2301#	0.2	mg/kg	0.4	0.6	0.5	0.4
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.7	2.2	1.6	1.9
Cadmium	DETSC 2301#	0.1	mg/kg	1.0	0.7	0.7	1.0
Chromium	DETSC 2301#	0.15	mg/kg	47	46	45	76
Chromium III	DETSC 2301*	0.15	mg/kg	47	46	45	76
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	29	38	26	34
Lead	DETSC 2301#	0.3	mg/kg	66	5000	59	130
Manganese	DETSC 2301#	20	mg/kg	1300	1400	980	2200
Mercury	DETSC 2325#	0.05	mg/kg	0.08	< 0.05	0.10	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	1.6	1.0	1.1	1.2
Nickel	DETSC 2301#	1	mg/kg	15	13	15	17
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	140	140	110	110
Inorganics							
pH	DETSC 2008#			11.2	11.2	11.2	11.7
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.6	0.5	0.6	0.7
Cyanide complex	DETSC 2130*	0.2	mg/kg	0.6	0.5	0.6	0.7
Organic matter	DETSC 2002#	0.1	%	2.6	2.6	2.2	1.8
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.22	0.21	0.22	0.23
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.05	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 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
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 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
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	38	51	37	63
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	10	13	10	20
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	38	51	38	64
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 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
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 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
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	13	11	13	13
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	91	93	84	130

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

Summary of Chemical Analysis
Soil Samples

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

			Lab No	878344	878345	878346	878347
			Sample ID	AS1	AS2	AS3	AS4
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	30/09/15	30/09/15	30/09/15	30/09/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	19	93	84	29
Aromatic C5-C35	DETSC 3072*	10	mg/kg	100	100	97	140
TPH Ali/Aro	DETSC 3072*	10	mg/kg	140	150	130	200
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.12	0.19	0.30	0.19
Anthracene	DETSC 3303	0.03	mg/kg	0.03	0.05	0.08	0.05
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.25	0.35	0.57	0.36
Pyrene	DETSC 3303#	0.03	mg/kg	0.22	0.31	0.49	0.31
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.11	0.15	0.24	0.15
Chrysene	DETSC 3303	0.03	mg/kg	0.13	0.19	0.31	0.19
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.19	0.35	0.22
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.06	0.11	0.07
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.09	0.11	0.21	0.14
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.06	0.11	0.07
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.06	0.07	0.13	0.08
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.3	1.7	3.0	1.8
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

			Lab No	878348	878349	878350	878351
			Sample ID	AS1	AS2	AS3	AS4
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	30/09/15	30/09/15	30/09/15	30/09/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.2	2.5	2.1	2.0
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.36	0.37	0.32	0.28
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.8	2.2	2.1	2.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.32	0.39	0.29	0.37
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.01	< 0.01	0.01	0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.47	< 0.25	0.37	0.34
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25	1.73	< 1.25
Inorganics							
pH	DETSC 2008			7.4	7.6	7.3	7.4
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.7	1.9	1.7	1.8
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	22	18	21	23
Total Organic Carbon	DETSC 2033	2	mg/l	4.2	4.8	5.0	4.8
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 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
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 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
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
PAHs							
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	0.11	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

			Lab No	878348	878349	878350	878351
			Sample ID	AS1	AS2	AS3	AS4
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	30/09/15	30/09/15	30/09/15	30/09/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	0.07	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	0.14	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	0.13	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	0.45	< 0.20	< 0.20
PAH	DETSC 3304	0.04	ug/l	5.5	4.0	6.5	2.7
Phenols							
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50

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

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
878344	AS1	SOIL	NAD	none	Colin Patrick
878345	AS2	SOIL	NAD	none	Colin Patrick
878346	AS3	SOIL	NAD	none	Colin Patrick
878347	AS4	SOIL	NAD	none	Colin Patrick

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.

Information in Support of the Analytical Results

Our Ref 15-46635
Client Ref 12032ASP
Contract ABERBARGOED

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
878344	AS1 SOIL	30/09/15	GJ 250ml x3, PT 1L x2		
878345	AS2 SOIL	30/09/15	GJ 250ml x3, PT 1L x2		
878346	AS3 SOIL	30/09/15	GJ 250ml x3, PT 1L x2		
878347	AS4 SOIL	30/09/15	GJ 250ml x3, PT 1L x2		
878348	AS1 LEACHATE	30/09/15	GJ 250ml x3, PT 1L x2		
878349	AS2 LEACHATE	30/09/15	GJ 250ml x3, PT 1L x2		
878350	AS3 LEACHATE	30/09/15	GJ 250ml x3, PT 1L x2		
878351	AS4 LEACHATE	30/09/15	GJ 250ml x3, 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 and/or inappropriate containers 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.

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.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-47308-1

30-Oct-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-47308-1

Client Reference 12032

Order No 12032

Contract Title HERBERT ROAD (H.RD)

Description 2 Soil samples, 2 Leachate samples.

Date Received 12-Oct-15

Date Started 12-Oct-15

Date Completed 30-Oct-15

Test Procedures Identified by prefix DETSn (details on request).

Notes **This report supersedes 15-47308, extra testing.**

Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING 2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-47308-1
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

Sample ID	Lab No	Completed	Matrix Description
CITIVISION S1	882282	19/10/2015	Dark brown, gravelly, sandy CLAY
CITIVISION S2	882283	19/10/2015	Dark brown, gravelly, sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 15-47308-1
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

			Lab No	882282	882283
				CITIVISI	CITIVISI
			Sample ID	ON S1	ON S2
			Depth		
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	08/10/15	08/10/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Asbestos Quantification OHR	DETSC 1102	0		Y	Y
Preparation					
Moisture Content	DETSC 1004*	0.1	%	12	8.7
Metals					
Antimony	DETSC 2301*	1	mg/kg	3.5	3.0
Arsenic	DETSC 2301#	0.2	mg/kg	7.0	7.4
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	0.5
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	2.7	2.5
Cadmium	DETSC 2301#	0.1	mg/kg	1.1	1.2
Chromium	DETSC 2301#	0.15	mg/kg	150	100
Chromium III	DETSC 2301*	0.15	mg/kg	150	100
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	27	21
Lead	DETSC 2301#	0.3	mg/kg	72	270
Manganese	DETSC 2301#	20	mg/kg	7400	5600
Mercury	DETSC 2325#	0.05	mg/kg	0.09	0.16
Molybdenum	DETSC 2301#	0.4	mg/kg	1.1	1.0
Nickel	DETSC 2301#	1	mg/kg	14	11
Selenium	DETSC 2301#	0.5	mg/kg	2.2	1.0
Zinc	DETSC 2301#	1	mg/kg	92	85
Inorganics					
pH	DETSC 2008#			11.6	11.5
Cyanide Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	1.7	2.1
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.22	0.24

Summary of Chemical Analysis
Soil Samples

Our Ref 15-47308-1
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

			Lab No	882282	882283
				CITIVISION S1	CITIVISION S2
			Sample ID		
			Depth		
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	08/10/15	08/10/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	19
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	130
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	150
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	150
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.05	0.07
Fluorene	DETSC 3303	0.03	mg/kg	0.04	0.05
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.37	0.46
Anthracene	DETSC 3303	0.03	mg/kg	0.10	0.12
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.72	1.0
Pyrene	DETSC 3303#	0.03	mg/kg	0.65	0.91
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.28	0.41
Chrysene	DETSC 3303	0.03	mg/kg	0.40	0.53
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.41	0.63
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.13	0.21
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.22	0.34
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.16	0.23
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.04	0.05
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.16	0.24
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	3.8	5.4
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-47308-1
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

			Lab No	882284	882285
			Sample ID	CITIVISION S1	CITIVISION S2
			Depth		
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	08/10/15	08/10/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
NRA Leachate Preparation	DETS 036*			Y	Y
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	3.5	4.0
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	1.4	1.1
Chromium III Dissolved	DETSC 2302*	1	ug/l	1.4	1.1
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.5	1.0
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.53	1.0
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25
Inorganics					
pH	DETSC 2008			9.8	8.0
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.6	1.6
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	6.3	7.1
Total Organic Carbon	DETSC 2033	2	mg/l	6.6	5.2
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	2.0	2.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	7.3	19
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	29
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	4.9
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	54
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	8.2	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	8.1
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	18	63

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

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-47308-1
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

			Lab No	882284	882285
			Sample ID	CITIVISION S1	CITIVISION S2
			Depth		
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	08/10/15	08/10/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETS 074*	0.01	ug/l	0.02	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	0.02	< 0.01
Pyrene	DETS 074*	0.01	ug/l	0.03	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20
Phenols					
Phenol	*	0.5	ug/l	< 0.50	< 0.50

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

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-47308-1
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
882282	CITIVISION S1	SOIL	Chrysotile	Bundles of Chrysotile present	Andrew Little
882283	CITIVISION S2	SOIL	Chrysotile	Bundles of Chrysotile present	Andrew Little

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 15-47308-1
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

		Lab No	882282	882283
		Sample ID	CITIVISION S1	CITIVISION S2
		Depth		
		Other ID		
		Sample Type	SOIL	SOIL
		Sampling Date	08/10/15	08/10/15
		Sampling Time		
Test	**Method**	**Units**		
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.003**	**0.002**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.003	0.002
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na
Breakdown of Gravimetric Analysis (a)				
Mass of Sample		g	621.13	427.37
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
% Serpentine bundles in sample		Mass %	0.003	0.002
Breakdown of PCOM Analysis (c)				
% Amphibole fibres in sample		Mass %	na	na
% Serpentine fibres in sample		Mass %	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)				
Amphibole fibres		Fibres/g	na	na
Chrysotile fibres		Fibres/g	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 15-47308-1
Client Ref 12032
Contract HERBERT ROAD (H.RD)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
882282	CITIVISION S1 SOIL	08/10/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
882283	CITIVISION S2 SOIL	08/10/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
882284	CITIVISION S1 LEACHATE	08/10/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
882285	CITIVISION S2 LEACHATE	08/10/15	GJ 250ml x2, GJ 60ml, 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 and/or inappropriate containers 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.

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.

ANNEX D
Earthworks Compaction Specification Reports: Riversee Limited Stockpile

COMPACTION SPECIFICATION

Lower Half of Engineered Fill Source
Stockpile Herbert Road
Newport

Prepared for:
Riversee Limited

July 2015

Report No. 12032/CS2

REPORT TITLE	**:**	**Compaction Specification: Lower Half of Engineered Fill Source Stockpile, Herbert Road, Newport**
REPORT STATUS	**:**	**Final**
JOB NUMBER	**:**	**12032/CS2**
DATE	**:**	**July 2015**
PREPARED BY	**:**	R. Howells. …….. **(Mrs R. Howells)**
REVIEWED BY	**:**	louisedow …….. **(Miss L. Dow)**
APPROVED BY	**:**	…….. **(Dr G. C. Lake)**

Executive Summary

Riversee Limited is proposing to undertake earthworks on a proposed development site off Herbert Road, Newport, where the site is to be raised by up to 1.6m, taking it to a level of 8.8m AOD.

Proposed engineered fill materials are stockpiled on a nearby site on Herbert Road.

Samples of the lower top half of the stockpile was sampled by Terra Firma.

These samples taken were submitted to Geo Site and Testing Services Limited in Llanelli in order to assess their optimum moisture content/maximum dry density and to undertake grading analyses.

The initial moisture content of the soils was found to be between 17 and 29% with an optimum moisture content of between 8 and 15%.

In order for there to be tolerable settlements from the placed fill materials, it needs to be compacted at or close to 95% of its Optimum Moisture Content/Maximum Dry Density. Drying of the soils is likely to be required to achieve this.

In order to meet the above criterion it is clear that the materials will need to be dried.

Grading analysis results have been used to classify the soils as selected stony cohesive material (Type 2C, 7D, 1A and 6F2).

The materials should be laid and compacted in layers as given by the Specification Works for Highways 600.

TABLE OF CONTENTS

SECTION 1 Introduction

Riversee Limited is proposing to undertake earthworks on a proposed development site off Herbert Road, Newport, where the site is to be raised by up to 1.6m, taking it to a level of 8.8m AOD.

The ground is to be brought up in layers, in accordance with the Department of Transport Specification for Highway Works, prior to construction and the importation of inert materials in landscaped areas.

Proposed engineered fill materials are stockpiled on a nearby site on Herbert Road.

Terra Firma (Wales) Limited has been commissioned by Riversee Limited to undertake sampling and testing of off-site stockpiled soil to assess its suitability as fill.

This report details the compaction specification for soils in the lower half of the stockpile only.

1.1 Limitations and Exceptions

The compaction specification report has been prepared for the sole internal reliance of Riversee Limited and its design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The report represents the findings and opinions of experienced geo-environmental and geo-technical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may also be required.

SECTION 2 Soil Property Testing

2.1 Soil Sampling

Terra Firma (Wales) Limited visited the stockpile site on the 8th and 13th July in order to obtain samples for geotechnical testing.

Ten representative samples were taken and submitted to Geo Site and Testing Services Limited in Llanelli in order to assess their optimum moisture content/maximum dry density and to undertake grading analyses.

The table below summarises the samples taken.

Table 2.1 Sample Descriptions

Sample Location	Depth in Stockpile (m)	Description
TP1	1.0	Brown, grey and red brown mixed slightly sandy gravelly cobbly CLAY
TP1	2.0	Grey, red brown and red gravelly cobbly CLAY
TP3	3.5	Brown clayey SAND and GRAVEL and COBBLE, occasional boulder
TP4	2.0	Dark grey and brown mixed CLAY with red inclusions
TP4	3.0	Dark grey gravelly cobbly CLAY with red and brown inclusions
TP6	2.0	Dark grey sandy gravelly cobbly CLAY
TP7	2.0	Light grey brown gravelly cobbly CLAY
TP12	2.0	Grey gravelly cobbly CLAY
TP13	2.0	Grey sandy clayey GRAVEL and COBBLE
TP17	1.5	Grey and red mixed gravelly cobbly CLAY

2.2 Optimum Moisture Content/Maximum Dry Density

The results of the optimum moisture content and maximum dry density tests are detailed in the table below.

These tests were conducted in accordance with BS 1377: Part 4: 1990.

Table 2.2 Optimum Moisture Content/Maximum Dry Density Test Results

Sample Location	Depth in Stockpile (m)	Initial Moisture Content (%)	Optimum Moisture Content (%)	Maximum Dry Density(mg/m^3)
TP1	1.0	21	10	1.95
TP1	2.0	24	9.7	2.03
TP3	3.5	17	8.5	2.05
TP4	2.0	20	11	1.97
TP4	3.0	23	10	1.84
TP6	2.0	20	8.0	2.07
TP7	2.0	29	15	1.62
TP12	2.0	26	10	1.81
TP13	2.0	18	14	1.81
TP17	1.5	26	10	1.85

The suitable fill materials should be placed at or close to i.e. 95% of their optimum moisture content/maximum dry density and compacted in layers as per the requirements of the Specification for Highway Works.

The test certificates are given in **Annex A.**

2.3 Grading Analysis

The ten samples were tested in the laboratory by dry and wet sieving analysis to determine their grading characteristics. These tests were conducted in accordance with BS1377: Part 2, Clause 9.2: 1990.

The test certificates are presented in **Annex A.**

Based upon the soil property test results, and referring to Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements and Table 6/2: Grading Requirements for Acceptable Earthworks Materials, of the 'Specification for Highway Works, Series 600', the samples can be classified as summarised in the table below.

Table 2.3 Grading Analysis Results and Soil Classification

Sample Location	Depth in Stockpile (m)	Type (Table 6/2)	Classification (Table 6/1)	Compaction Method
TP1	1.0	7D	Selected Stony Cohesive Material	Method 2
TP6	2.0			
TP12	2.0			
TP3	3.5	6F2	Selected Granular Material	Method 6
TP4	2.0			
TP13	2.0			
TP7	2.0	2C	Stony Cohesive Material	Method 2
TP1	2.0			
TP4	3.0			
TP17	1.5			

The dark grey gravelly cobbly sampled in TP4 (3.0m) did not contain coarse enough fragments to strictly classed as Class 2C. As the volume of this soil type appears to be limited it is recommended that it is mixed with other soils classed as 2C and compacted accordingly.

Similarly, the sample from TP13 (2.0m), although not strictly 6F2, is close to conforming to 6F2 grading and therefore may be compacted as such.

2.4 Compaction Specification

Compaction should be undertaken in accordance with the appropriate methodology as given in of Table 6/4 of the Specification for Highway Works, Series 600, as summarised in **Tables 2.4 and 2.5.**

Details for just a smoothed wheeled roller and vibratory roller are provided. If an alternative roller is proposed then Table 6/4 should be consulted.

Table 2.4 Compaction Specification - Method 2

Type of Compaction Plant	Mass per Metre Width of Roll (kg)	Maximum depth of Compacted Layer (mm)	Number of Passes
Smoothed Wheeled Roller	2100 – 2700 2700 – 5400 >5400	125 125 150	10 8 8
Vibratory Roller	270 – 450 450 – 700 700 – 1300 1300 – 1800 1800 – 2300 2300 – 2900 2900 – 3600 3600 – 4300 4300 – 5000 >5000	75 75 125 150 150 175 200 225 250 275	16 12 10 8 4 4 4 4 4 4

Table 2.5 Compaction Specification - Method 6

Type of Compaction Plant	Mass per Metre Width of Roll (kg)	Number of Passes		
		110mm layer	150mm layer	250mm layer
Smoothed Wheeled Roller	2100 – 2700 2700 – 5400 >5400	Unsuitable 16 8	Unsuitable Unsuitable 16	Unsuitable Unsuitable Unsuitable
Vibratory Roller	270 – 450 450 – 700 700 – 1300 1300 – 1800 1800 – 2300 2300 – 2900 2900 – 3600 3600 – 4300 4300 – 5000 >5000	Unsuitable Unsuitable 16 6 4 3 3 2 2 2	Unsuitable Unsuitable Unsuitable 16 6 5 5 4 4 3	Unsuitable Unsuitable Unsuitable Unsuitable 12 11 10 8 7 6

2.4 Compaction Specification (Continued)

Compaction should be undertaken in accordance with Table 6/1 and 6/4.

Where combinations of different types or categories of plant are used, the depth of the layer should be for the type of plant requiring the least depth of layer, and the number of passes should be that for the type of plant requiring the greatest number of passes.

Earthmoving plants are not recommended for use as compaction plant, nor are lighter categories of plants used to provide preliminary compaction to assist the use of heavier plant.

The soils should be sorted and all deleterious material, such as timber and plastic removed.

All roots and tree roots should be excavated and removed.

The stability of excavations or fills should not be compromised by the location of stock piled materials or use of plant or location of temporary buildings/structures.

All earthworks must be kept free of water including arranging for the rapid removal of water, water shed onto the earthworks and water entering the earthworks from any source.

Fill materials especially cohesive (silt and clay) fill should not be deposited and compacted during wet weather, where an increase in moisture content will increase the liquid limit of the soil.

The initial moisture content of the soil was found to be double the optimum moisture content in some instances, indicating that the clay soils will need to be dried out prior to filling to achieve adequate compaction.

All exposed fill surfaces must be adequately weather proofed during inclement weather or at the end of the working day/compaction process. Any exposed cohesive fill that becomes wet and slurrified due to water ingress or weather erosion must be stripped off, spread into thin layers and aerated. The fill should then be re-compacted.

Plant movement across compaction layers should be restricted to that plant necessary for its deposition, spreading and compaction.

Fill areas should be constructed evenly over their full width and their fullest possible extent and the contractor should control and direct constructional plant and other traffic uniformly over them. Damage by construction plant should be made good with material having the same characteristics and strength as the material had before it was damaged.

Embankments and other areas of unsupported fills should not be constructed with steeper side slopes than the materials effective shear strength, with exception to allowing the adequate compaction at the edges before trimming back, within the minimum period necessary for the safety of the works.

2.4 Compaction Specification (Continued)

Where fill is to be placed against a natural slope, or sloping earthworks face including embankments, cuttings and other fills and excavations, such faces should be appropriately benched immediately before placing the subsequent fill.

In-situ density tests (sand replacement method) should be undertaken to ensure the compaction process is performing satisfactory during the enabling works. In-situ testing should be undertaken at an appropriate spacing to reflect the adequacy of the compaction process beneath the entire development area.

It is also recommended that a number of in-situ plate load tests be performed mid way through the earthworks and at the final finished site level beneath the access road.

The earthworks should be supervised by a suitable engineer.

The tests should be conducted in accordance with BS 1377: Part 9: 1990 under the supervision of a qualified geotechnical engineer.

Should the in-situ testing show densities which indicate that the compaction process is inadequate, the deposited material must be excavated and re-laid.

Allowances should also be made for the removal of soft spots and their replacement with imported suitable selected inert granular materials or suitable inert site won materials.

SECTION 3 Conclusions as to the Suitability of the Materials as Site Fill

In order for there to be tolerable settlements from the placed fill materials, they need to be compacted at or close to their optimum moisture content and maximum dry density (95%). This will ensure that a minimum 95% compaction will be achieved.

In order to meet the above criterion it is clear that the materials will need to be dried. This can be achieved by excavating and allowing the materials to dry naturally.

Once the given moisture content has been achieved then the materials may be used as structural fill. The materials have been graded according to the Specification Works for Highways 600 and should be laid and compacted in layers by referring to the Specification as described in Section 2.4.

A programme of in-situ density testing should also be carried out during fill works in order to confirm the effectiveness of the compaction procedure.

ANNEX A
Grading Analysis and Proctor Test Results

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 27497

Client's Reference: **12032**

Report Date: **27-07-2015**

Client **Terrafirma Wales Ltd**
5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HB

Contract Title: **Herbert Road, Newport**

For the attention of: **Ruth Liley**

Date Received: **10-07-2015**

Date Commenced: **10-07-2015**

Date Completed: **27-07-2015**

Test Description	Qty
PSD Wet Sieve method 1377 : 1990 Part 2 : 9.2 - * UKAS	10
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould) 1377 : 1990 Part 4 : 3.3 - * UKAS	10
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

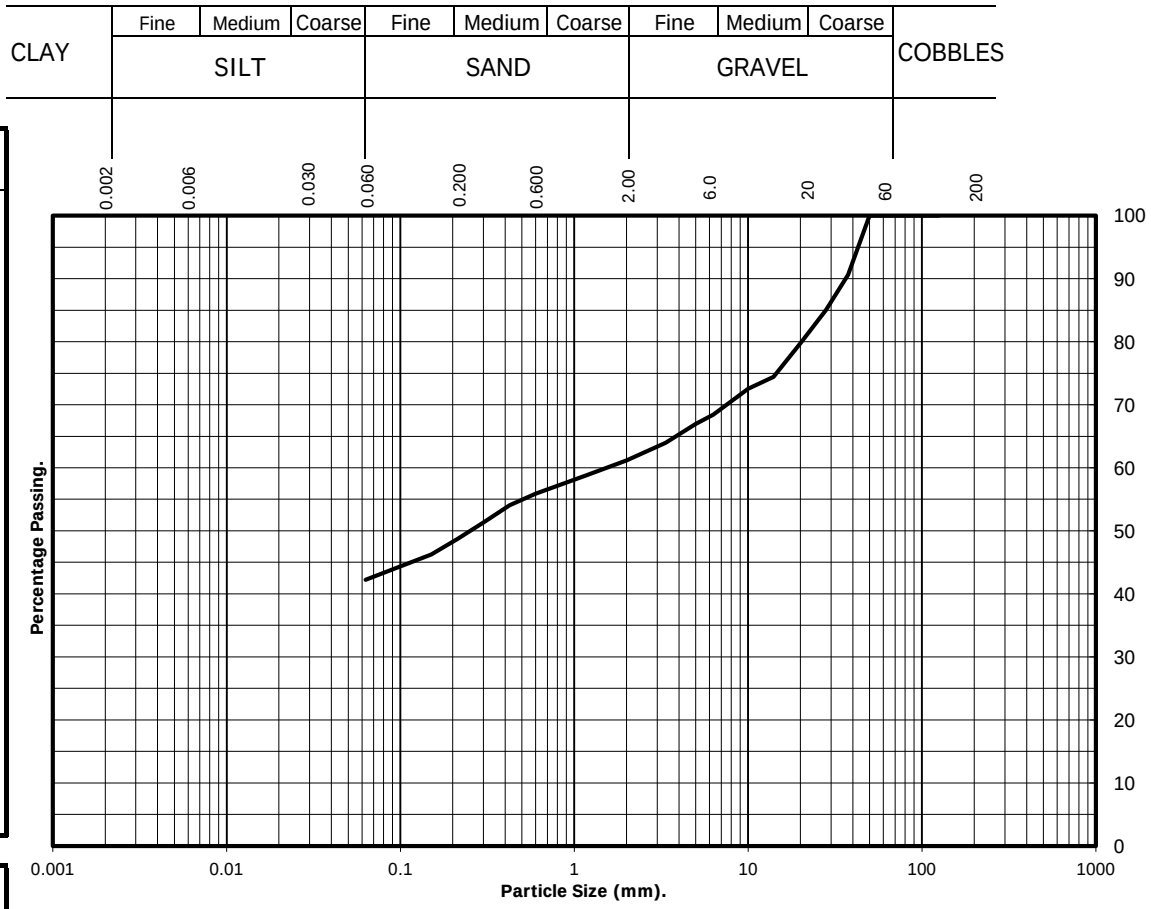
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP1**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**1.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy gravelly (fine-coarse) silty CLAY**



BS Test Sieve	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	91
28	85
20	80
14	74
10	73
6.3	68
5.0	67
3.35	64
2.00	61
1.18	59
0.60	56
0.425	54
0.300	51
0.212	49
0.150	46
0.063	42

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	42	19	39	0	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

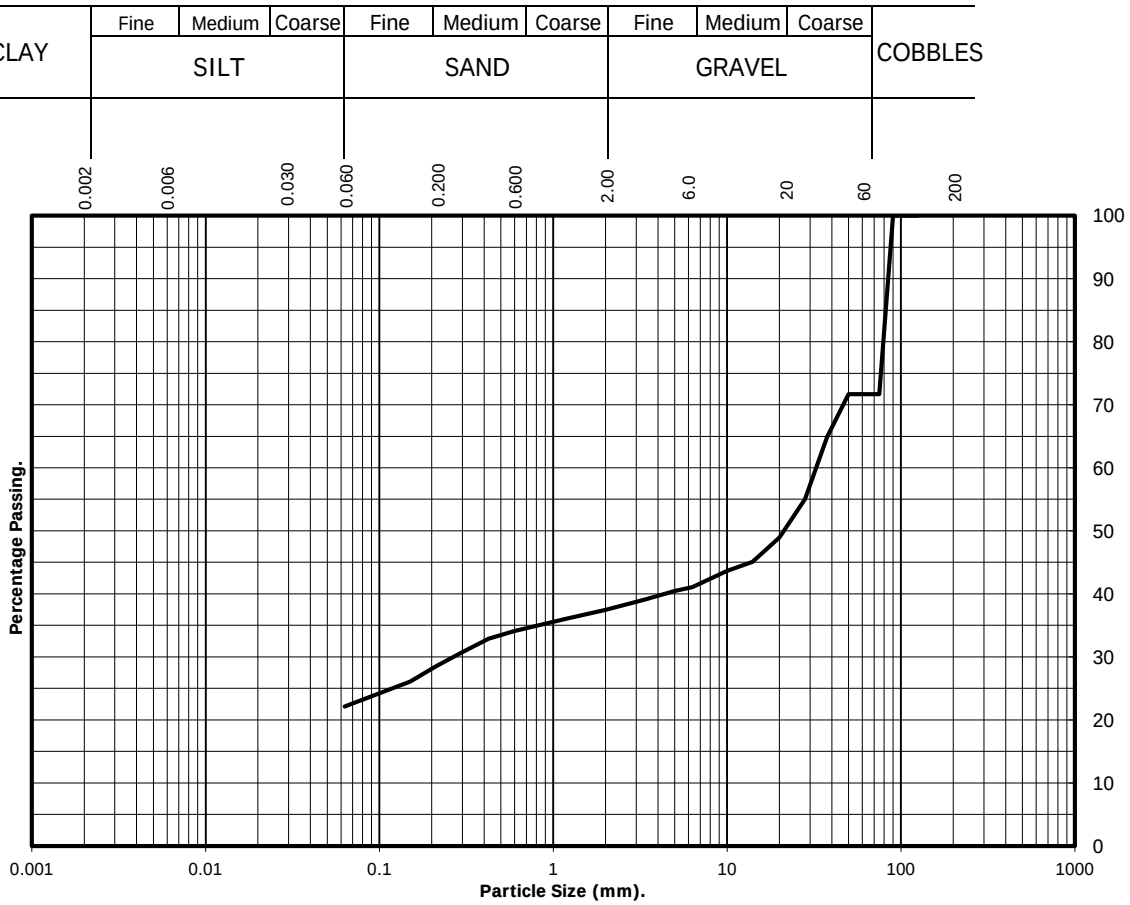
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP1**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	100
90	100
75	72
63	72
50	72
37.5	65
28	55
20	49
14	45
10	44
6.3	41
5.0	40
3.35	39
2.00	37
1.18	36
0.60	34
0.425	33
0.300	31
0.212	29
0.150	26
0.063	22

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	22	15	35	28	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:

Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

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GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

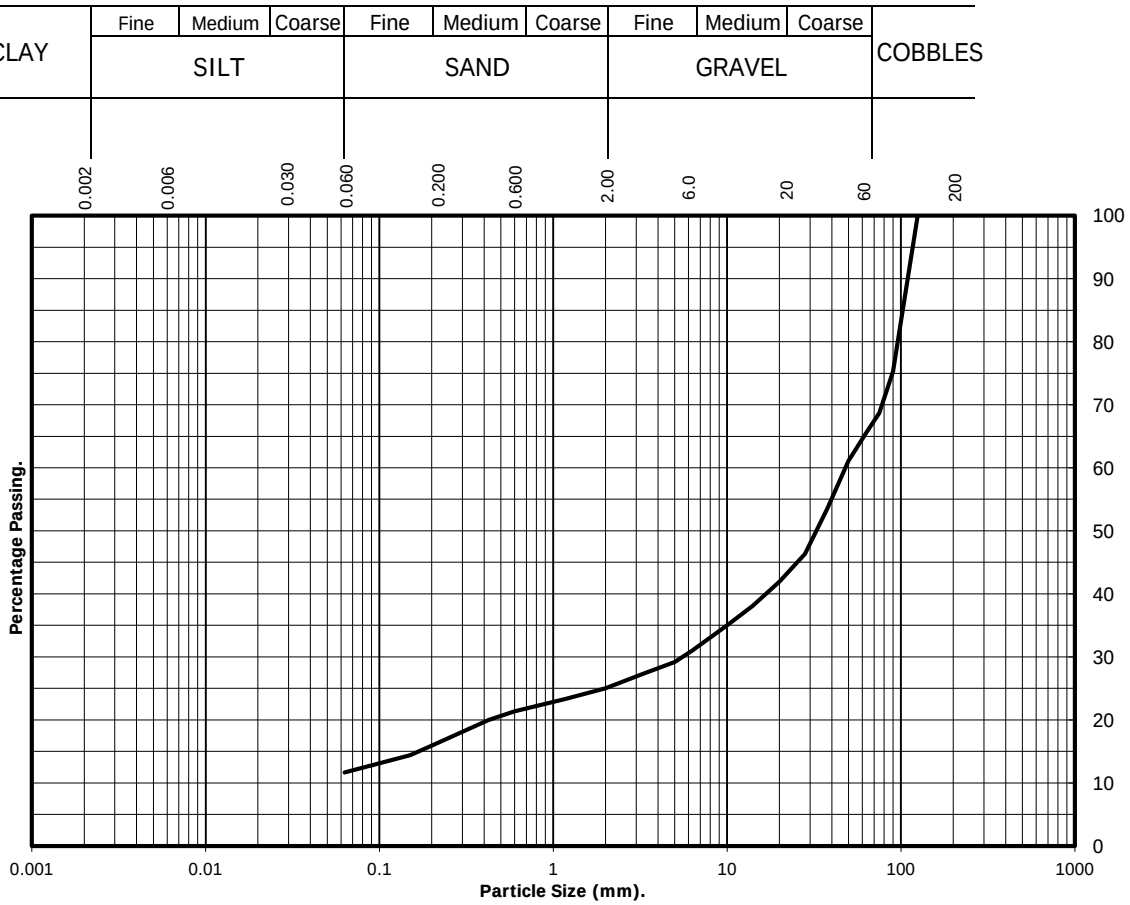
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP3**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**3.50**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	100
90	75
75	69
63	66
50	61
37.5	53
28	46
20	42
14	38
10	35
6.3	31
5.0	29
3.35	27
2.00	25
1.18	23
0.60	21
0.425	20
0.300	18
0.212	16
0.150	14
0.063	12

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	12	13	41	34	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

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GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

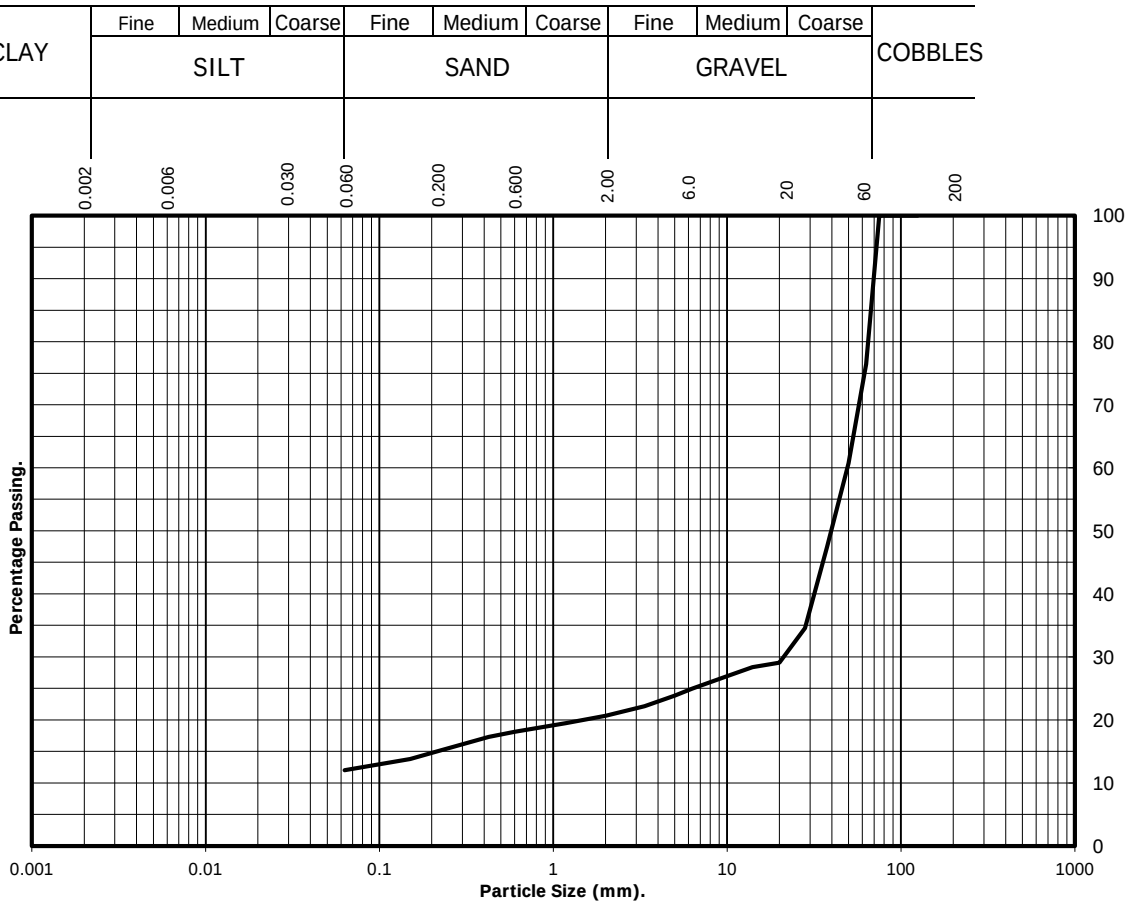
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP4**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	100
90	100
75	100
63	76
50	61
37.5	47
28	35
20	29
14	28
10	27
6.3	25
5.0	24
3.35	22
2.00	21
1.18	19
0.60	18
0.425	17
0.300	16
0.212	15
0.150	14
0.063	12

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	12	9	55	24	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:

Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP4**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**3.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	% Passing
125	75
90	75
75	75
63	75
50	74
37.5	63
28	60
20	54
14	50
10	47
6.3	43
5.0	42
3.35	40
2.00	38
1.18	36
0.60	34
0.425	32
0.300	30
0.212	28
0.150	26
0.063	22

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	22	16	37	25	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

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2788

Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

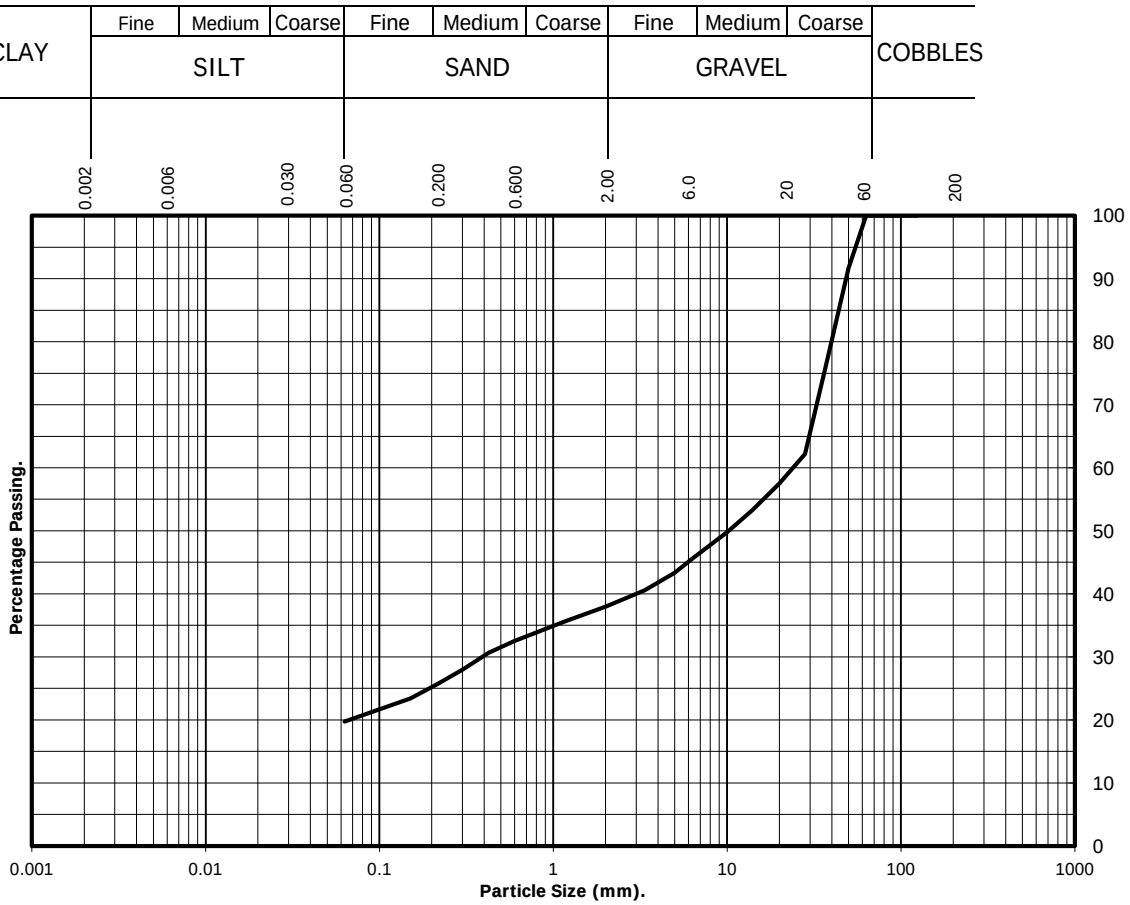
Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP6**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse)**

BS Test Sieve	% Passing
125	100
90	100
75	100
63	100
50	92
37.5	77
28	62
20	57
14	53
10	50
6.3	46
5.0	43
3.35	41
2.00	38
1.18	36
0.60	33
0.425	31
0.300	28
0.212	26
0.150	23
0.063	20

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	20	18	62	0	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:

Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

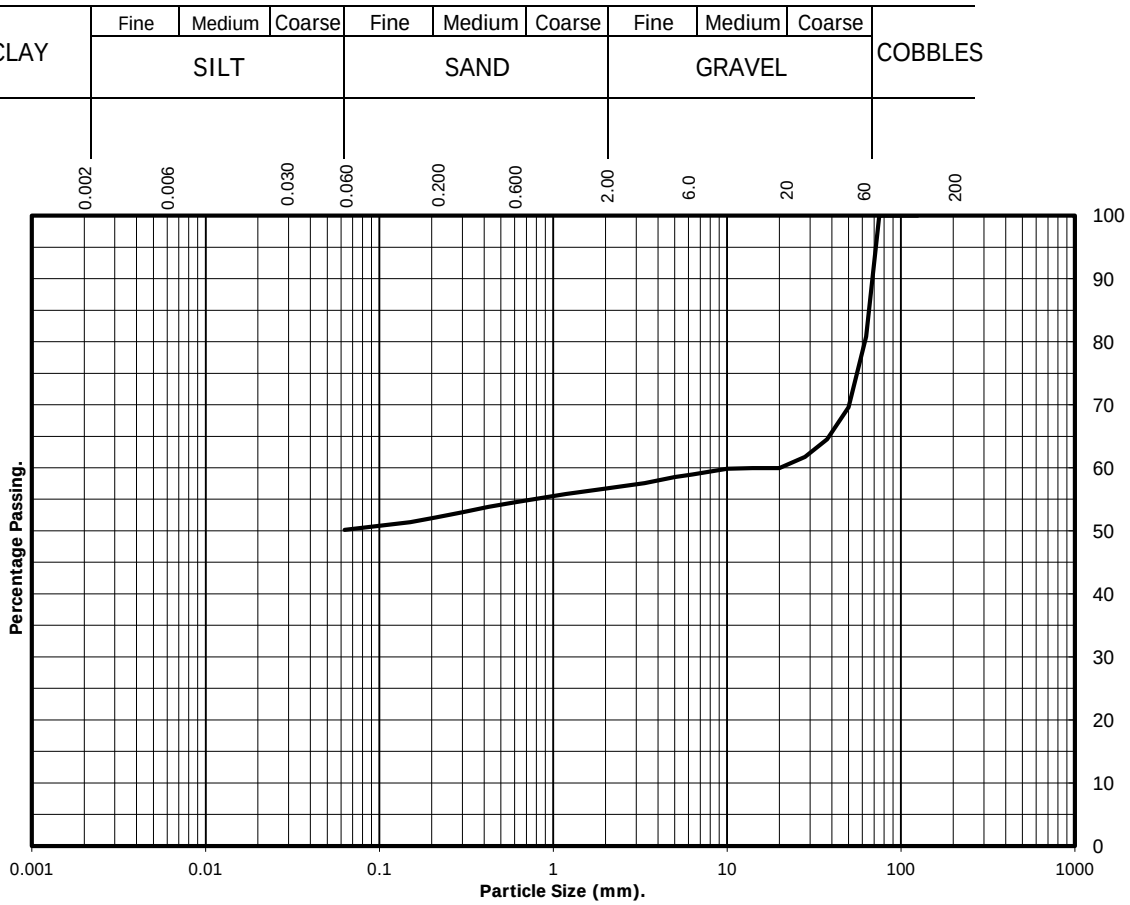
UKAS TESTING 2788

Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.
Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP7**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy gravelly (fine-coarse) silty CLAY with many cobbles**



BS Test Sieve	% Passing
125	100
90	100
75	100
63	81
50	70
37.5	65
28	62
20	60
14	60
10	60
6.3	59
5.0	59
3.35	58
2.00	57
1.18	56
0.60	55
0.425	54
0.300	53
0.212	52
0.150	51
0.063	50

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	50	7	24	19	Total Percentage

Remarks:
#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

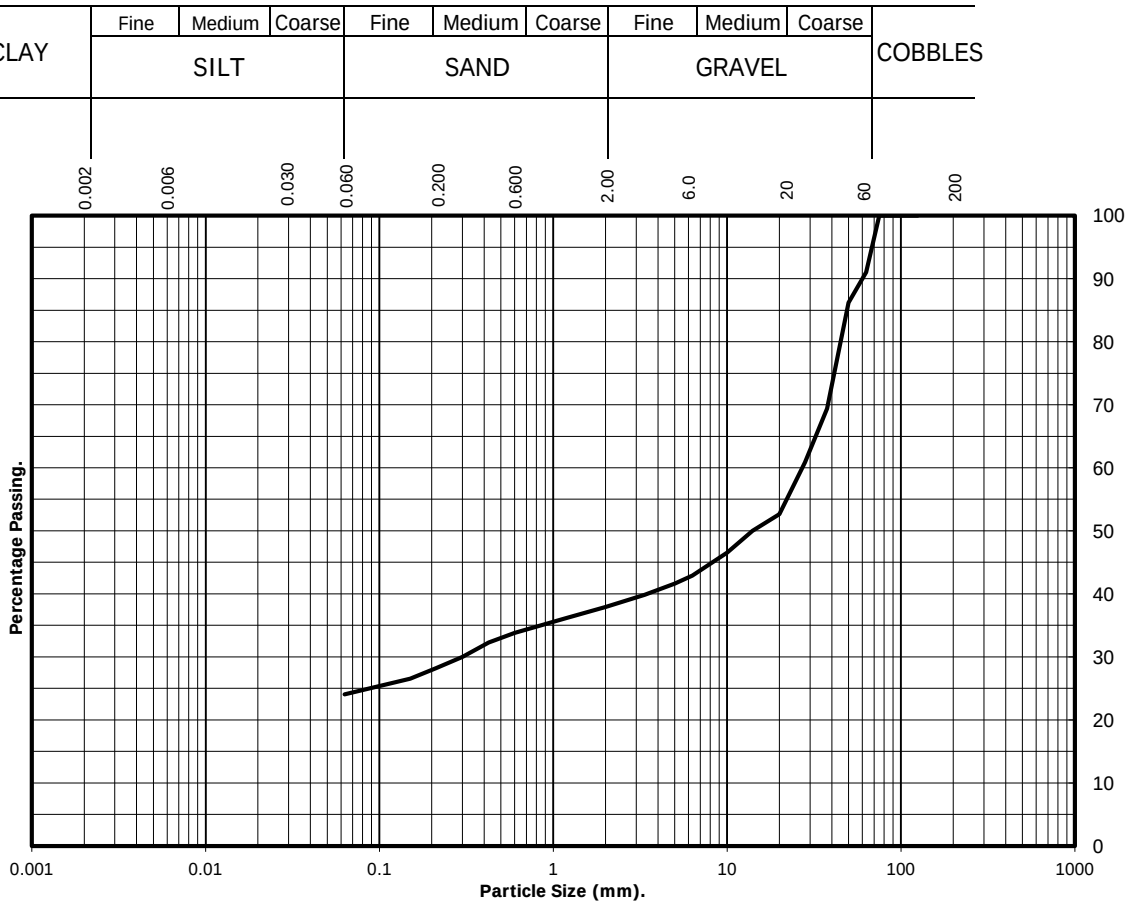
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP12**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse) with cobbles**



BS Test Sieve	% Passing
125	100
90	100
75	100
63	91
50	86
37.5	69
28	61
20	53
14	50
10	47
6.3	43
5.0	42
3.35	40
2.00	38
1.18	36
0.60	34
0.425	32
0.300	30
0.212	28
0.150	27
0.063	24

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	24	14	53	9	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

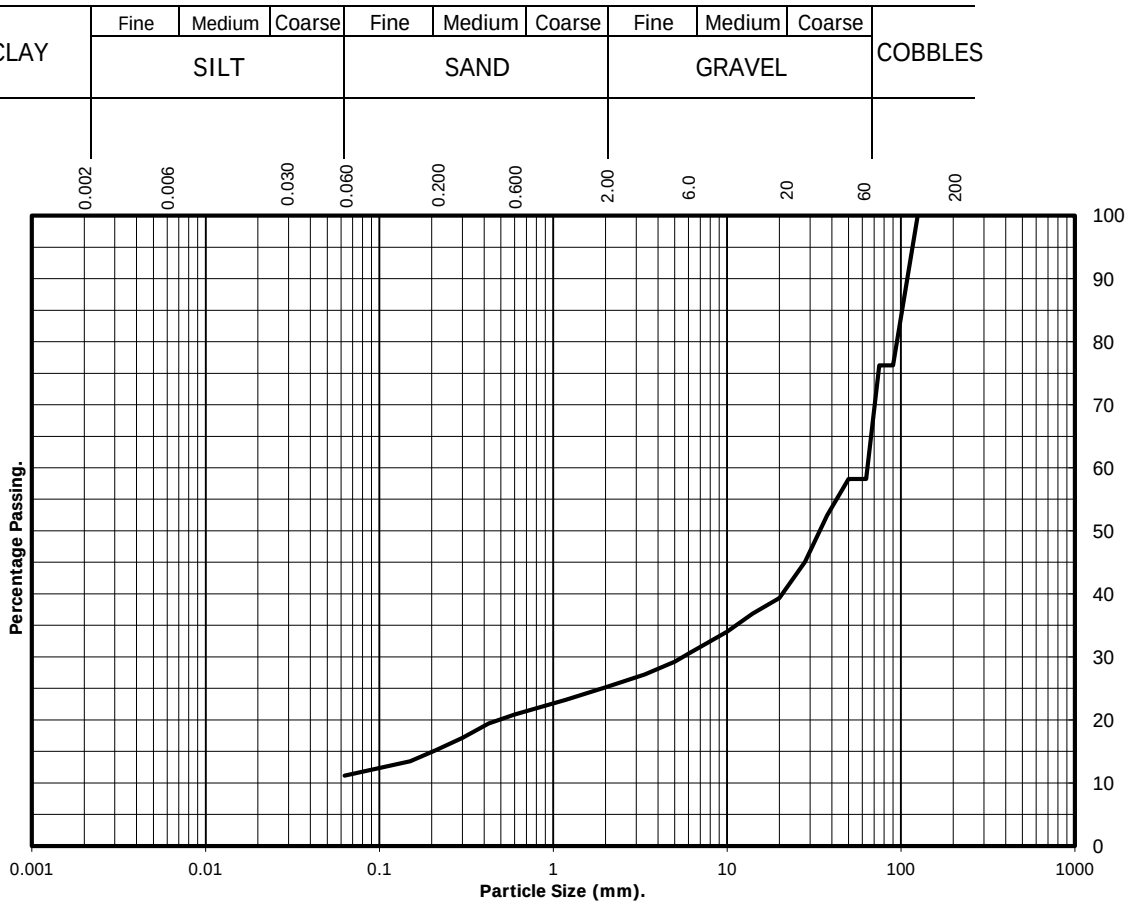
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP13**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	100
90	76
75	76
63	58
50	58
37.5	52
28	45
20	39
14	37
10	34
6.3	31
5.0	29
3.35	27
2.00	25
1.18	23
0.60	21
0.425	19
0.300	17
0.212	15
0.150	13
0.063	11

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	11	14	33	42	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:

Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

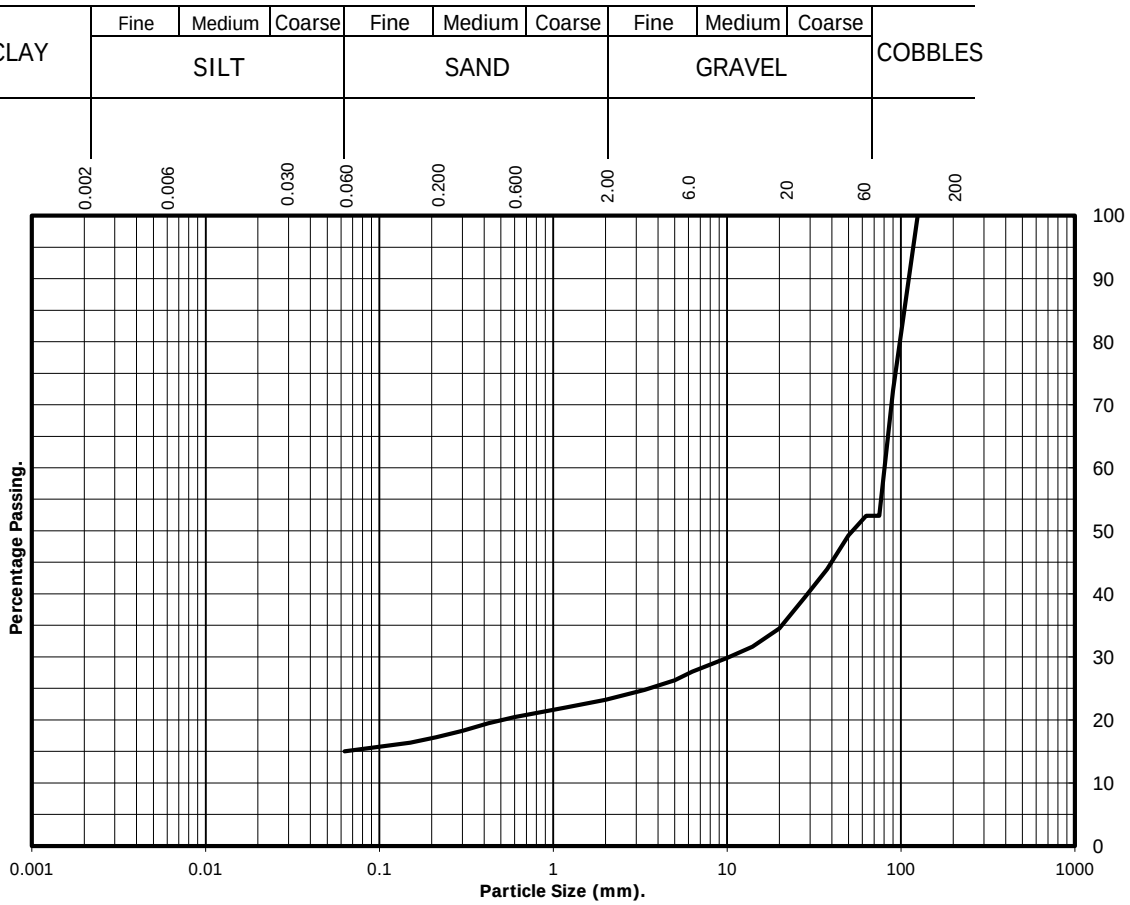
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP17**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**1.50**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	100
90	72
75	52
63	52
50	49
37.5	44
28	40
20	34
14	32
10	30
6.3	28
5.0	26
3.35	25
2.00	23
1.18	22
0.60	20
0.425	20
0.300	18
0.212	17
0.150	16
0.063	15

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	15	8	29	48	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:

Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

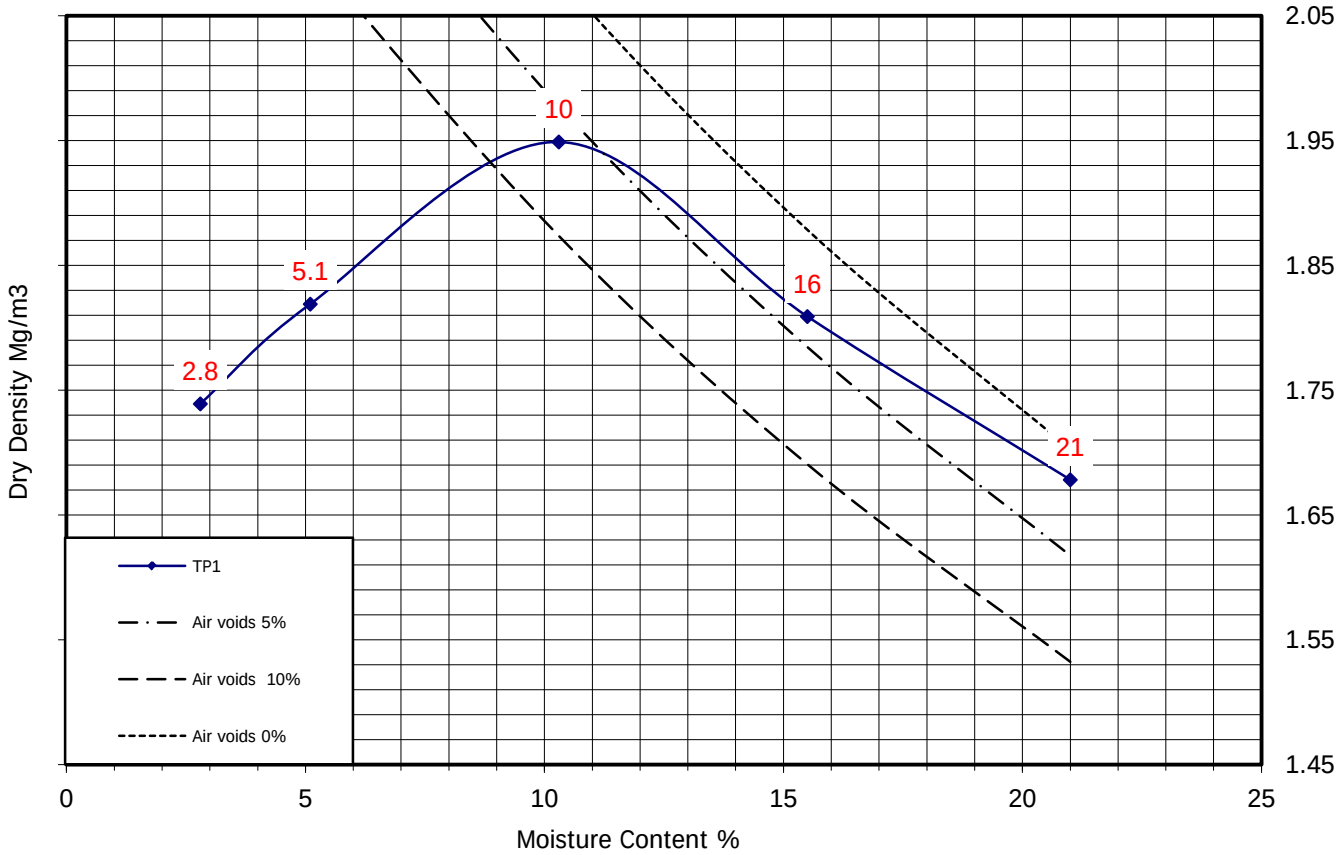
GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP1**
Sample Number:	
Depth (m):	**1.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.8	5.1	10	16	21
Bulk Density (Mg/m^3):	1.79	1.91	2.15	2.09	2.03
Dry Density (Mg/m^3):	1.74	1.82	1.95	1.81	1.68

Initial Moisture Content:	**21**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**9**
Maximum Dry Density (mg/m^3):	**1.95**	Material Retained on 20.0 mm Test Sieve (%):	**20**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.5.2**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

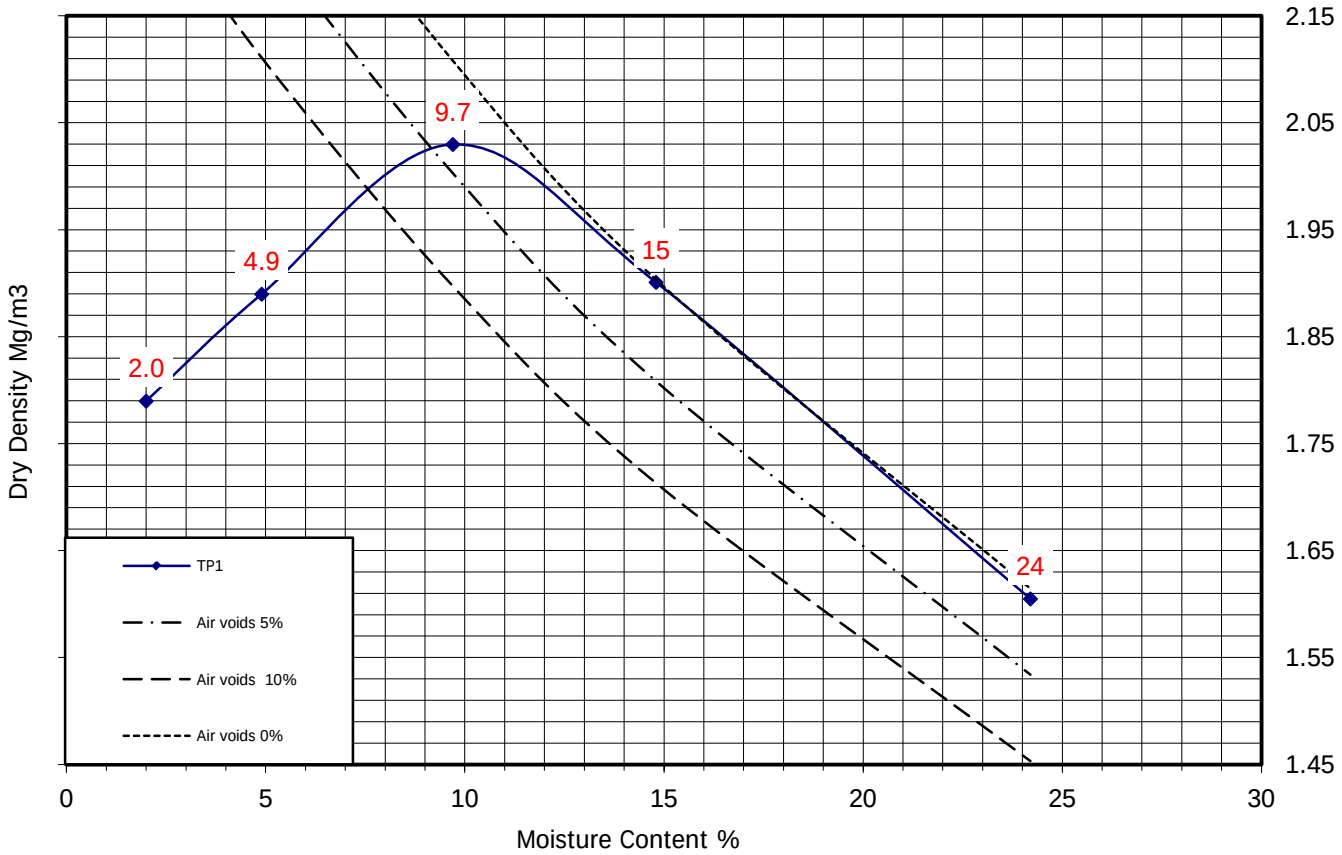
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP1**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.0	4.9	9.7	15	24
Bulk Density (Mg/m^3):	1.83	1.98	2.23	2.18	1.99
Dry Density (Mg/m^3):	1.79	1.89	2.03	1.90	1.60

Initial Moisture Content:	**24**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**35**
Maximum Dry Density (mg/m^3):	**2.03**	Material Retained on 20.0 mm Test Sieve (%):	**51**
Optimum Moisture Content (%):	**9.7**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

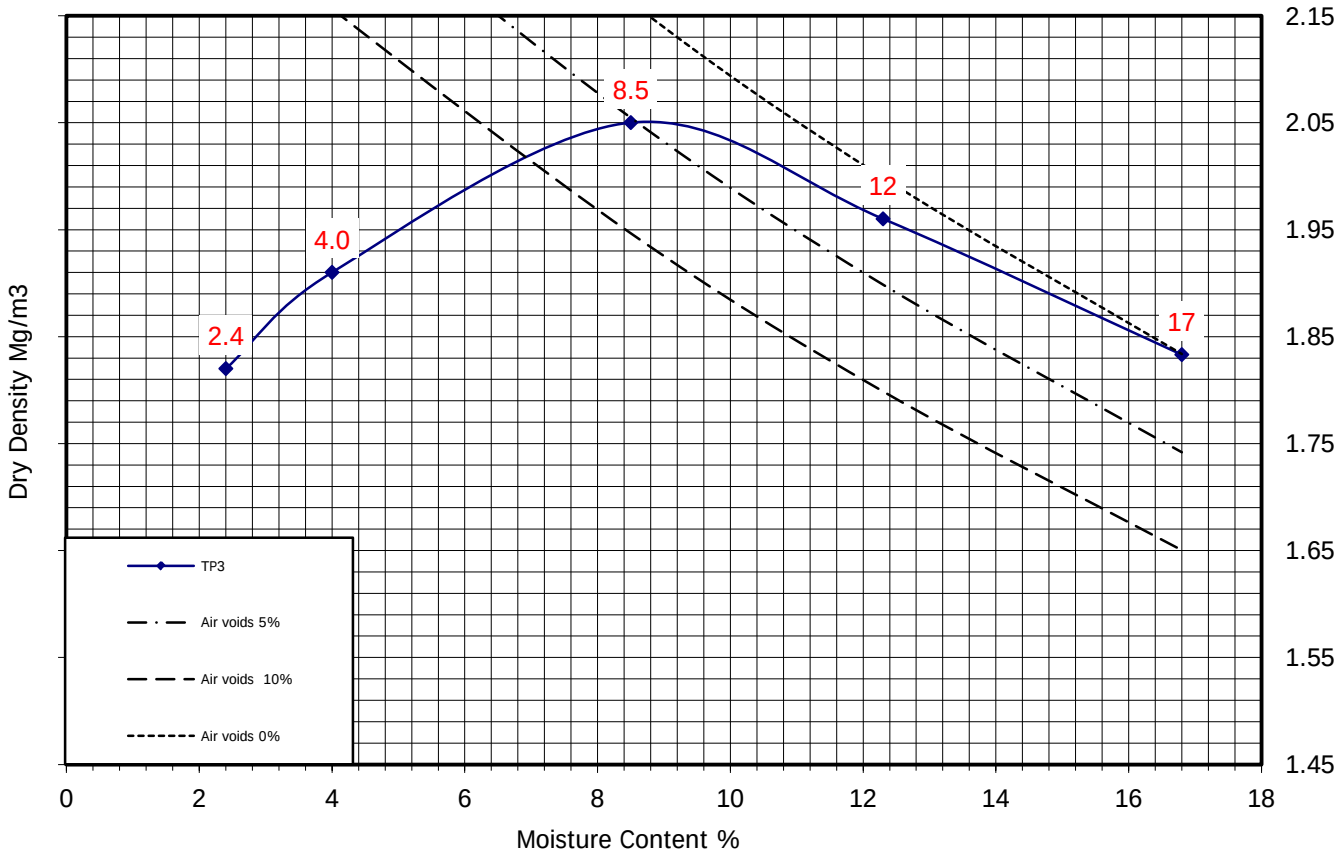
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP3**
Sample Number:	
Depth (m):	**3.50**
Sample Type:	**B**



Compaction Point:	**1**	**2**	**3**	**4**	**5**
Moisture Content:	2.4	4.0	8.5	12	17
Bulk Density (Mg/m^3):	1.86	1.99	2.22	2.20	2.14
Dry Density (Mg/m^3):	1.82	1.91	2.05	1.96	1.83

Initial Moisture Content:	**17**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**47**
Maximum Dry Density (mg/m^3):	**2.05**	Material Retained on 20.0 mm Test Sieve (%):	**58**
Optimum Moisture Content (%):	**8.5**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

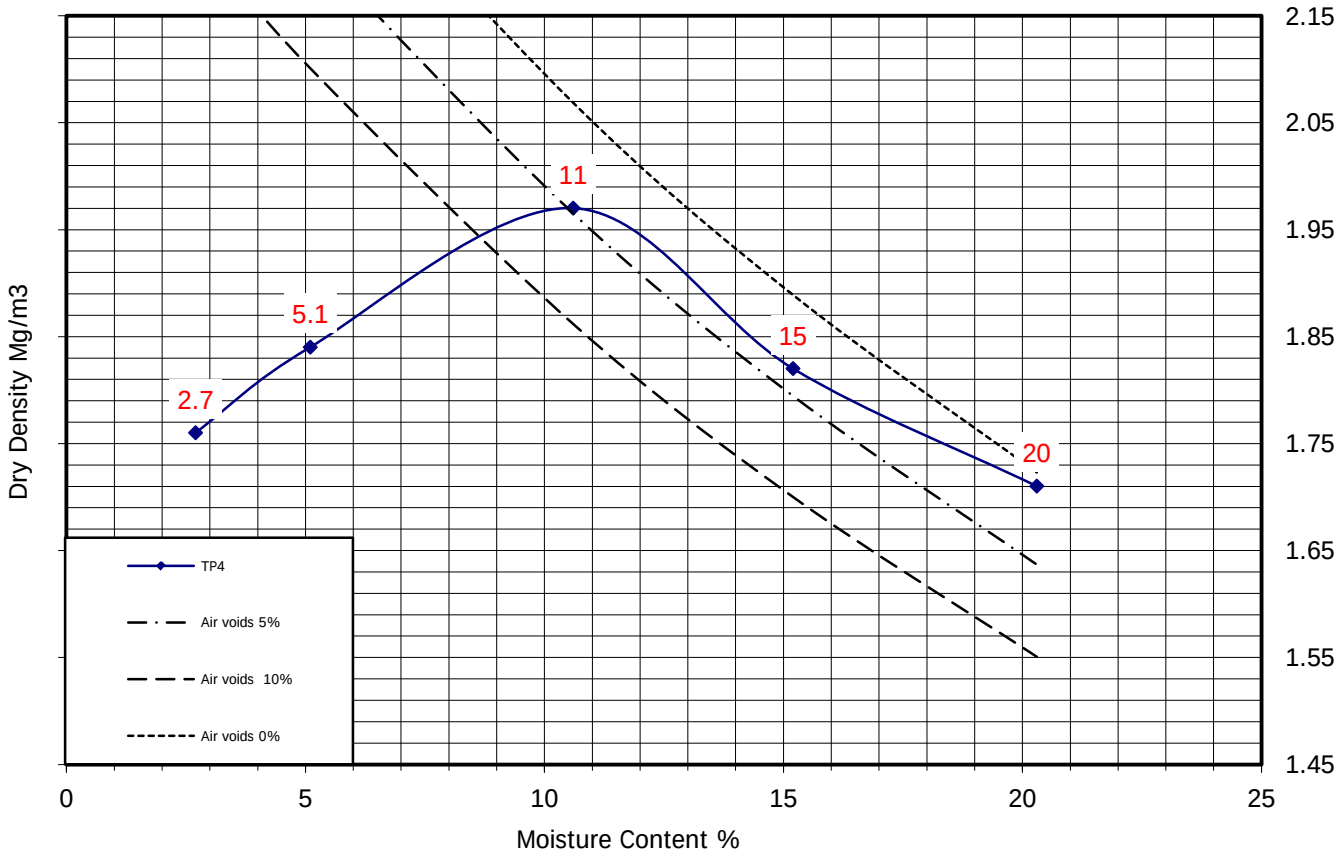
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP4**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.7	5.1	11	15	20
Bulk Density (Mg/m^3):	1.81	1.93	2.18	2.10	2.06
Dry Density (Mg/m^3):	1.76	1.84	1.97	1.82	1.71

Initial Moisture Content:	**20**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**53**
Maximum Dry Density (mg/m^3):	**1.97**	Material Retained on 20.0 mm Test Sieve (%):	**71**
Optimum Moisture Content (%):	**11**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

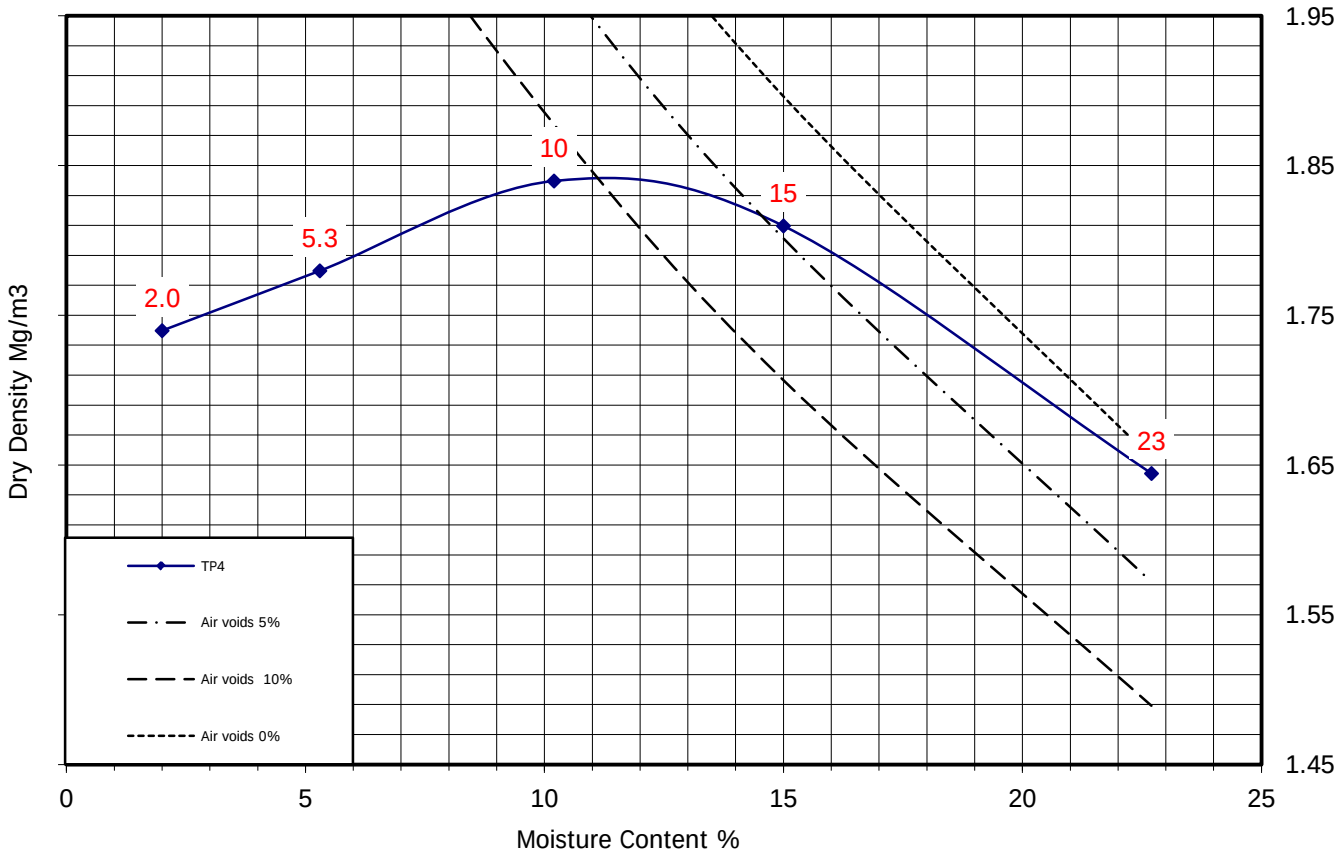
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP4**
Sample Number:	
Depth (m):	**3.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.0	5.3	10	15	23
Bulk Density (Mg/m^3):	1.77	1.87	2.03	2.08	2.02
Dry Density (Mg/m^3):	1.74	1.78	1.84	1.81	1.64

Initial Moisture Content:	**23**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**37**
Maximum Dry Density (mg/m^3):	**1.84**	Material Retained on 20.0 mm Test Sieve (%):	**46**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

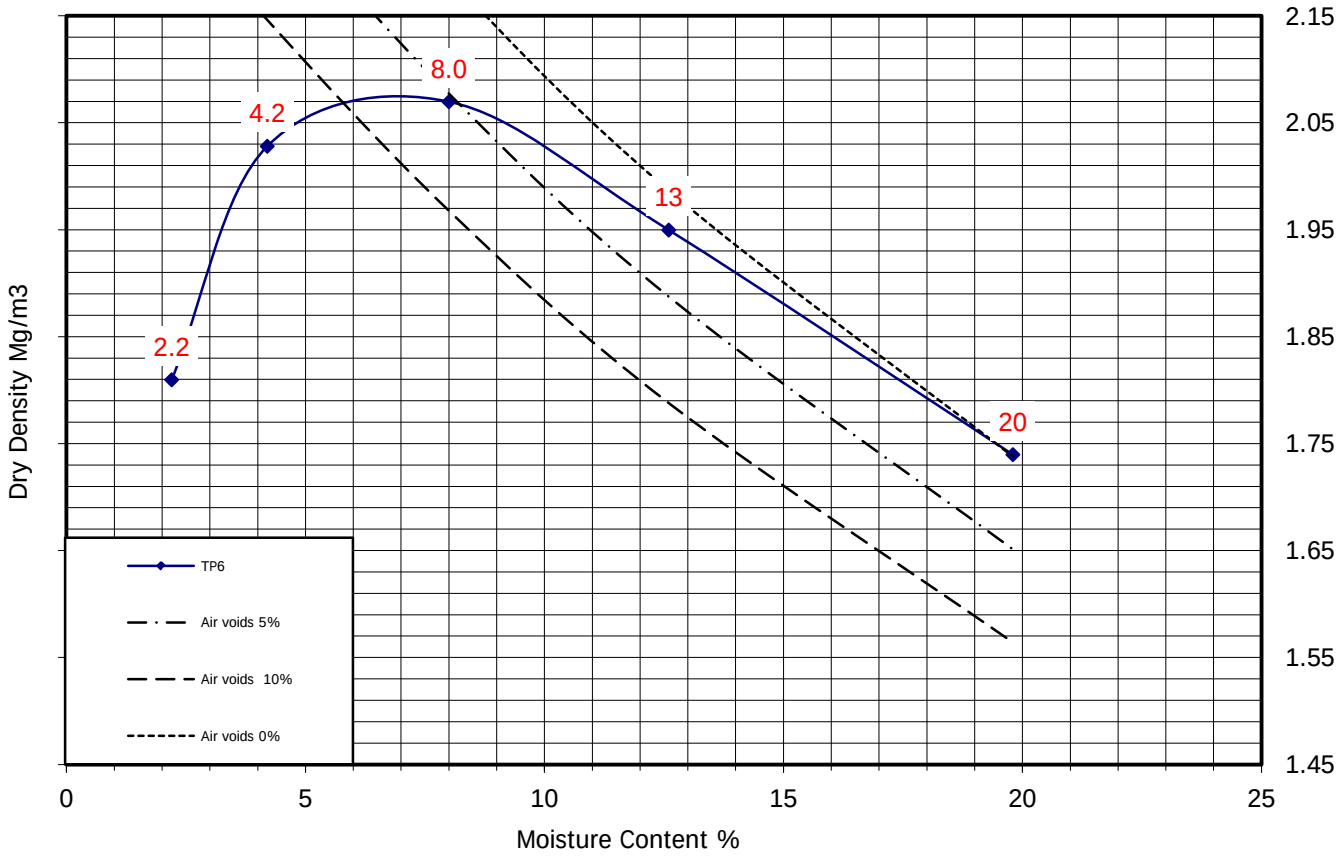
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP6**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.2	4.2	8.0	13	20
Bulk Density (Mg/m^3):	1.85	2.11	2.24	2.20	2.08
Dry Density (Mg/m^3):	1.81	2.03	2.07	1.95	1.74

Initial Moisture Content:	**20**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**23**
Maximum Dry Density (mg/m^3):	**2.07**	Material Retained on 20.0 mm Test Sieve (%):	**43**
Optimum Moisture Content (%):	**8.0**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

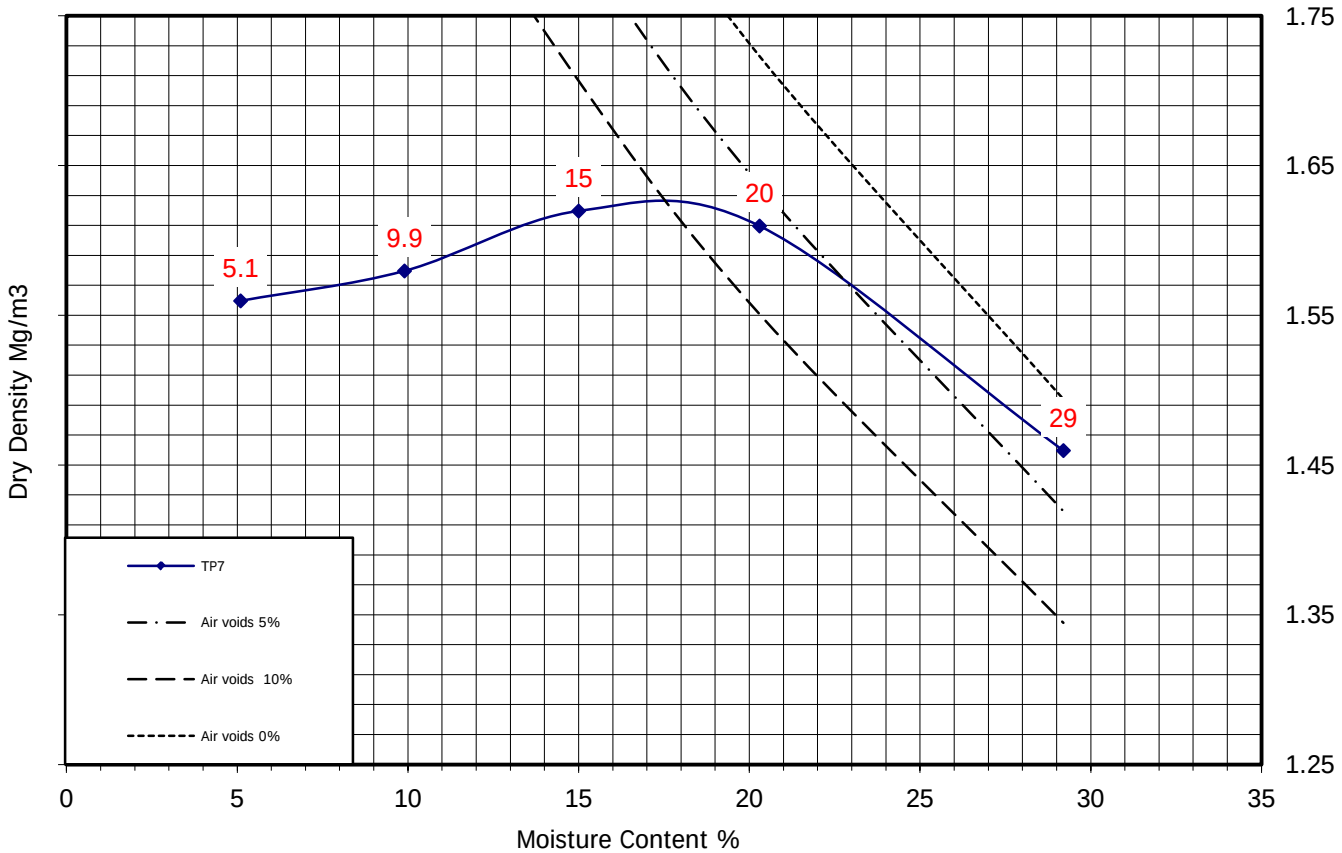
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP7**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	5.1	9.9	15	20	29
Bulk Density (Mg/m^3):	1.64	1.74	1.86	1.94	1.89
Dry Density (Mg/m^3):	1.56	1.58	1.62	1.61	1.46

Initial Moisture Content:	**29**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**35**
Maximum Dry Density (mg/m^3):	**1.62**	Material Retained on 20.0 mm Test Sieve (%):	**40**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

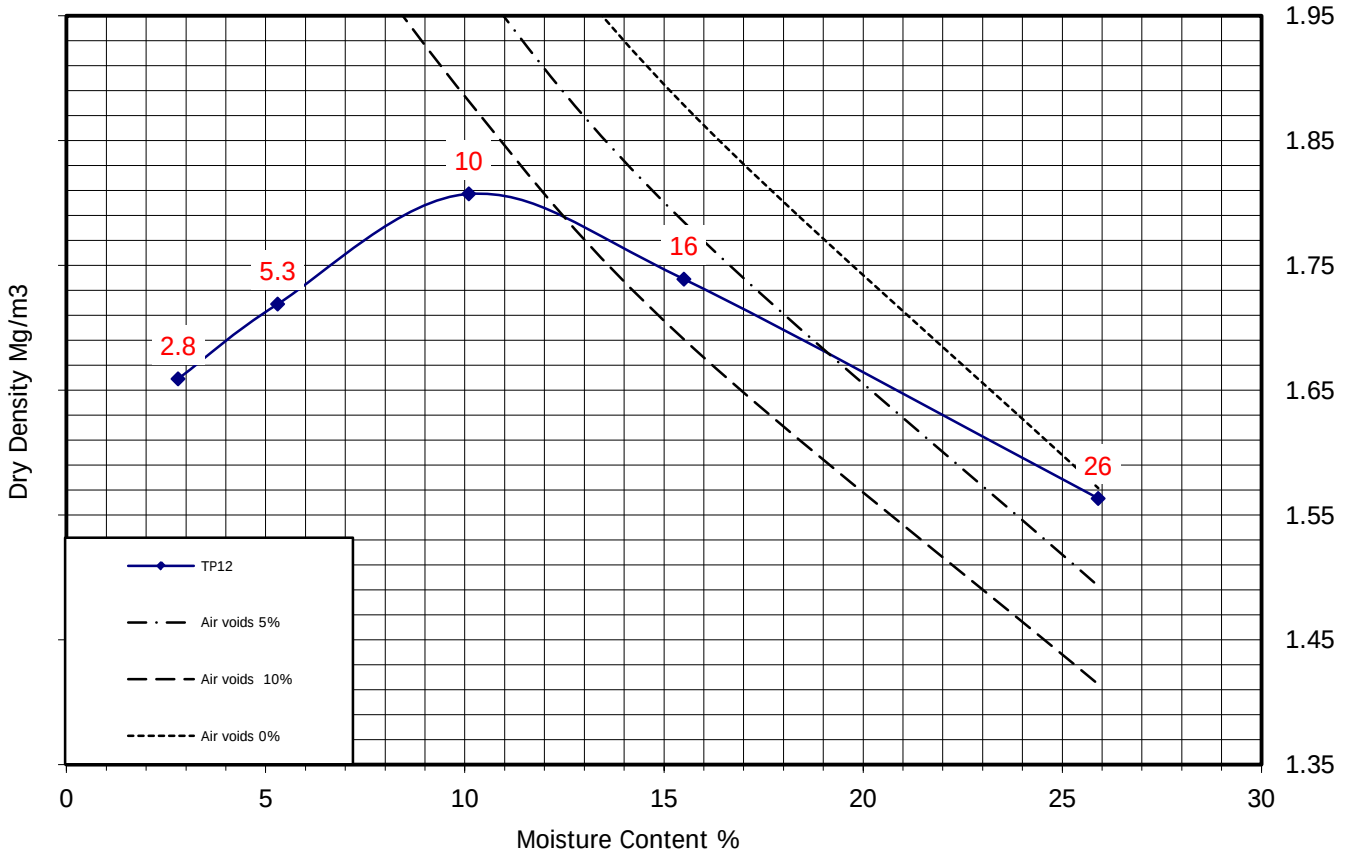
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP12**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	**1**	**2**	**3**	**4**	**5**
Moisture Content:	2.8	5.3	10	16	26
Bulk Density (Mg/m^3):	1.71	1.81	1.99	2.01	1.97
Dry Density (Mg/m^3):	1.66	1.72	1.81	1.74	1.56

Initial Moisture Content:	**26**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**31**
Maximum Dry Density (mg/m^3):	**1.81**	Material Retained on 20.0 mm Test Sieve (%):	**47**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

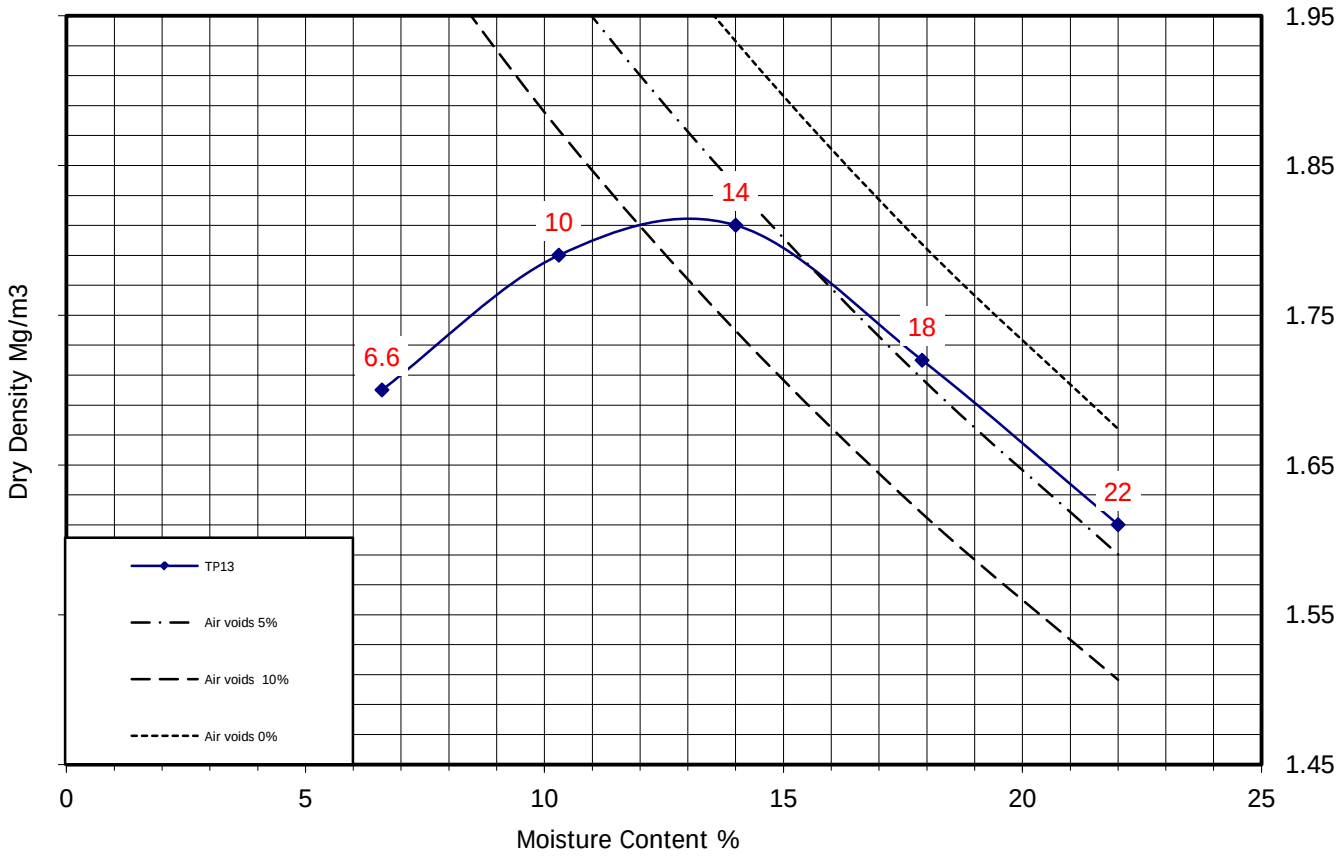
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP13**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	6.6	10	14	18	22
Bulk Density (Mg/m^3):	1.81	1.97	2.06	2.03	1.96
Dry Density (Mg/m^3):	1.70	1.79	1.81	1.72	1.61

Initial Moisture Content:	**18**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**48**
Maximum Dry Density (mg/m^3):	**1.81**	Material Retained on 20.0 mm Test Sieve (%):	**61**
Optimum Moisture Content (%):	**14**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

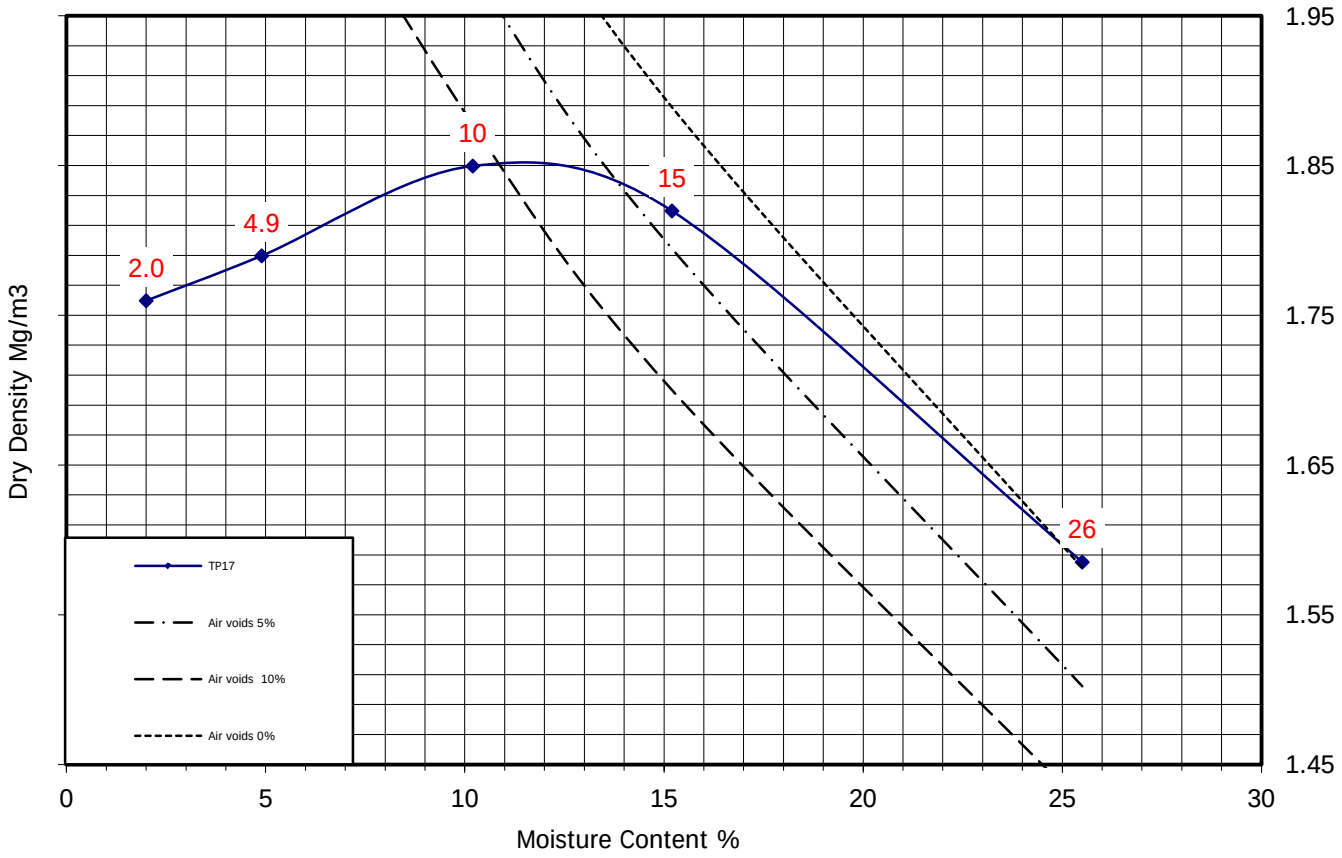
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP17**
Sample Number:	
Depth (m):	**0.50**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.0	4.9	10	15	26
Bulk Density (Mg/m^3):	1.79	1.88	2.04	2.10	1.99
Dry Density (Mg/m^3):	1.76	1.79	1.85	1.82	1.59

Initial Moisture Content:	**26**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**56**
Maximum Dry Density (mg/m^3):	**1.85**	Material Retained on 20.0 mm Test Sieve (%):	**66**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 27.7.15

UKAS TESTING
2788

COMPACTION SPECIFICATION

Top Half of Engineered Fill Source
Stockpile Herbert Road
Newport

Prepared for:
Riversee Limited

July 2015

Report No. 12032/CS1

REPORT TITLE	**:**	**Compaction Specification: Top Half of Engineered Fill Source Stockpile, Herbert Road, Newport**
REPORT STATUS	**:**	**Final**
JOB NUMBER	**:**	**12032/CS1**
DATE	**:**	**July 2015**
PREPARED BY	**:**	R. Howells. …….. **(Mrs R. Howells)**
REVIEWED BY	**:**	louisedow …….. **(Miss L. Dow)**
APPROVED BY	**:**	…….. **(Dr G. C. Lake)**

Executive Summary

Riversee Limited is proposing to undertake earthworks on a proposed development site off Herbert Road, Newport, where the site is to be raised by up to 1.6m, taking it to a level of 8.8m AOD.

Proposed engineered fill materials are stockpiled on a nearby site on Herbert Road.

Samples of the upper top half of the stockpile was sampled by Terra Firma.

These samples taken were submitted to Geo Site and Testing Services Limited in Llanelli in order to assess their optimum moisture content/maximum dry density and to undertake grading analyses.

The initial moisture content of the soils was found to be between 15 and 26% with an optimum moisture content of between 9.5 and 14%.

In order for there to be tolerable settlements from the placed fill materials, it needs to be compacted at or close to 95% of its Optimum Moisture Content/Maximum Dry Density. Drying of the soils is likely to be required to achieve this.

In order to meet the above criterion it is clear that the materials will need to be dried.

Grading analysis results have been used to classify the soils as selected stony cohesive material (Type 2C and 6F2).

The materials should be laid and compacted in layers as given by the Specification Works for Highways 600.

TABLE OF CONTENTS

SECTION 1 Introduction

Riversee Limited is proposing to undertake earthworks on a proposed development site off Herbert Road, Newport, where the site is to be raised by up to 1.6m, taking it to a level of 8.8m AOD.

The ground is to be brought up in layers, in accordance with the Department of Transport Specification for Highway Works, prior to construction and the importation of inert materials in landscaped areas.

Proposed engineered fill materials are stockpiled on a nearby site on Herbert Road.

Terra Firma (Wales) Limited has been commissioned by Riversee Limited to undertake sampling and testing of off-site stockpiled soil to assess its suitability as fill.

This report details the compaction specification for soils in the upper half of the stockpile only.

1.1 Limitations and Exceptions

The compaction specification report has been prepared for the sole internal reliance of Riversee Limited and its design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The report represents the findings and opinions of experienced geo-environmental and geo-technical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may also be required.

SECTION 2 Soil Property Testing

2.1 Soil Sampling

Terra Firma (Wales) Limited attended the stockpile site on 11th February 2015 in order to obtain samples for geotechnical testing.

Eight representative samples were taken and submitted to Geo Site and Testing Services Limited in Llanelli in order to assess their optimum moisture content/maximum dry density and to undertake grading analyses.

The table below summarises the samples taken.

Table 2.1 Sample Descriptions

Sample	Depth in Stockpile (m)	Description
S1	1.7	Grey brown sandy gravelly cobbly clay
S2	1.0	Brown gravelly cobbly clay mixed with grey gravelly cobbly clay
S3	0.5	Grey sandy gravelly cobbly clay
S4	1.5	Brown gravelly cobbly clay mixed with grey gravelly cobbly clay
S5	0.5	Grey brown gravelly cobbly clay with pockets of red clay
S6	1.7	Grey clay mixed with red sandy clay
S7	3.0	Red sand, gravel and cobble
S8	0.5	Grey brown gravelly cobbly clay with pockets of red clay

2.2 Optimum Moisture Content/Maximum Dry Density

The results of the optimum moisture content and maximum dry density tests are detailed in the table below.

These tests were conducted in accordance with BS 1377: Part 4: 1990.

Table 2.2 Optimum Moisture Content/Maximum Dry Density Test Results

Sample	Initial Moisture Content (%)	Optimum Moisture Content (%)	Maximum Dry Density(mg/m^3)
S1	20	10	1.90
S2	22	10	1.95
S3	22	9.7	1.93
S4	15	12	1.89
S5	20	9.5	1.93
S6	21	10	1.90
S7	16	14	1.84
S8	26	10	1.88

The suitable fill materials should be placed at or close to i.e. 95% of their optimum moisture content/maximum dry density and compacted in layers as per the requirements of the Specification for Highway Works.

The test certificates are given in **Annex A.**

2.3 Grading Analysis

The eight samples were tested in the laboratory by dry and wet sieving analysis to determine their grading characteristics. These tests were conducted in accordance with BS1377: Part 2, Clause 9.2: 1990.

The test certificates are presented in **Annex A.**

Based upon the soil property test results, and referring to Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements and Table 6/2: Grading Requirements for Acceptable Earthworks Materials, of the 'Specification for Highway Works, Series 600', the samples can be classified as summarised in the table below.

Table 2.3 Grading Analysis Results and Soil Classification

Sample	Type (Table 6/2)	Classification (Table 6/1)	Compaction Method
S1	6F2	Selected Granular Material	Method 6
S2	2C	Stony Cohesive Material	Method 2
S3			
S4			
S5			
S6			
S7			
S8			

2.4 Compaction Specification

Compaction should be undertaken in accordance with the appropriate methodology as given in of Table 6/4 of the Specification for Highway Works, Series 600, as summarised in **Tables 2.4 and 2.5.**

Details for just a smoothed wheeled roller and vibratory roller are provided. If an alternative roller is proposed then Table 6/4 should be consulted.

Table 2.4 Compaction Specification - Method 2

Type of Compaction Plant	Mass per Metre Width of Roll (kg)	Maximum depth of Compacted Layer (mm)	Number of Passes
Smoothed Wheeled Roller	2100 – 2700 2700 – 5400 >5400	125 125 150	10 8 8
Vibratory Roller	270 – 450 450 – 700 700 – 1300 1300 – 1800 1800 – 2300 2300 – 2900 2900 – 3600 3600 – 4300 4300 – 5000 >5000	75 75 125 150 150 175 200 225 250 275	16 12 10 8 4 4 4 4 4 4

Table 2.5 Compaction Specification - Method 6

Type of Compaction Plant	Mass per Metre Width of Roll (kg)	Number of Passes		
		110mm layer	150mm layer	250mm layer
Smoothed Wheeled Roller	2100 – 2700 2700 – 5400 >5400	Unsuitable 16 8	Unsuitable Unsuitable 16	Unsuitable Unsuitable Unsuitable
Vibratory Roller	270 – 450 450 – 700 700 – 1300 1300 – 1800 1800 – 2300 2300 – 2900 2900 – 3600 3600 – 4300 4300 – 5000 >5000	Unsuitable Unsuitable 16 6 4 3 3 2 2 2	Unsuitable Unsuitable Unsuitable 16 6 5 5 4 4 3	Unsuitable Unsuitable Unsuitable Unsuitable 12 11 10 8 7 6

2.4 Compaction Specification (Continued)

Compaction should be undertaken in accordance with Table 6/1 and 6/4, as soon as practicable after deposition.

Where combinations of different types or categories of plant are used, the depth of the layer should be for the type of plant requiring the least depth of layer, and the number of passes should be that for the type of plant requiring the greatest number of passes.

Earthmoving plants are not recommended for use as compaction plant, nor are lighter categories of plants used to provide preliminary compaction to assist the use of heavier plant.

The soils should be sorted and all deleterious material, such as timber and plastic removed.

All roots and tree roots should be excavated and removed.

The stability of excavations or fills should not be compromised by the location of stock piled materials or use of plant or location of temporary buildings/structures.

All earthworks must be kept free of water including arranging for the rapid removal of water, water shed onto the earthworks and water entering the earthworks from any source.

Fill materials especially cohesive (silt and clay) fill should not be deposited and compacted during wet weather, where an increase in moisture content will increase the liquid limit of the soil.

The initial moisture content of the soil was found to be double the optimum moisture content in some instances, indicating that the clay soils will need to be dried out prior to filling to achieve adequate compaction.

All exposed fill surfaces must be adequately weather proofed during inclement weather or at the end of the working day/compaction process. Any exposed cohesive fill that becomes wet and slurrified due to water ingress or weather erosion must be stripped off, spread into thin layers and aerated. The fill should then be re-compacted.

Plant movement across compaction layers should be restricted to that plant necessary for its deposition, spreading and compaction.

Fill areas should be constructed evenly over their full width and their fullest possible extent and the contractor should control and direct constructional plant and other traffic uniformly over them. Damage by construction plant should be made good with material having the same characteristics and strength as the material had before it was damaged.

Embankments and other areas of unsupported fills should not be constructed with steeper side slopes than the materials effective shear strength, with exception to allowing the adequate compaction at the edges before trimming back, within the minimum period necessary for the safety of the works.

2.4 **Compaction Specification** (Continued)

Where fill is to be placed against a natural slope, or sloping earthworks face including embankments, cuttings and other fills and excavations, such faces should be appropriately benched immediately before placing the subsequent fill.

In-situ density tests (sand replacement method) should be undertaken to ensure the compaction process is performing satisfactory during the enabling works. In-situ testing should be undertaken at an appropriate spacing to reflect the adequacy of the compaction process beneath the entire development area.

It is also recommended that a number of in-situ plate load tests be performed mid way through the earthworks and at the final finished site level beneath the access road.

The earthworks should be supervised by a suitable engineer.

The tests should be conducted in accordance with BS 1377: Part 9: 1990 under the supervision of a qualified geotechnical engineer.

Should the in-situ testing show densities which indicate that the compaction process is inadequate, the deposited material must be excavated and re-laid.

Allowances should also be made for the removal of soft spots and their replacement with imported suitable selected inert granular materials or suitable inert site won materials.

SECTION 3 Conclusions as to the Suitability of the Materials as Site Fill

In order for there to be tolerable settlements from the placed fill materials, they need to be compacted at or close to their optimum moisture content and maximum dry density (95%). This will ensure that a minimum 95% compaction will be achieved.

In order to meet the above criterion it is clear that the materials will need to be dried. This can be achieved by excavating and allowing the materials to dry naturally.

Once the given moisture content has been achieved then the materials may be used as structural fill. The materials have been graded according to the Specification Works for Highways 600 and should be laid and compacted in layers by referring to the Specification as described in Section 2.4.

A programme of in-situ density testing should also be carried out during fill works in order to confirm the effectiveness of the compaction procedure.

ANNEX A
Grading Analysis and Proctor Test Results

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 25872

Client's Reference: **TBC**

Report Date: **25-02-2015**

Client **Terrafirma Wales Ltd**
5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HB

Contract Title: **Herbert Road, Newport**

For the attention of: **Ruth Liley**

Date Received: **12-02-2015**

Date Commenced: **12-02-2015**

Date Completed: **25-02-2015**

Test Description	Qty
PSD Wet Sieve method 1377 : 1990 Part 2 : 9.2 - * UKAS	8
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould) 1377 : 1990 Part 4 : 3.3 - * UKAS	8

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Williams (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **1**

Depth from (m):

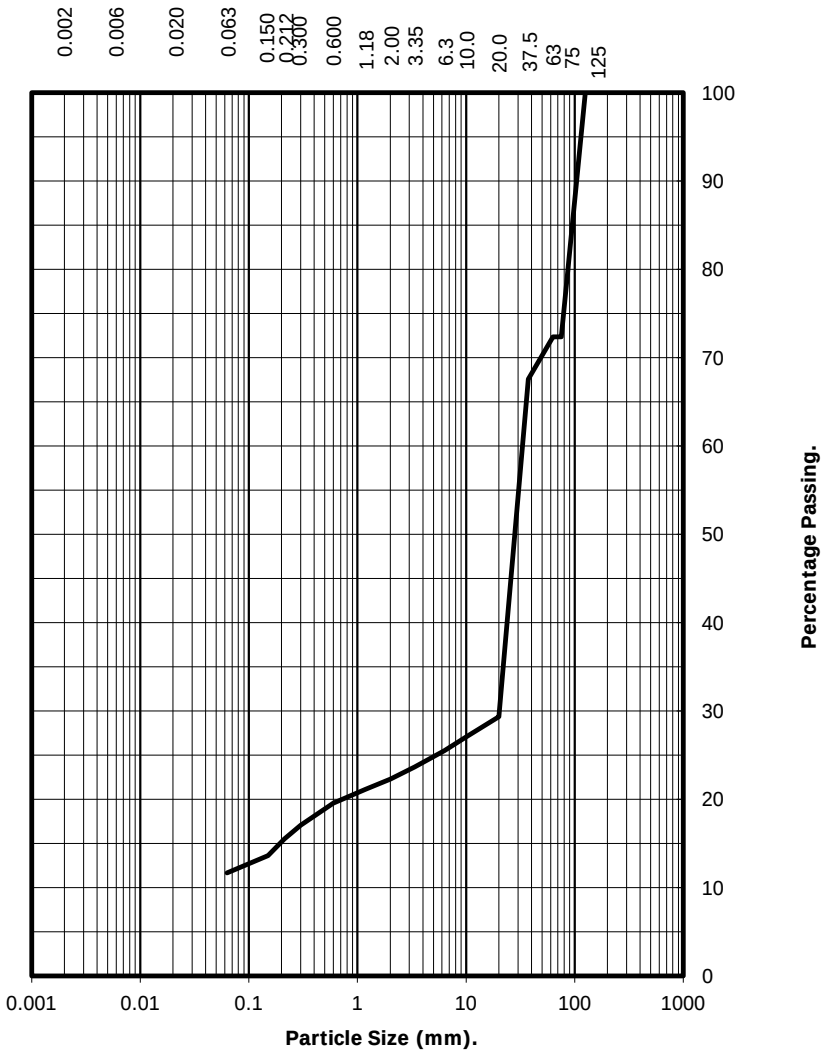
Depth to (m):

Sample Type: **B**

Description: **Brown/grey silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	72
63	72
37.5	68
20	29
10	27
6.3	25
3.35	24
2.00	22
1.18	21
0.60	20
0.300	17
0.212	16
0.150	14
0.063	12

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	12	**10**	**50**	**28**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **2**

Depth from (m):

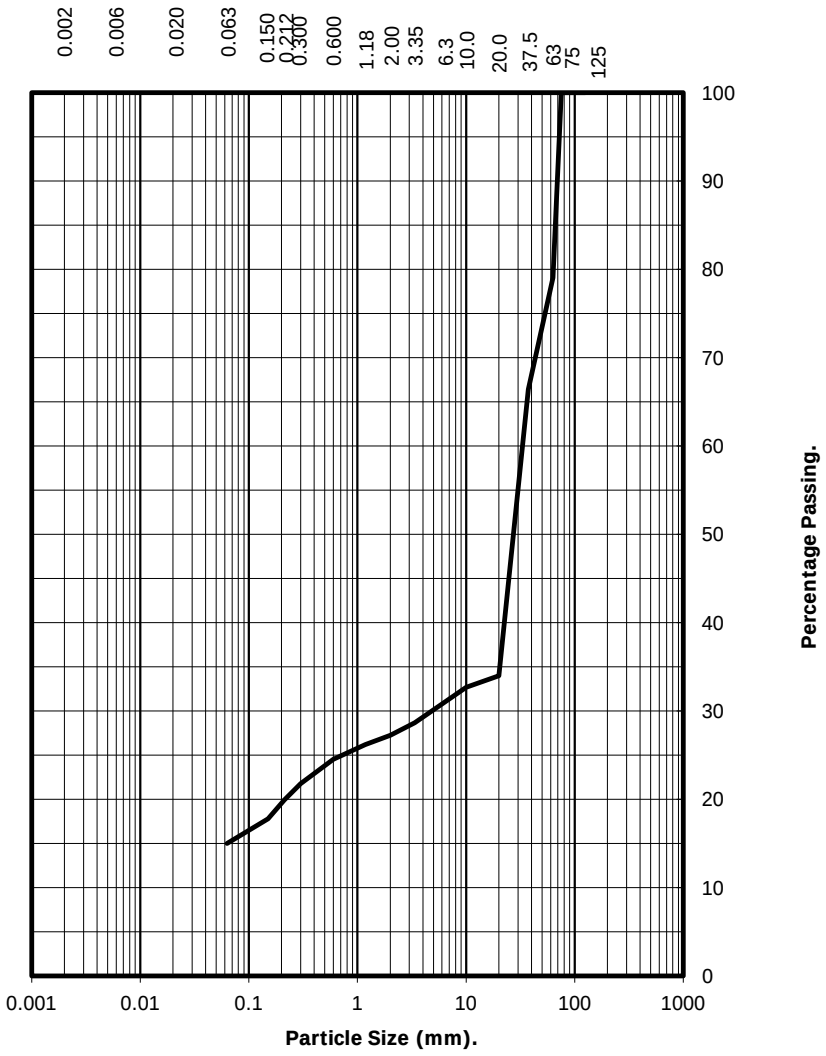
Depth to (m):

Sample Type: **B**

Description: **Brown/grey silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	100
63	79
37.5	66
20	34
10	33
6.3	31
3.35	29
2.00	27
1.18	26
0.60	25
0.300	22
0.212	20
0.150	18
0.063	15

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	15	**12**	**52**	**21**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **3**

Depth from (m):

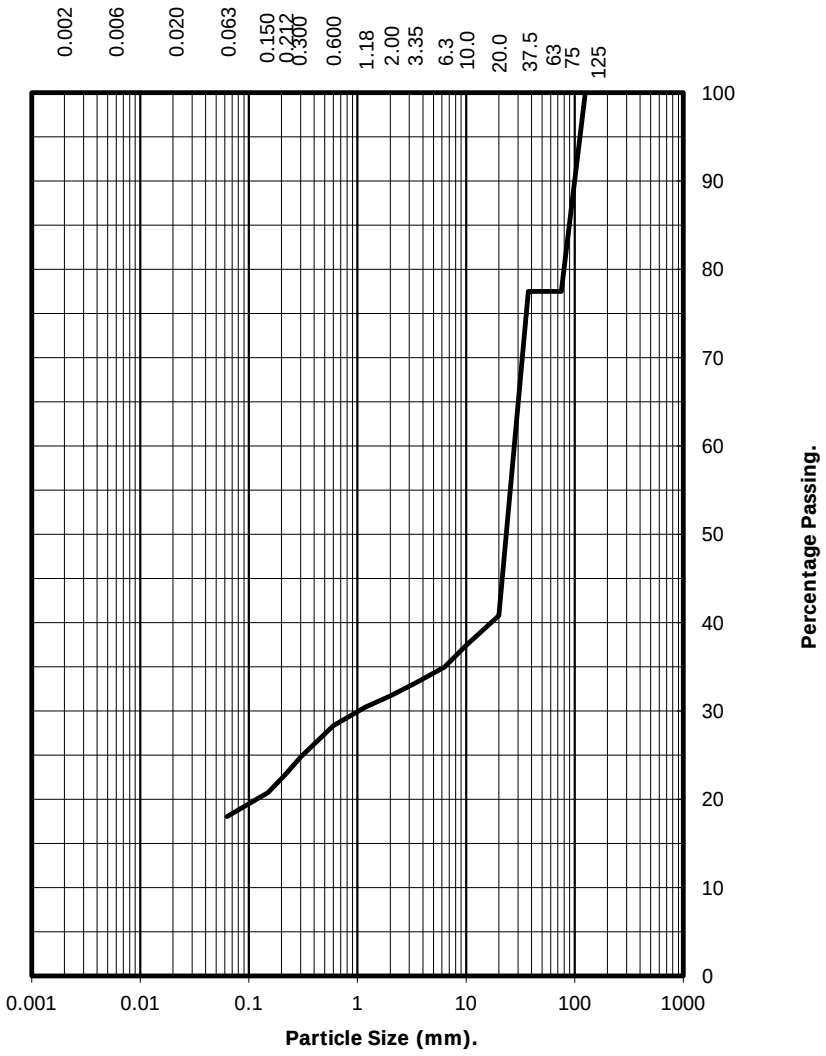
Depth to (m):

Sample Type: **B**

Description: **Brown/grey silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	77
63	77
37.5	77
20	41
10	37
6.3	35
3.35	33
2.00	32
1.18	30
0.60	28
0.300	25
0.212	23
0.150	21
0.063	18

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	18	**14**	**45**	**23**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **4**

Depth from (m):

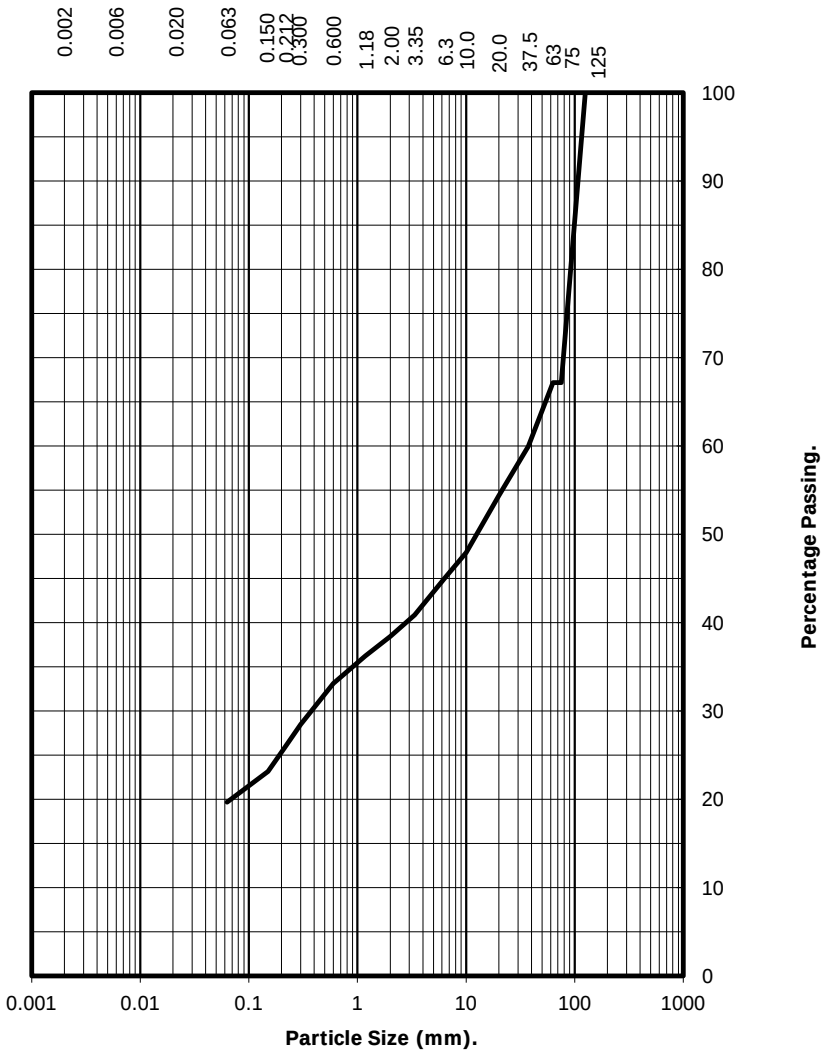
Depth to (m):

Sample Type: **B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	67
63	67
37.5	60
20	54
10	48
6.3	45
3.35	41
2.00	38
1.18	36
0.60	33
0.300	28
0.212	26
0.150	23
0.063	20

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	20	**18**	**29**	**33**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **5**

Depth from (m):

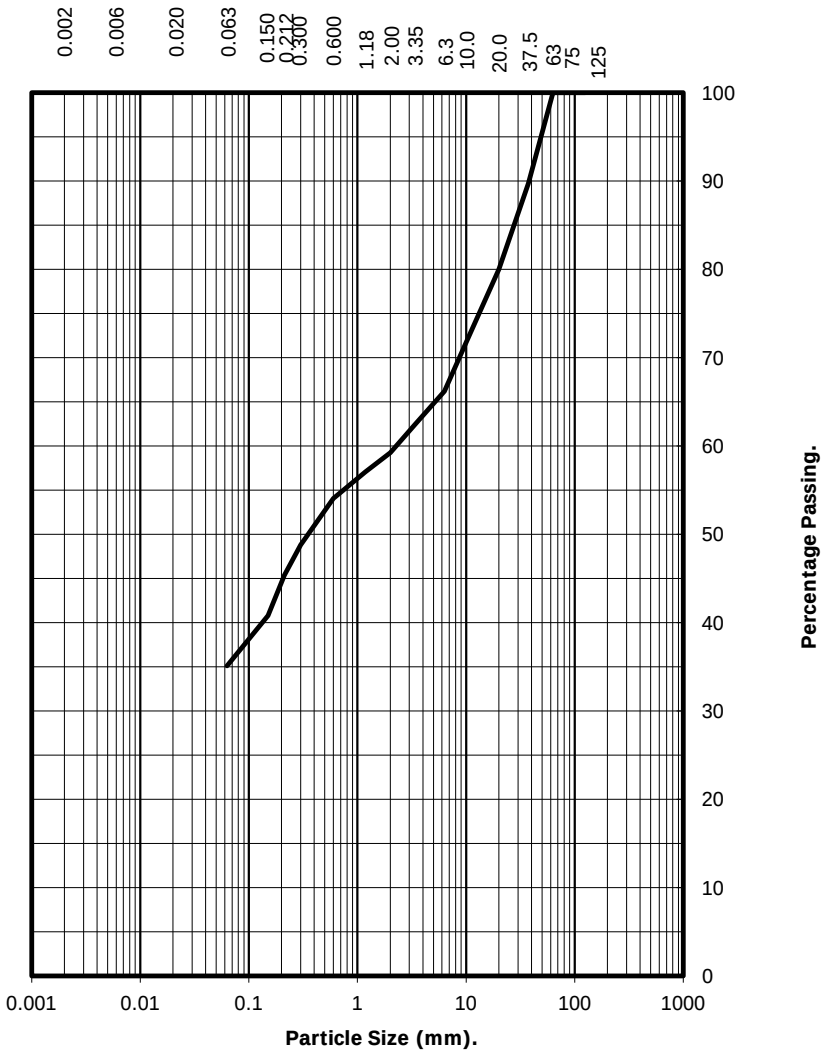
Depth to (m):

Sample Type: **B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse)**

BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	90
20	80
10	72
6.3	66
3.35	62
2.00	59
1.18	57
0.60	54
0.300	49
0.212	45
0.150	41
0.063	35

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	35	**24**	**41**	**0**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **6**

Depth from (m):

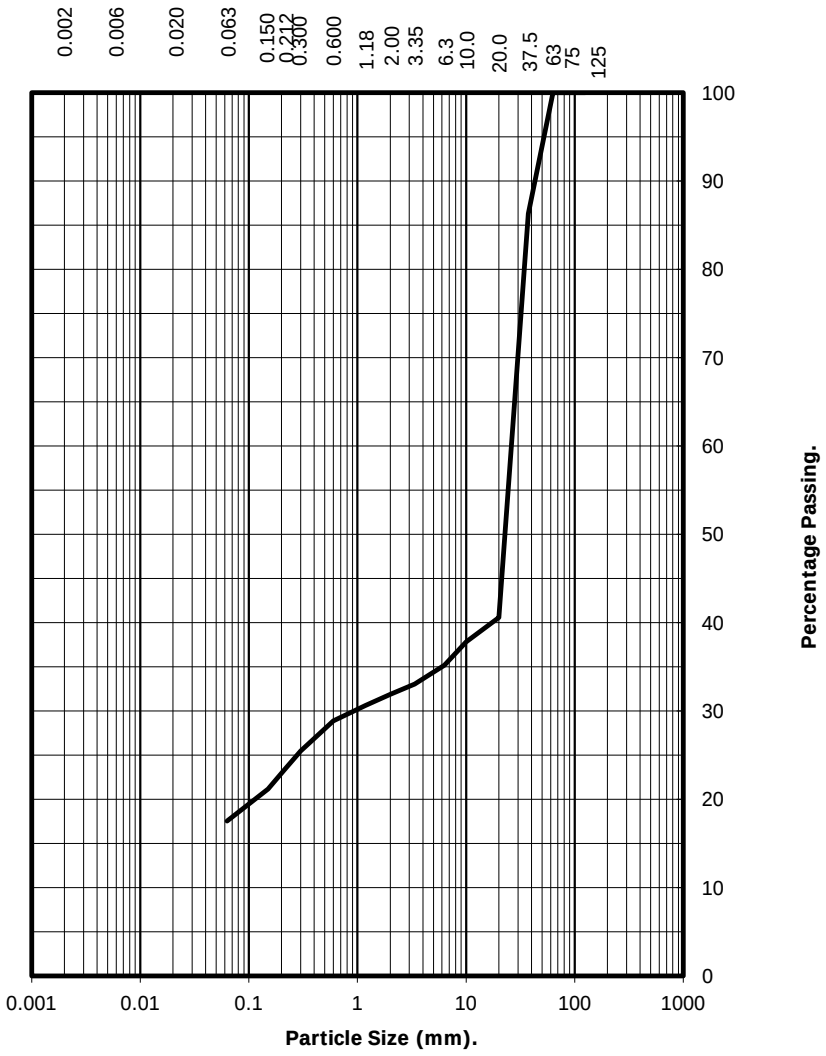
Depth to (m):

Sample Type: **B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse)**

BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	86
20	41
10	38
6.3	35
3.35	33
2.00	32
1.18	31
0.60	29
0.300	25
0.212	23
0.150	21
0.063	18

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	18	**14**	**68**	**0**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **7**

Depth from (m):

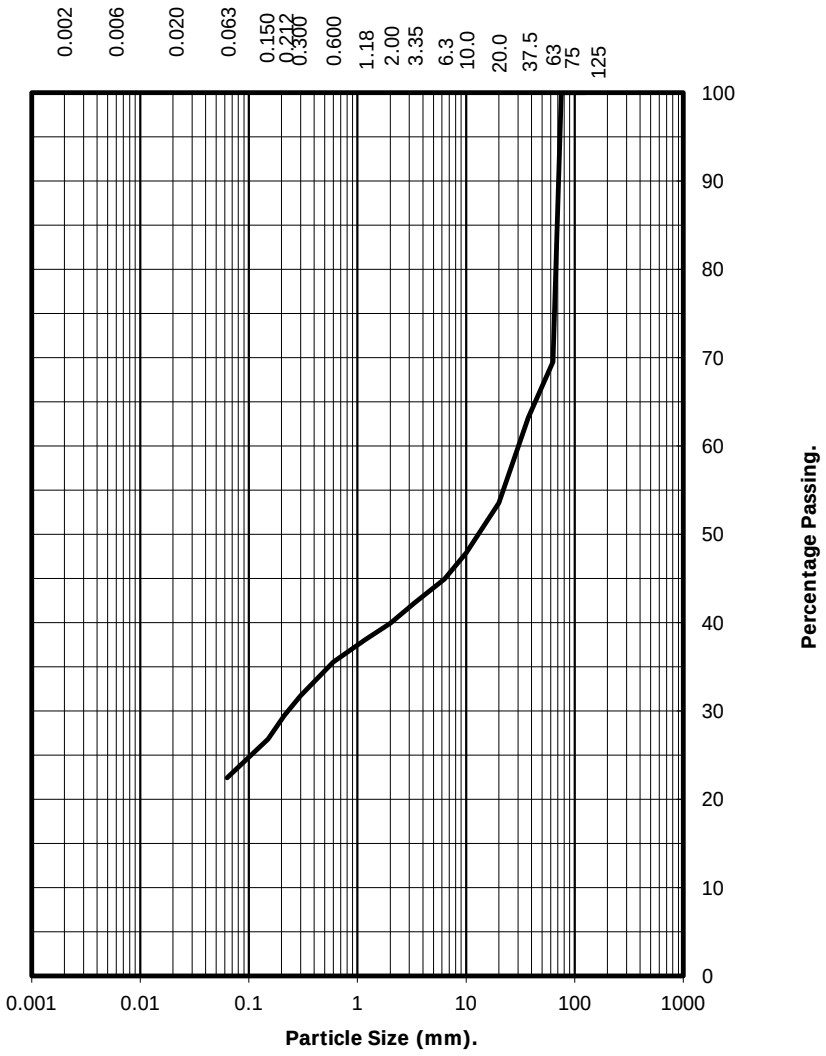
Depth to (m):

Sample Type: **B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	100
63	70
37.5	63
20	54
10	48
6.3	45
3.35	42
2.00	40
1.18	38
0.60	36
0.300	32
0.212	30
0.150	27
0.063	22

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	22	**18**	**30**	**30**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **8**

Depth from (m):

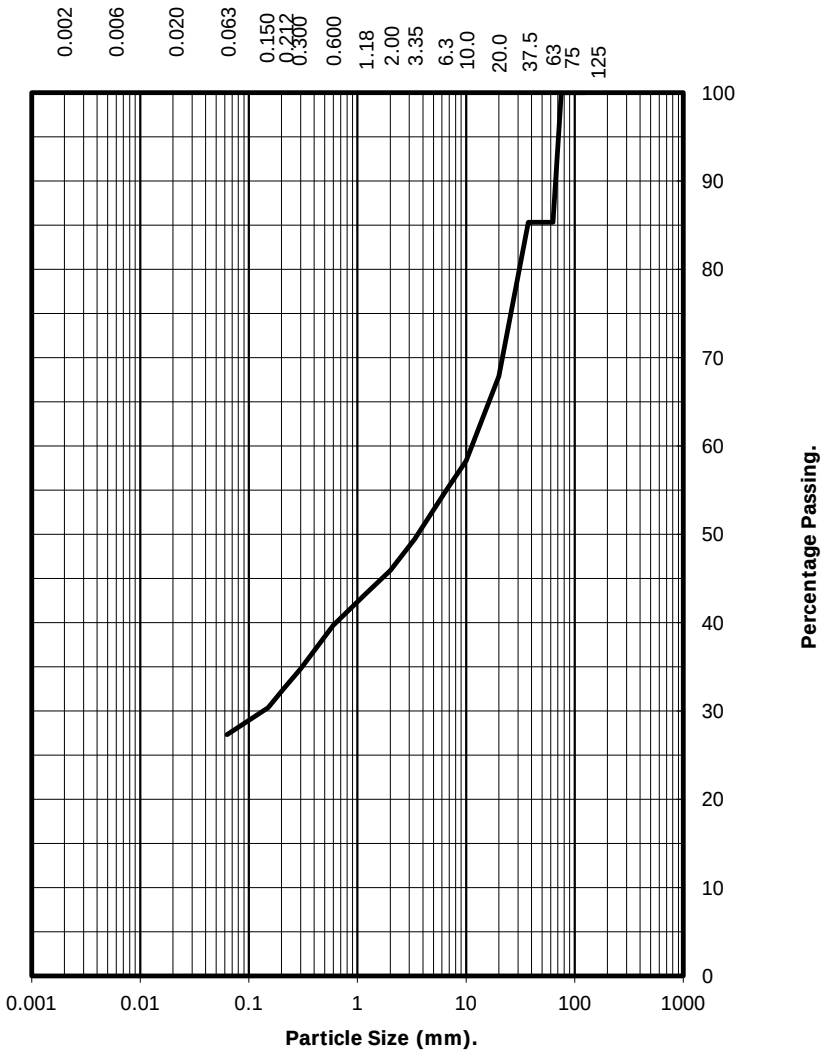
Depth to (m):

Sample Type: **B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	100
63	85
37.5	85
20	68
10	58
6.3	55
3.35	49
2.00	46
1.18	43
0.60	40
0.300	35
0.212	33
0.150	30
0.063	27

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	27	**19**	**39**	**15**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

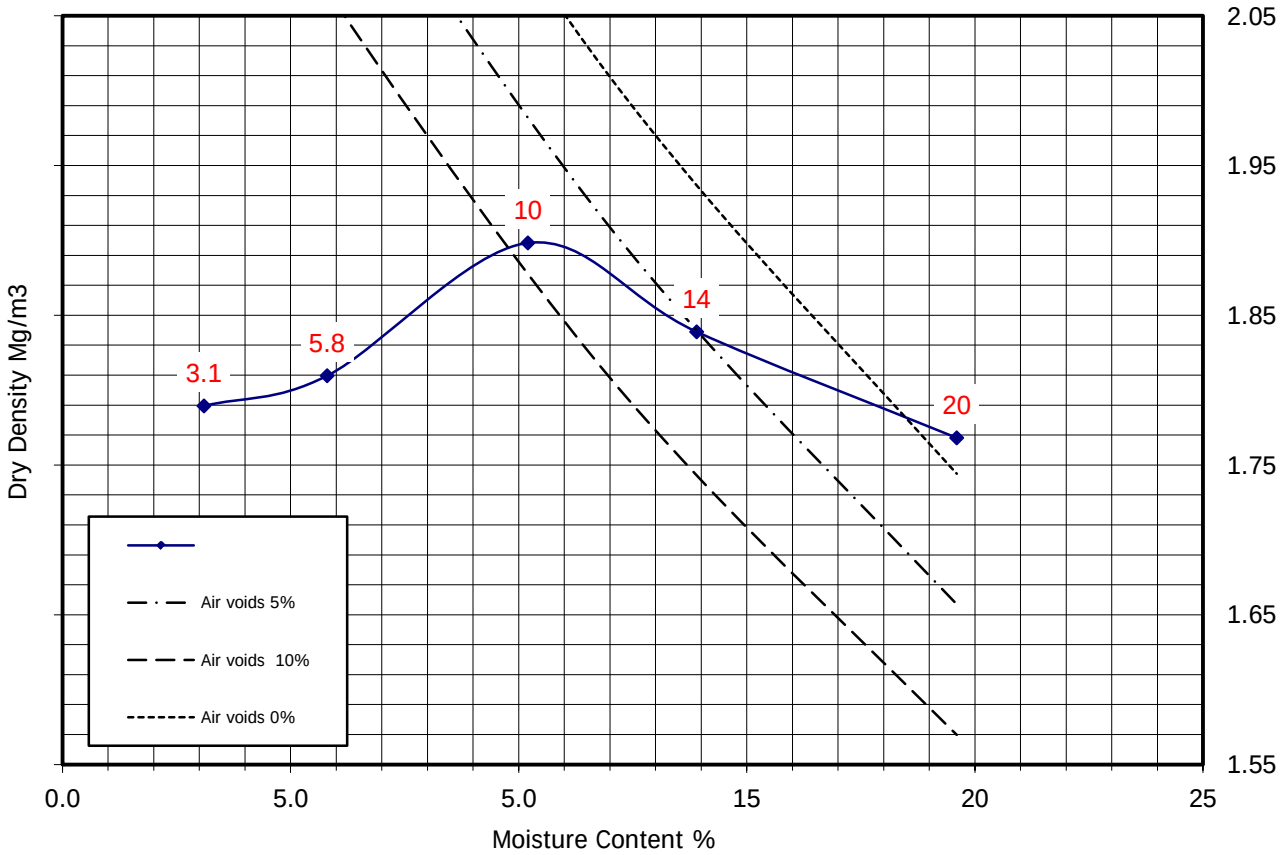
Contract Number: **25872-120215**

Hole Number:

Sample Number: **1**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.1	5.8	10	14	20
Bulk Density (Mg/m^3):	1.84	1.91	2.09	2.09	2.11
Dry Density (Mg/m^3):	1.79	1.81	1.90	1.84	1.77

Initial Moisture Content:	**20**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**32**
Maximum Dry Density (mg/m^3):	**1.90**	Material Retained on 20.0 mm Test Sieve (%):	**71**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 25.2.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

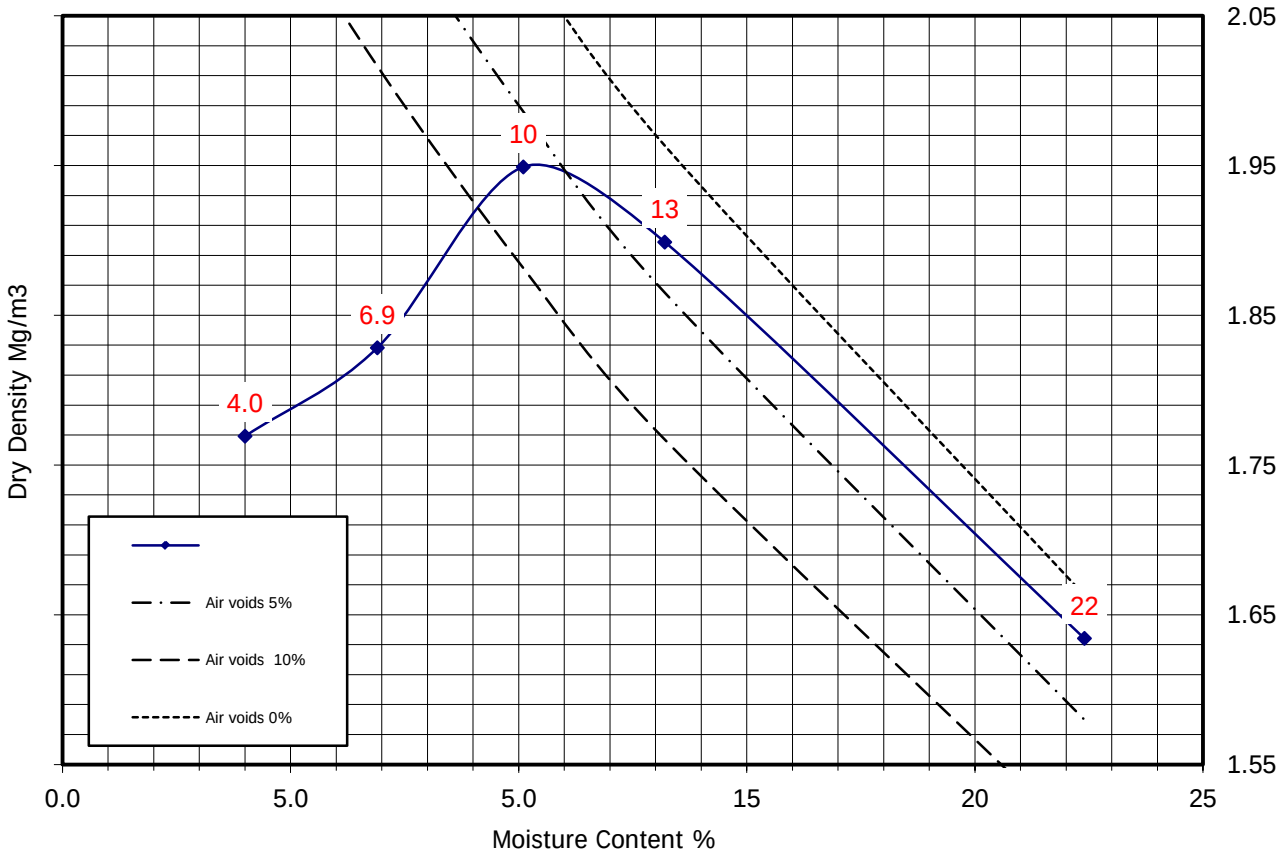
Contract Number: **25872-120215**

Hole Number:

Sample Number: **2**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	4.0	6.9	10	13	22
Bulk Density (Mg/m^3):	1.84	1.95	2.15	2.15	2.00
Dry Density (Mg/m^3):	1.77	1.83	1.95	1.90	1.63

Initial Moisture Content:	**22**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**34**
Maximum Dry Density (mg/m^3):	**1.95**	Material Retained on 20.0 mm Test Sieve (%):	**66**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 25.2.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

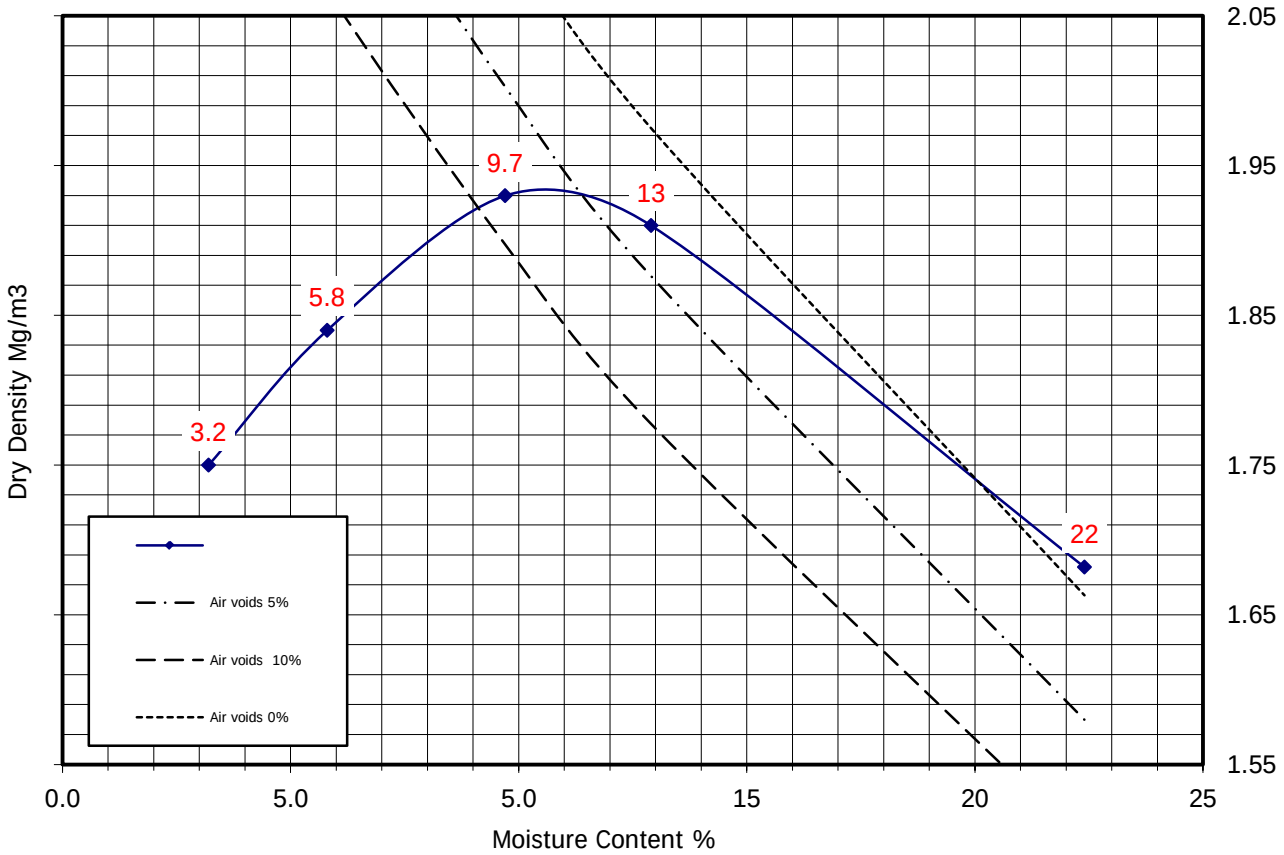
Contract Number: **25872-120215**

Hole Number:

Sample Number: **3**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.2	5.8	9.7	13	22
Bulk Density (Mg/m^3):	1.81	1.95	2.12	2.16	2.06
Dry Density (Mg/m^3):	1.75	1.84	1.93	1.91	1.68

Initial Moisture Content:	**22**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**23**
Maximum Dry Density (mg/m^3):	**1.93**	Material Retained on 20.0 mm Test Sieve (%):	**59**
Optimum Moisture Content (%):	**9.7**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 25.2.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

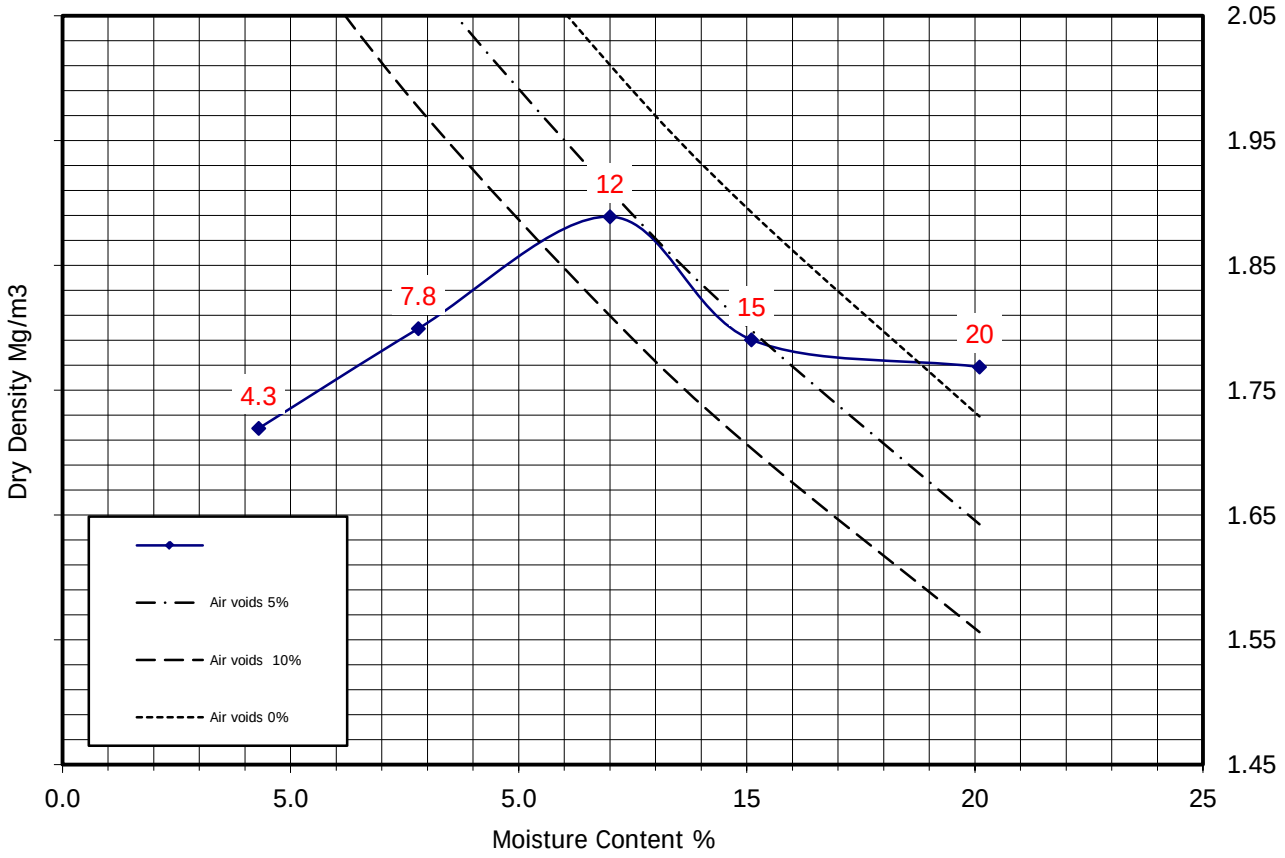
Contract Number: **25872-120215**

Hole Number:

Sample Number: **4**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	4.3	7.8	12	15	20
Bulk Density (Mg/m^3):	1.79	1.94	2.12	2.06	2.12
Dry Density (Mg/m^3):	1.72	1.80	1.89	1.79	1.77

Initial Moisture Content:	**15**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**40**
Maximum Dry Density (mg/m^3):	**1.89**	Material Retained on 20.0 mm Test Sieve (%):	**46**
Optimum Moisture Content (%):	**12**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: **25.2.15**

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

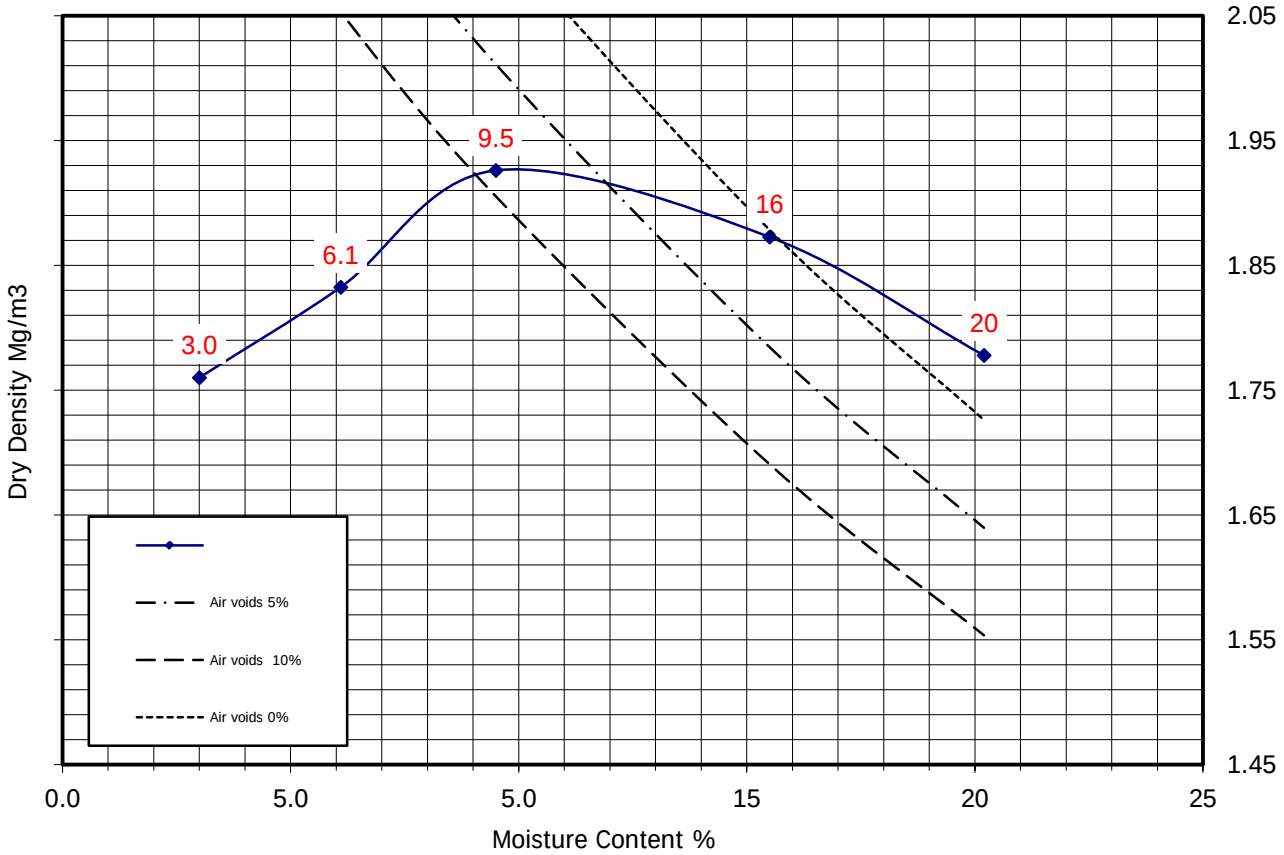
Contract Number: **25872-120215**

Hole Number:

Sample Number: **5**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.0	6.1	9.5	16	20
Bulk Density (Mg/m^3):	1.81	1.94	2.11	2.16	2.14
Dry Density (Mg/m^3):	1.76	1.83	1.93	1.87	1.78

Initial Moisture Content:	**20**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**10**
Maximum Dry Density (mg/m^3):	**1.93**	Material Retained on 20.0 mm Test Sieve (%):	**20**
Optimum Moisture Content (%):	**9.5**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: **25.2.15**

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

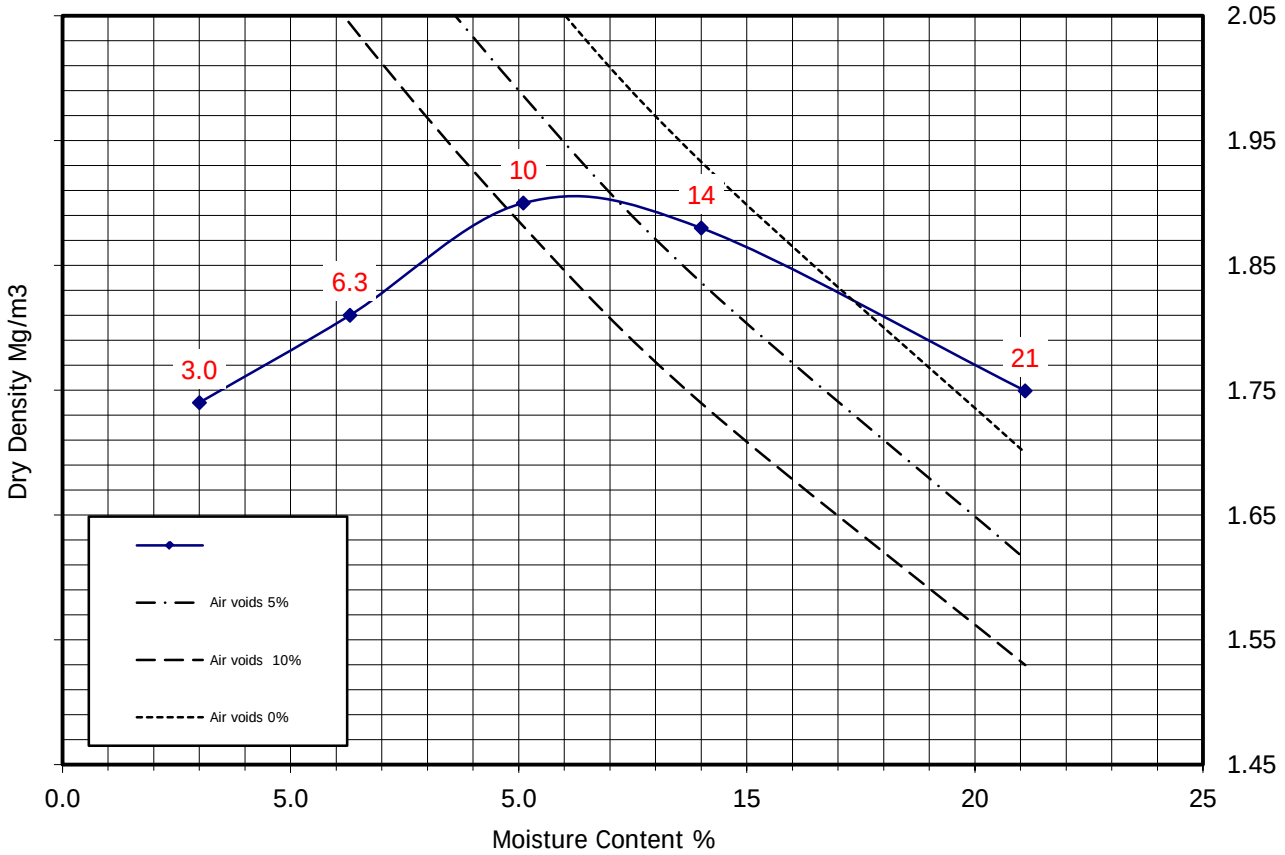
Contract Number: **25872-120215**

Hole Number:

Sample Number: **6**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.0	6.3	10	14	21
Bulk Density (Mg/m^3):	1.79	1.92	2.09	2.14	2.12
Dry Density (Mg/m^3):	1.74	1.81	1.90	1.88	1.75

Initial Moisture Content:	**21**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**14**
Maximum Dry Density (mg/m^3):	**1.90**	Material Retained on 20.0 mm Test Sieve (%):	**59**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: **25.2.15**

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

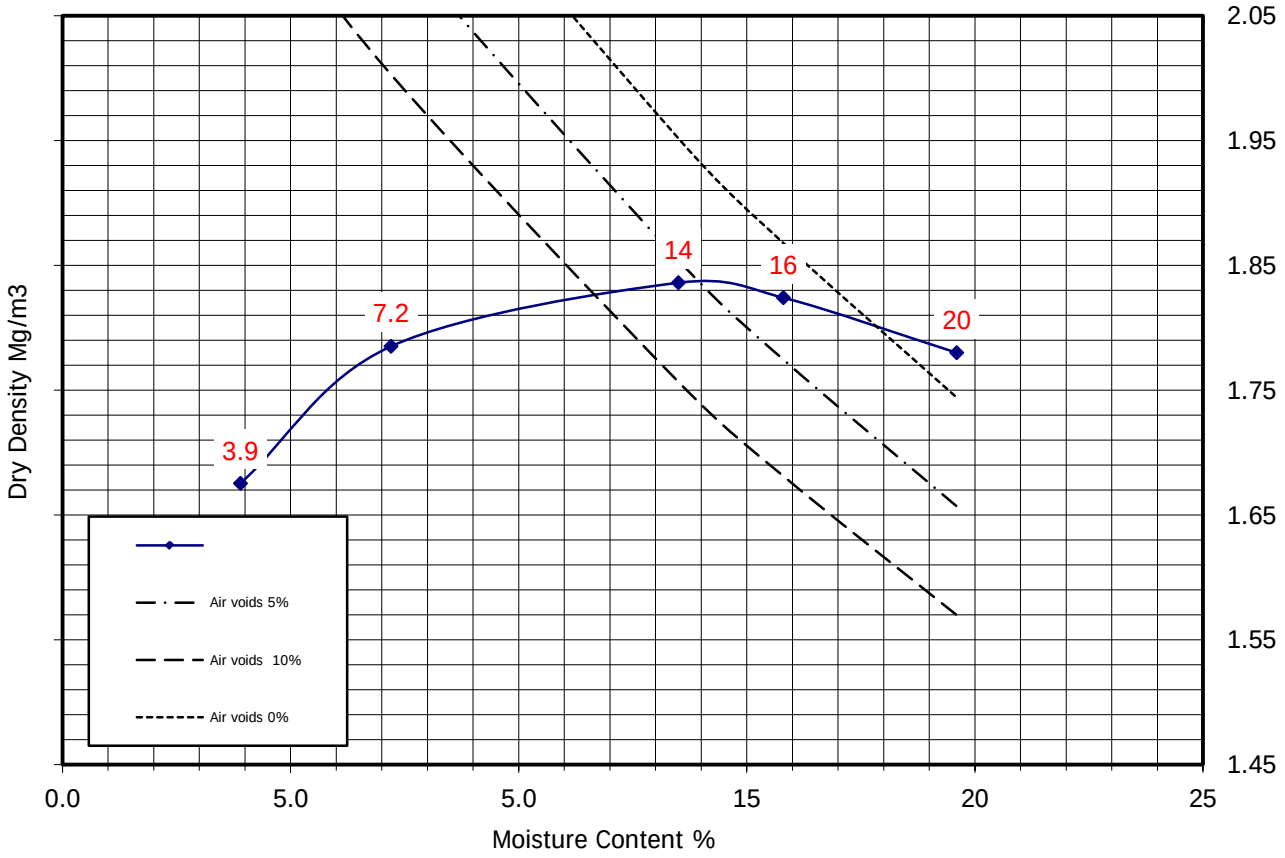
Contract Number: **25872-120215**

Hole Number:

Sample Number: **7**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.9	7.2	14	16	20
Bulk Density (Mg/m^3):	1.74	1.91	2.08	2.11	2.13
Dry Density (Mg/m^3):	1.68	1.79	1.84	1.82	1.78

Initial Moisture Content:	**16**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**37**
Maximum Dry Density (mg/m^3):	**1.84**	Material Retained on 20.0 mm Test Sieve (%):	**46**
Optimum Moisture Content (%):	**14**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 25.2.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

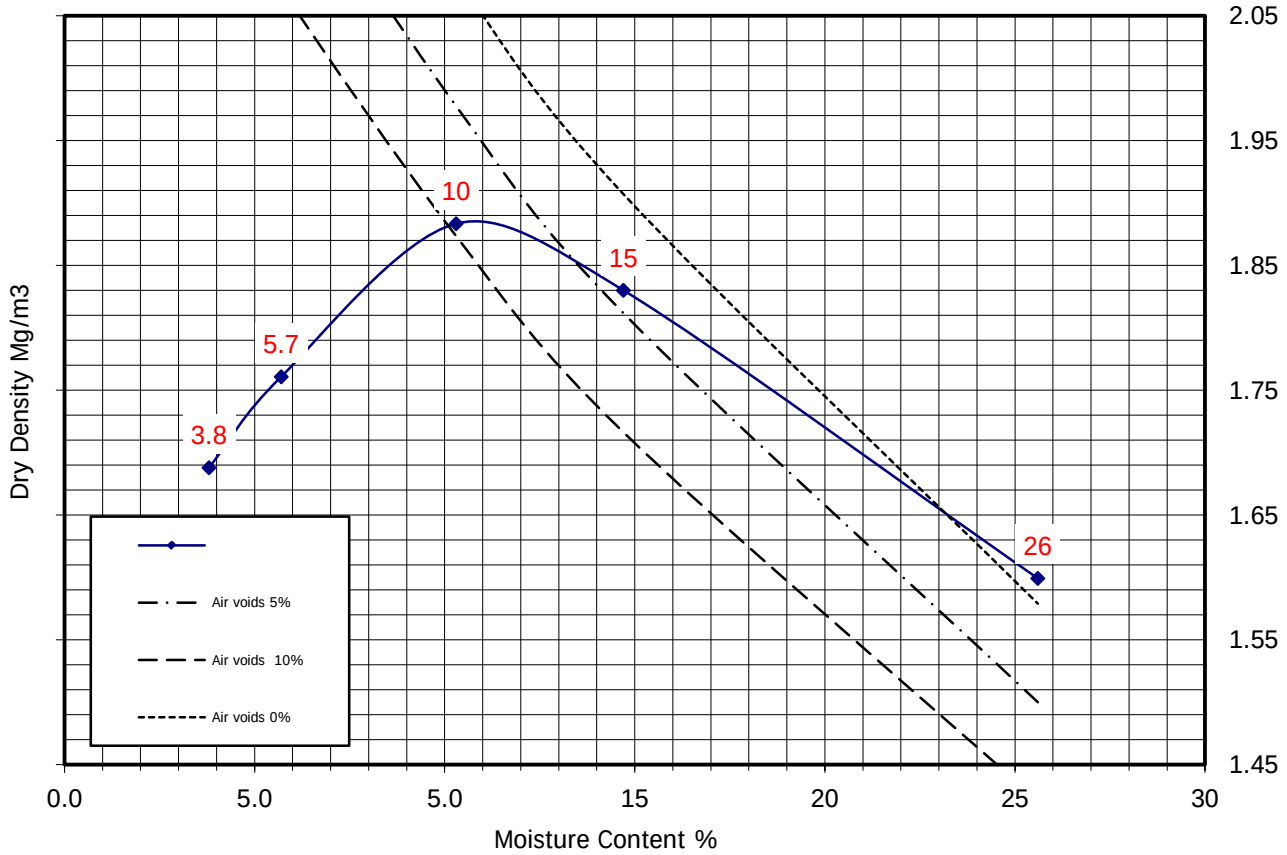
Contract Number: **25872-120215**

Hole Number:

Sample Number: **8**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.8	5.7	10	15	26
Bulk Density (Mg/m^3):	1.75	1.86	2.08	2.10	2.01
Dry Density (Mg/m^3):	1.69	1.76	1.88	1.83	1.60

Initial Moisture Content:	**26**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**15**
Maximum Dry Density (mg/m^3):	**1.88**	Material Retained on 20.0 mm Test Sieve (%):	**32**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 25.2.15

UKAS TESTING
2788

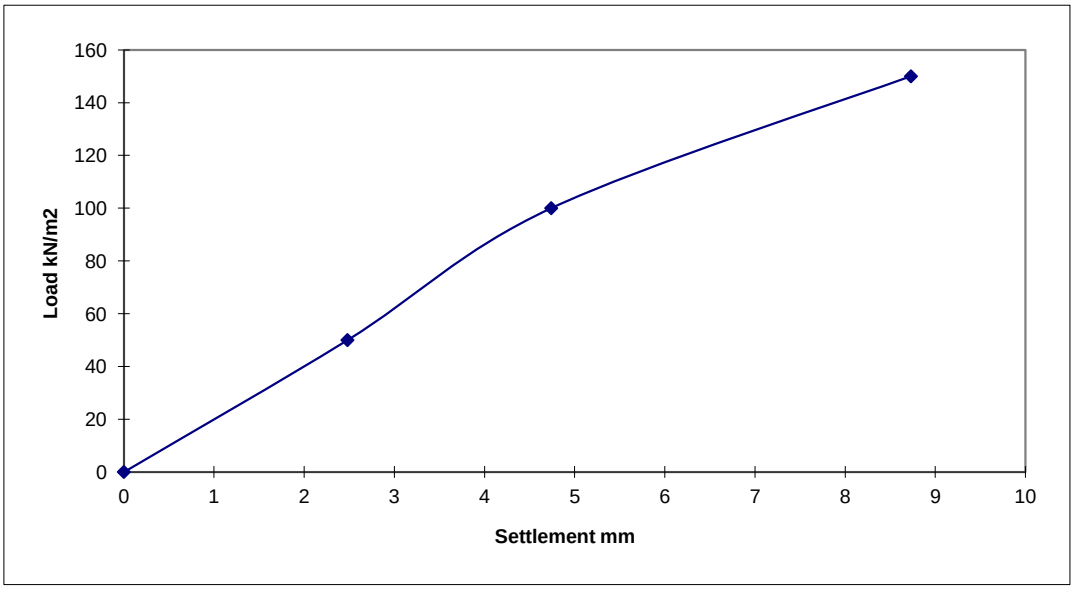
ANNEX E
In-situ Geotechnical Test Results

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: Test 1	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.48	50	50
4.74	100	100
8.73	150	150



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

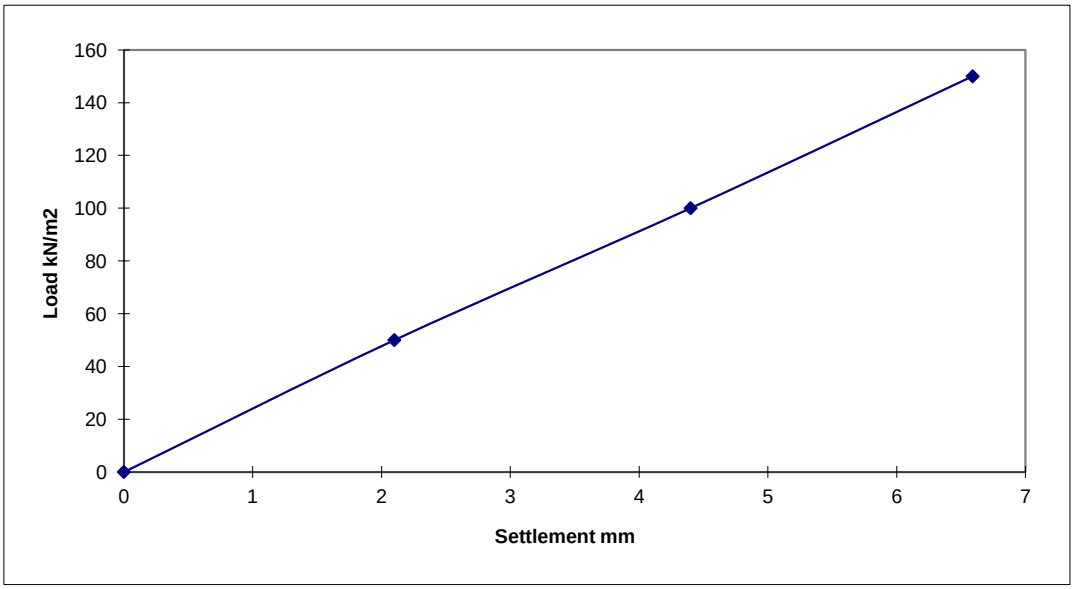
CONTRACT: Herbert Road, Newport	Date: 24.07.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: Test 3	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.10	50	50
4.40	100	100
6.59	150	150



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SGT
SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

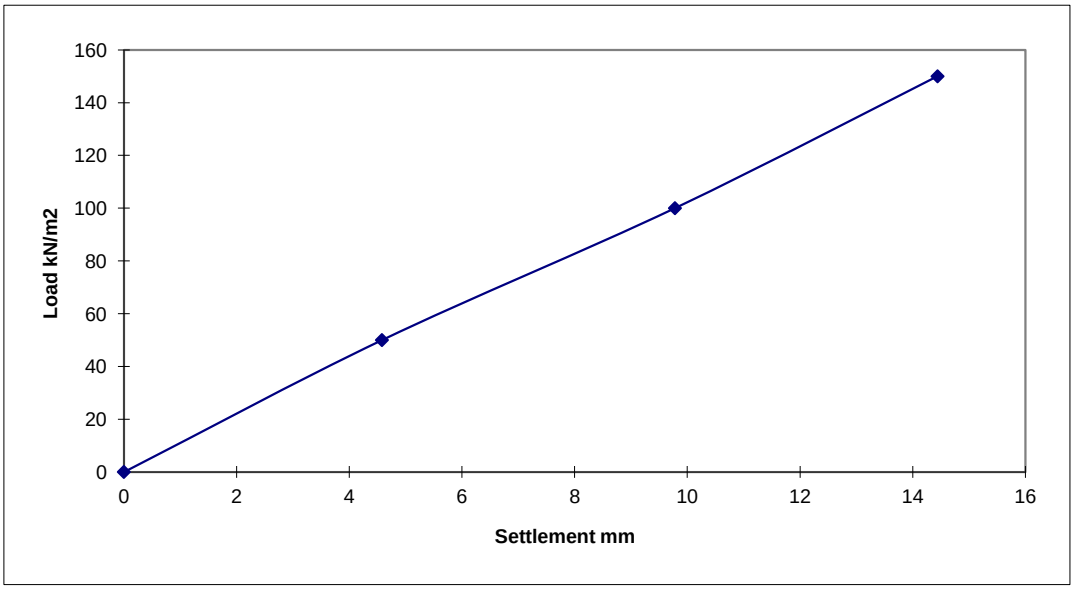
CONTRACT: Herbert Road, Newport	Date: 24.07.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: Test 5	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
4.58	50	50
9.78	100	100
14.44	150	150



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

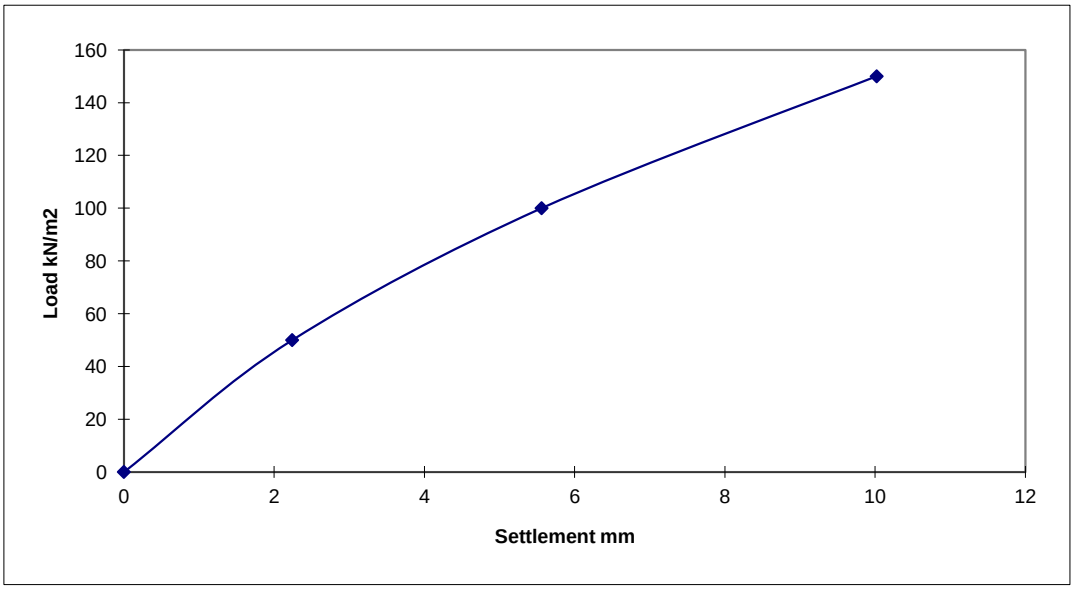
CONTRACT: Herbert Road, Newport	Date: 24.07.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: Test 6	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.24	50	50
5.56	100	100
10.02	150	150



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SGT
SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

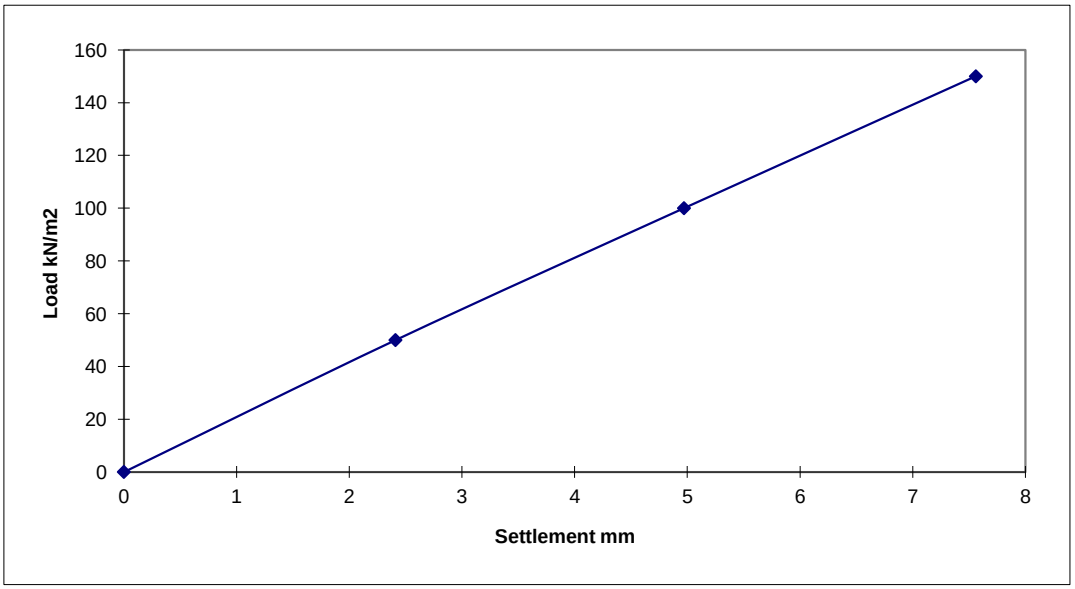
CONTRACT: Herbert Road, Newport	Date: 24.07.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: Test 7	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.41	50	50
4.97	100	100
7.56	150	150



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Herbert Road, Newport	Date: 24.07.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	7260	g
4.Weight of soil from excavation	(C3)	6494	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	4840	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.08	Mg/m^3
9. Moisture content of soil:	(C8)	7.89	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.93	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 1

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING
IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6830	g
4.Weight of soil from excavation	(C3)	6471	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5270	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	1.90	Mg/m^3
9. Moisture content of soil:	(C8)	6.52	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.79	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 2

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	5900	g
4.Weight of soil from excavation	(C3)	7997	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	6200	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.00	Mg/m^3
9. Moisture content of soil:	(C8)	9.75	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.82	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 3

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6752	g
4.Weight of soil from excavation	(C3)	6597	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5348	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	1.91	Mg/m^3
9. Moisture content of soil:	(C8)	5.78	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.81	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 4

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	7509	g
4.Weight of soil from excavation	(C3)	6111	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	4591	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.06	Mg/m^3
9. Moisture content of soil:	(C8)	8.40	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.90	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 5

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	7685	g
4.Weight of soil from excavation	(C3)	6140	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	4415	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.16	Mg/m^3
9. Moisture content of soil:	(C8)	8.90	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.98	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 6

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	7617	g
4.Weight of soil from excavation	(C3)	5890	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	4483	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.04	Mg/m^3
9. Moisture content of soil:	(C8)	6.06	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.92	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 7

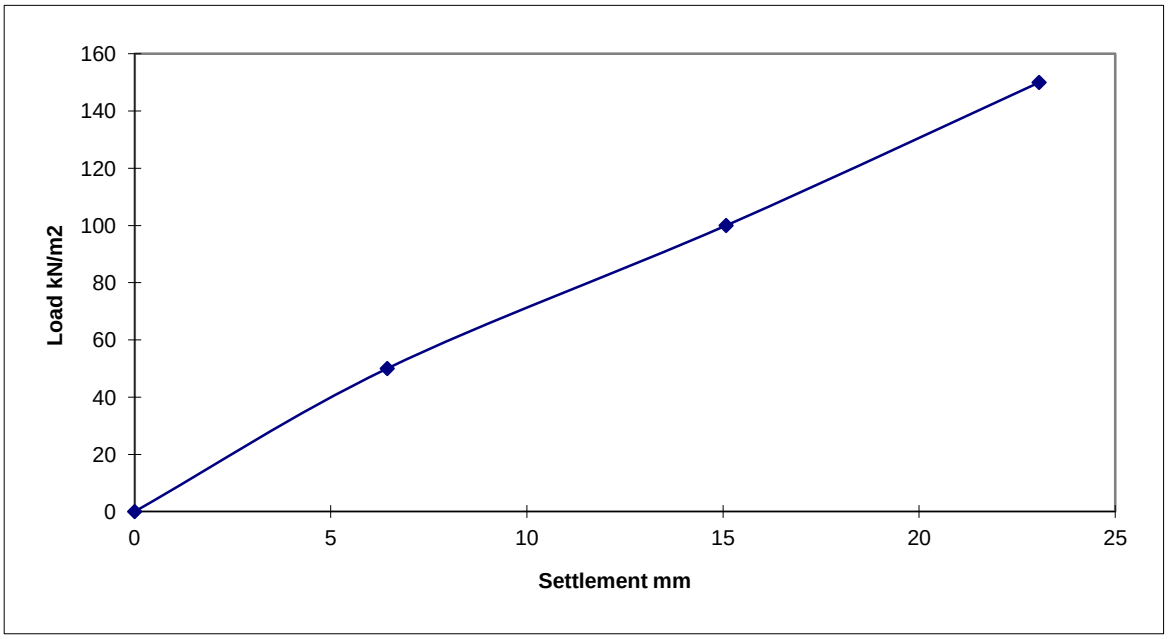
In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 1	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
6.44	50	12
15.08	100	24
23.06	150	36



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

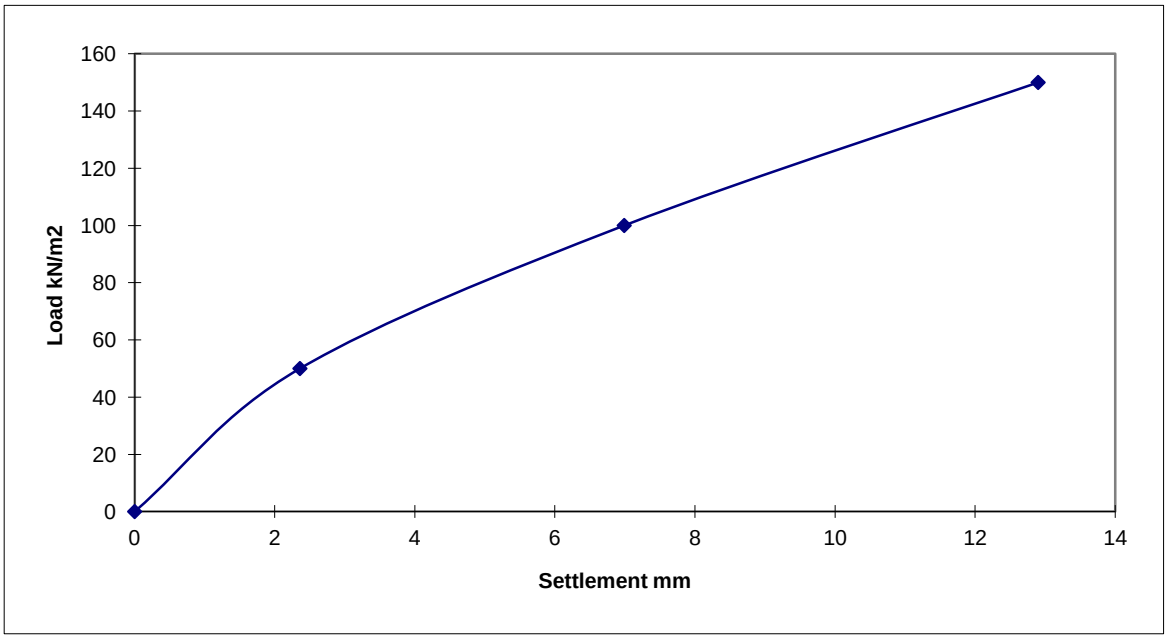
CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 2	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.36	50	5
6.99	100	11
12.90	150	19



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 3	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.90	50	3
3.77	100	8
5.12	150	13

Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

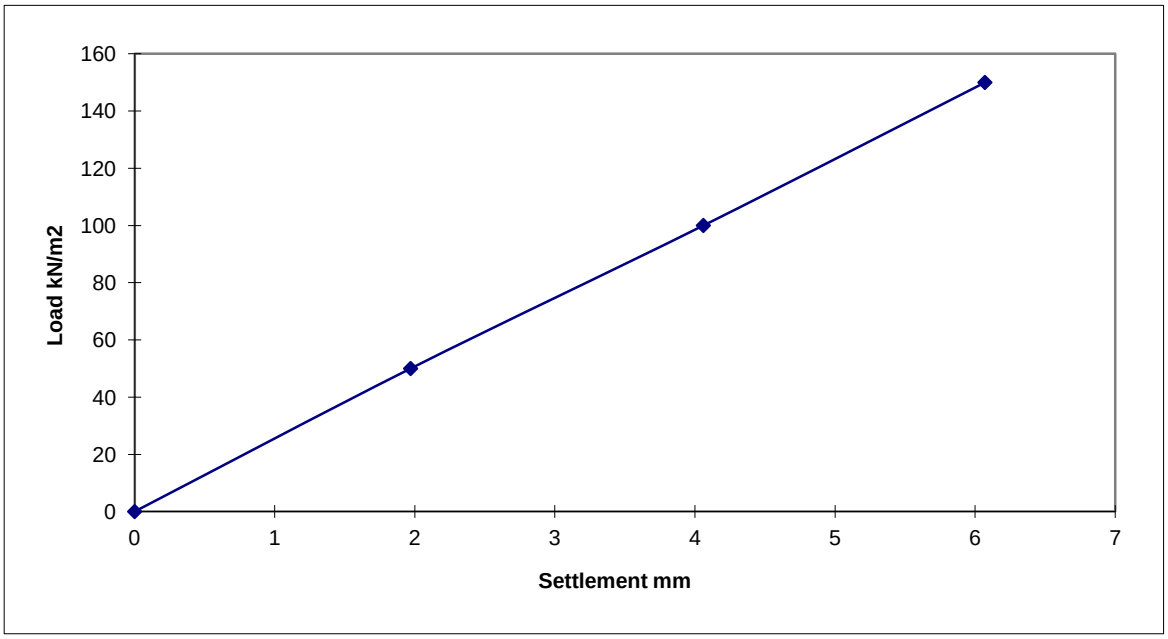
CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 4	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.97	50	4
4.06	100	9
6.07	150	15



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

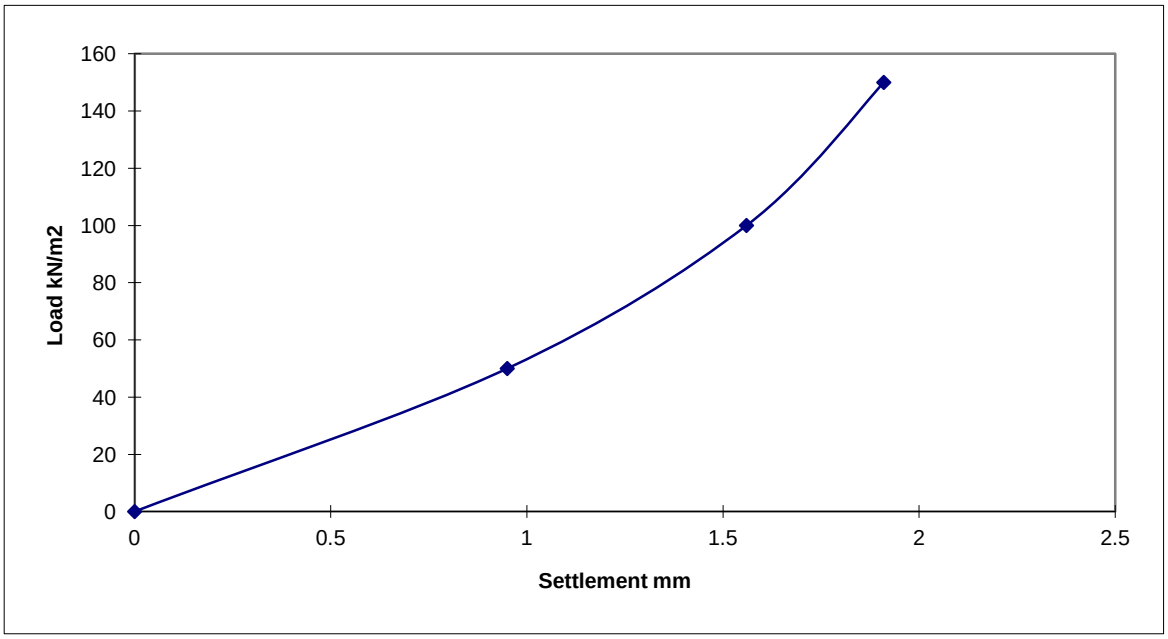
CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 5	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
0.95	50	3
1.56	100	6
1.91	150	9



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

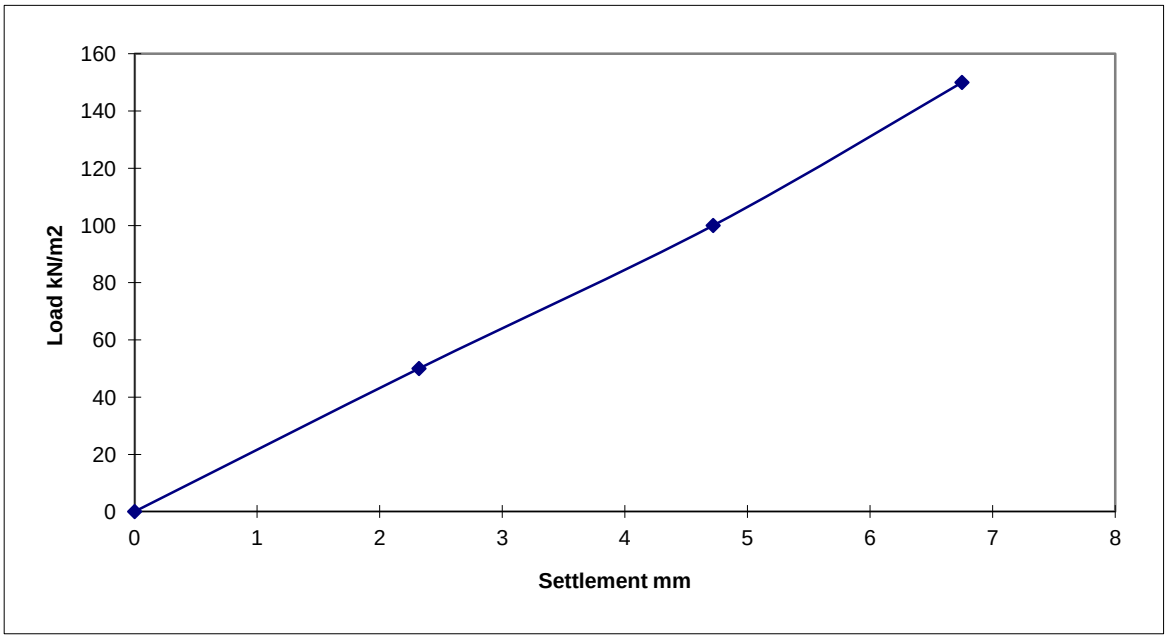
CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 6	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.32	50	4
4.72	100	8
6.75	150	12



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

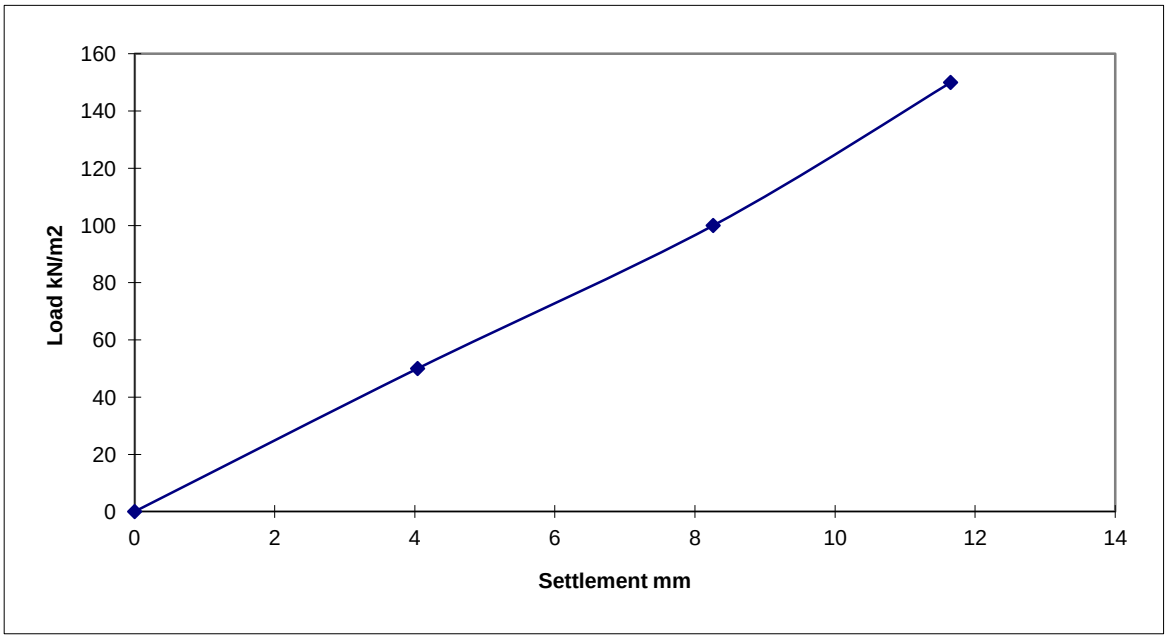
CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 7	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
4.04	50	4
8.26	100	9
11.65	150	15



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown clayey gravel	TEST DEPTH: GL DATE: 14.09.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6420	g
4.Weight of soil from excavation	(C3)	7600	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5680	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.07	Mg/m^3
9. Moisture content of soil:	(C8)	15.97	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.79	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 1

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown clayey gravel	TEST DEPTH: GL DATE: 14.09.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	7580	g
4.Weight of soil from excavation	(C3)	6350	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	4520	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.18	Mg/m^3
9. Moisture content of soil:	(C8)	8.58	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	2.01	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 2

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown clayey gravel	TEST DEPTH: GL DATE: 14.09.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6250	g
4.Weight of soil from excavation	(C3)	7950	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5850	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.11	Mg/m^3
9. Moisture content of soil:	(C8)	8.23	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.95	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 3

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 05.08.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6900	g
4.Weight of soil from excavation	(C3)	7650	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5200	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.28	Mg/m^3
9. Moisture content of soil:	(C8)	18.26	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.93	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 2

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 05.08.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	5650	g
4.Weight of soil from excavation	(C3)	9550	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	6450	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.29	Mg/m^3
9. Moisture content of soil:	(C8)	16.17	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.98	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 3

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 05.08.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6750	g
4.Weight of soil from excavation	(C3)	7890	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5350	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.29	Mg/m^3
9. Moisture content of soil:	(C8)	18.40	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.93	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 4

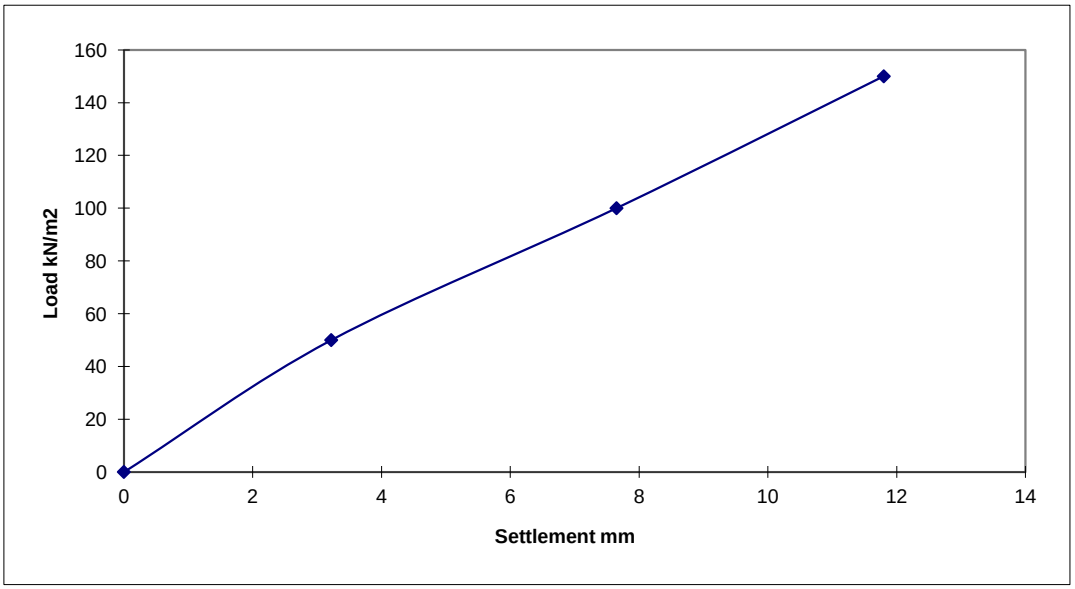
In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Test 1	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.22	50	5
7.65	100	10
11.80	150	21



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

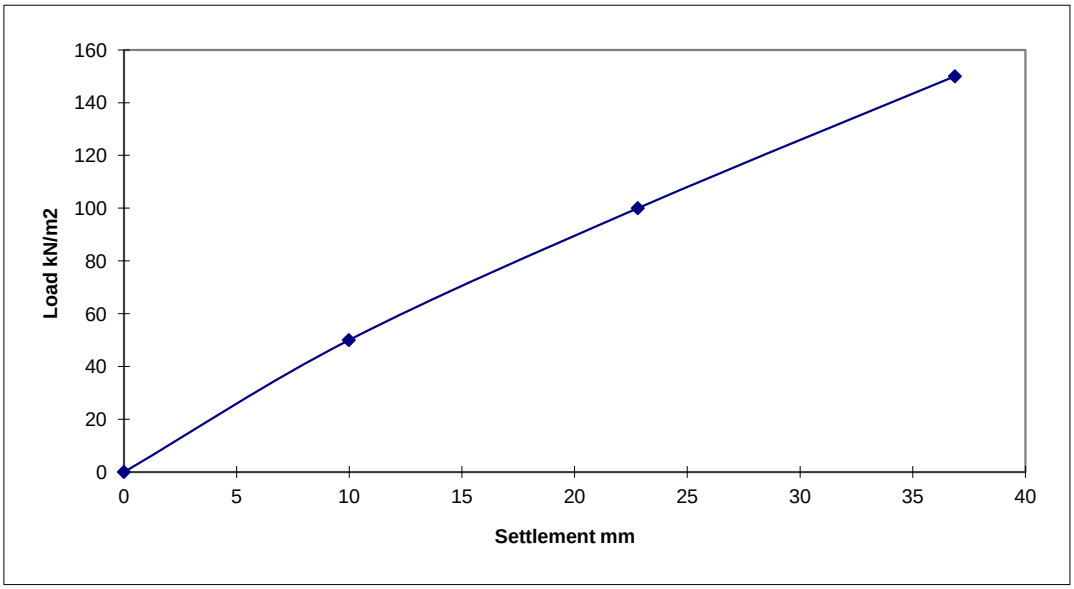
CONTRACT:	Date: 05.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Test 2	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
9.98	50	10
22.80	100	15
36.87	150	18



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

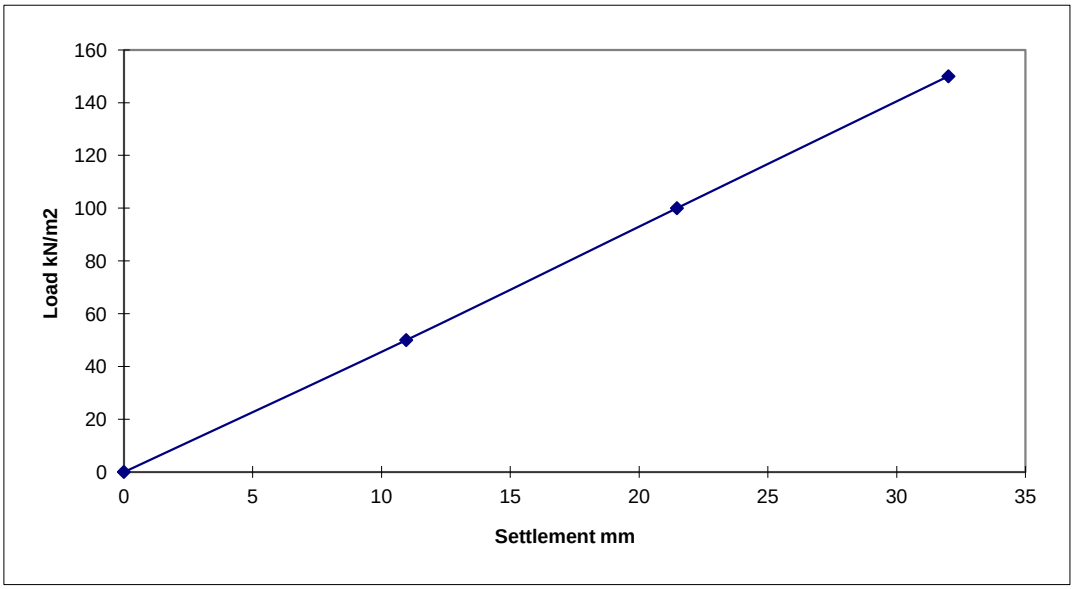
CONTRACT:	Date: 05.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Test 3	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
10.96	50	10
21.47	100	15
32.01	150	20



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

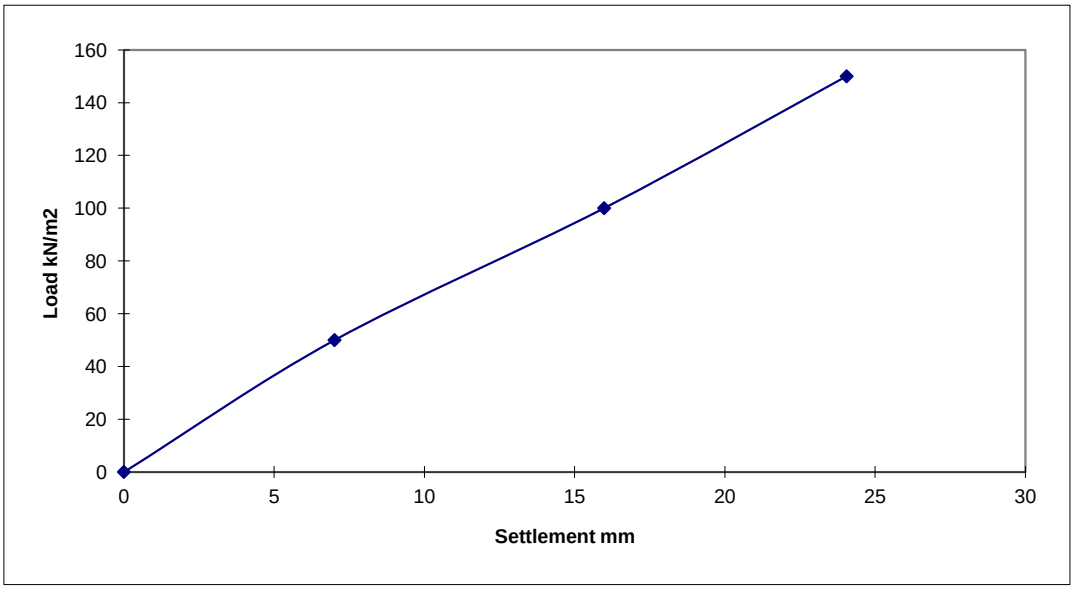
CONTRACT:	Date: 05.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Test 4	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
7.01	50	10
15.98	100	20
24.05	150	30



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

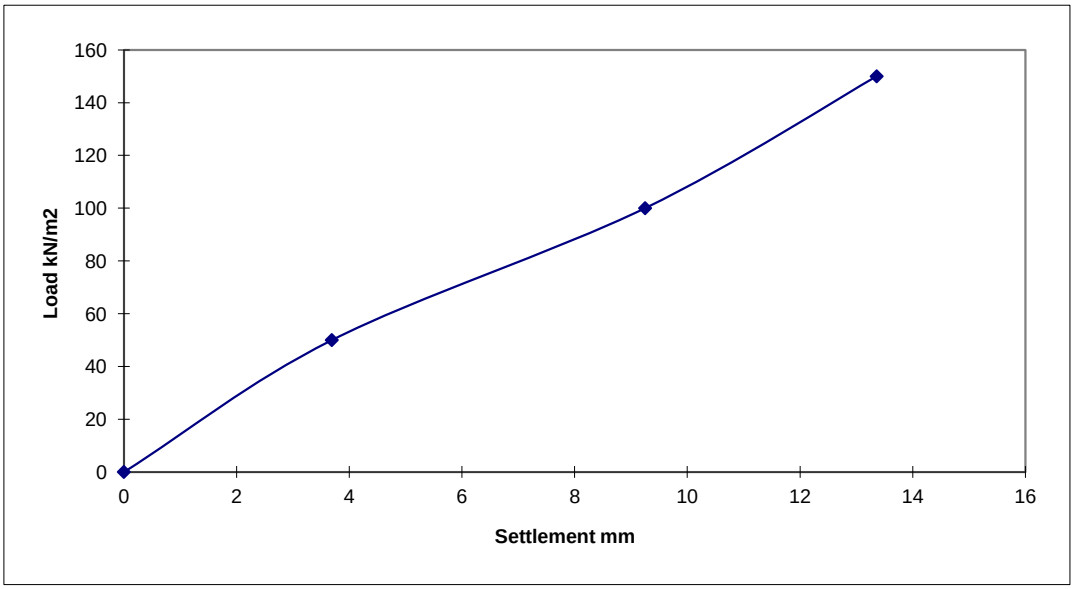
CONTRACT:	Date: 05.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Test 5	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.69	50	5
9.25	100	15
13.36	150	25



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

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SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

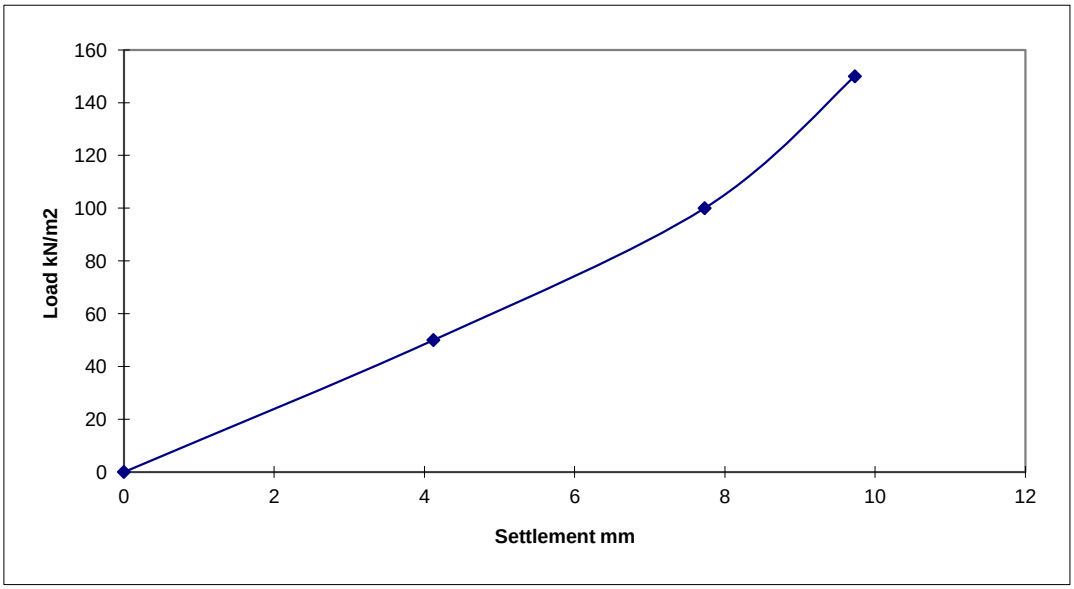
CONTRACT:	Date: 05.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 8	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
4.12	50	5
7.73	100	13
9.73	150	17



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

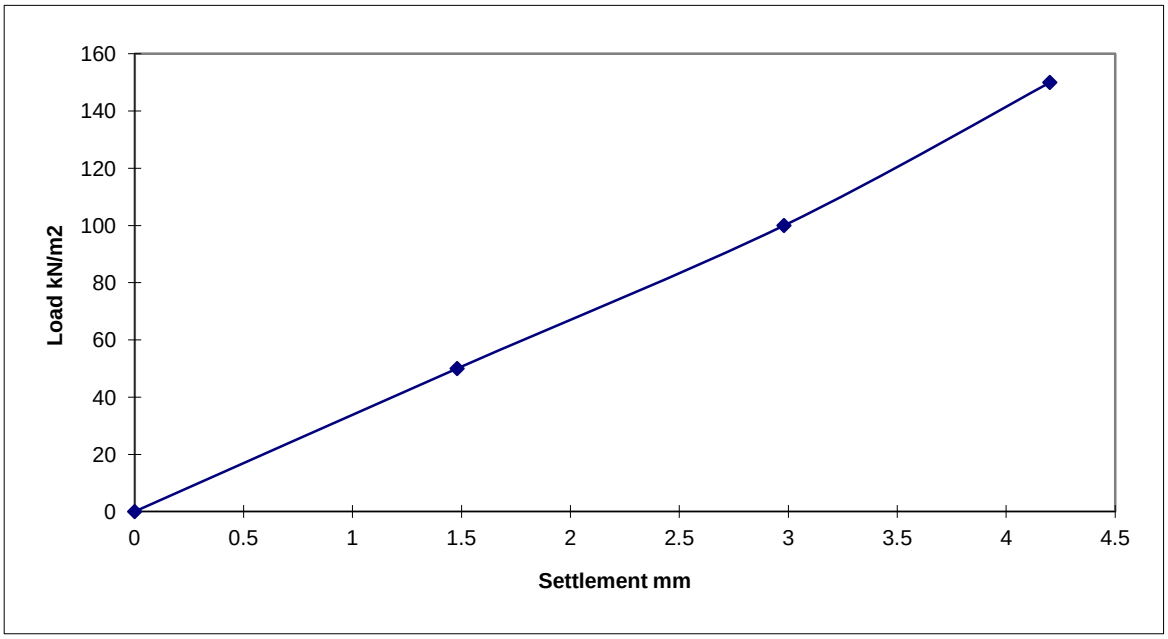
CONTRACT:	Date: 18.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 1	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.48	50	3
2.98	100	6
4.20	150	13



Notes:

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2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

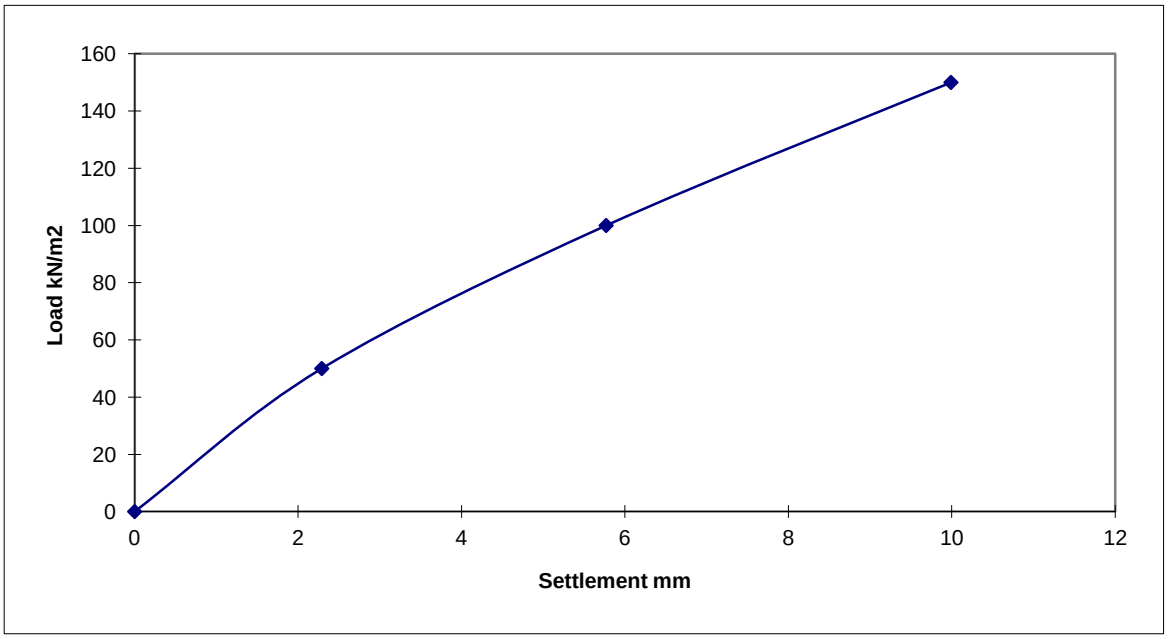
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 2	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.29	50	6
5.77	100	12
9.99	150	20



Notes:

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2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

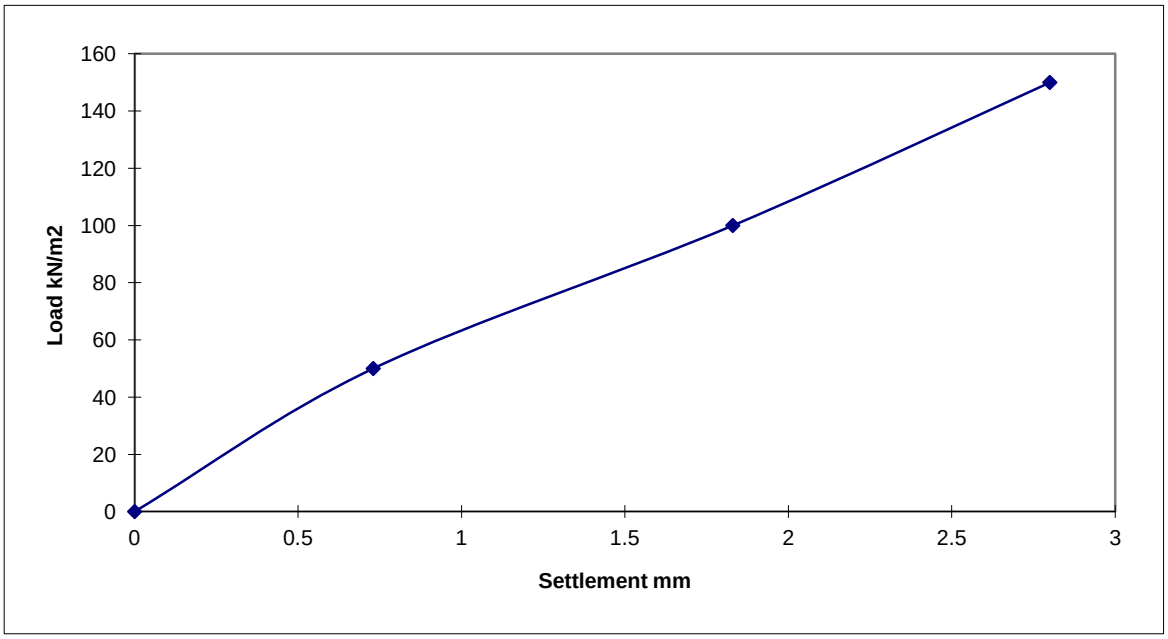
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 3	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
0.73	50	3
1.83	100	6
2.80	150	13



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

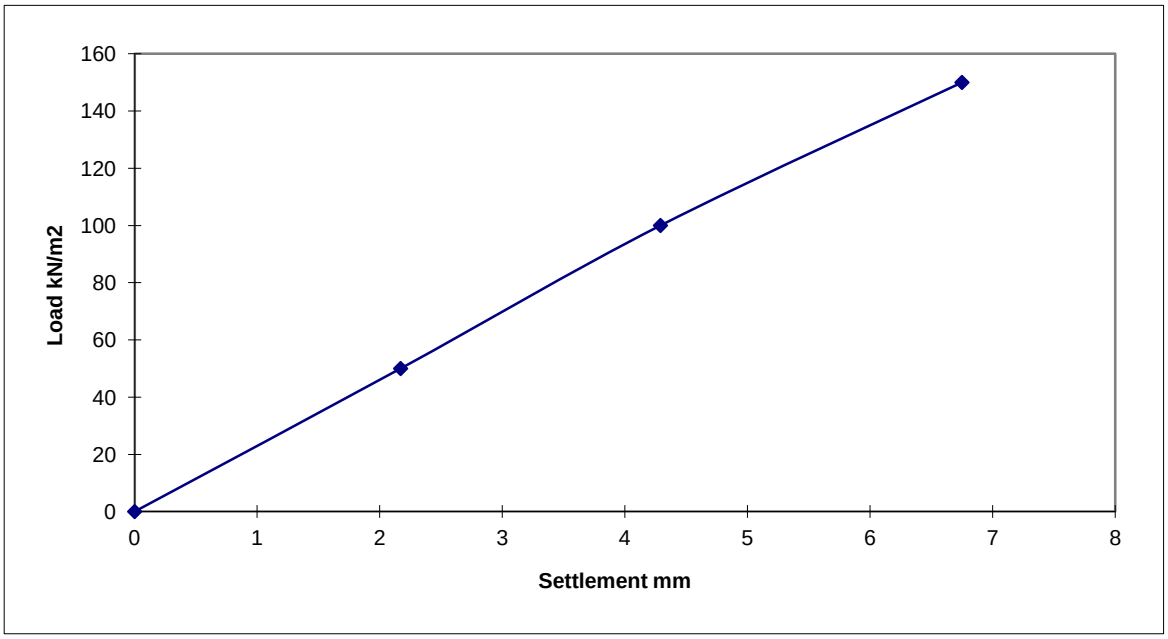
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 4	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.17	50	5
4.29	100	10
6.75	150	17



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

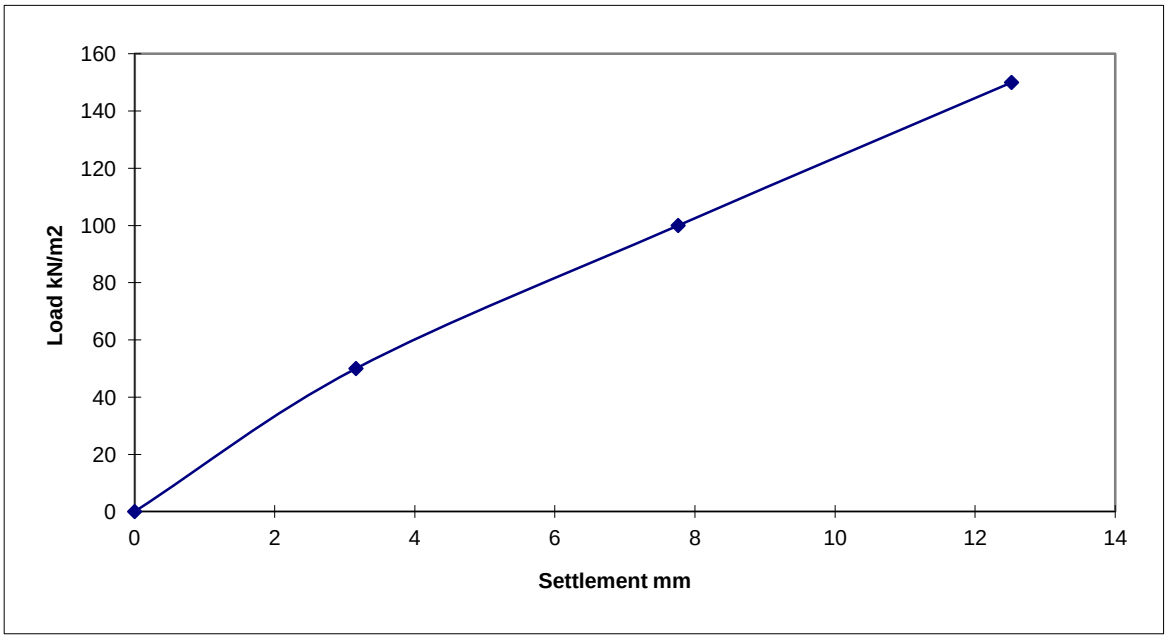
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 5	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.16	50	5
7.76	100	12
12.52	150	21



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

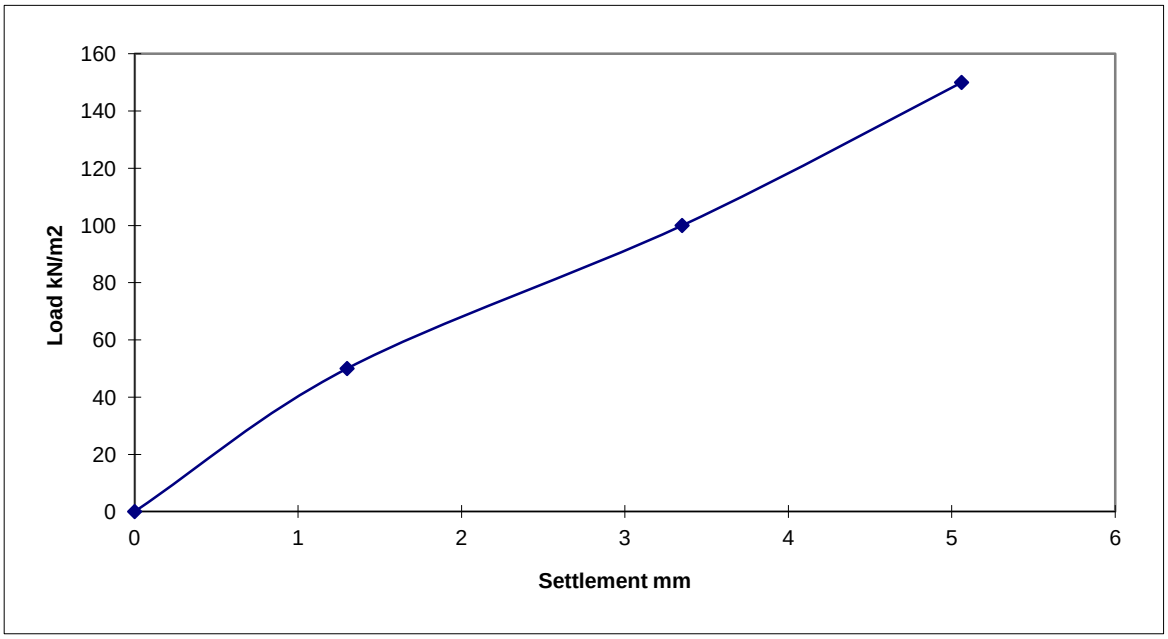
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 6	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.30	50	4
3.35	100	11
5.06	150	15



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

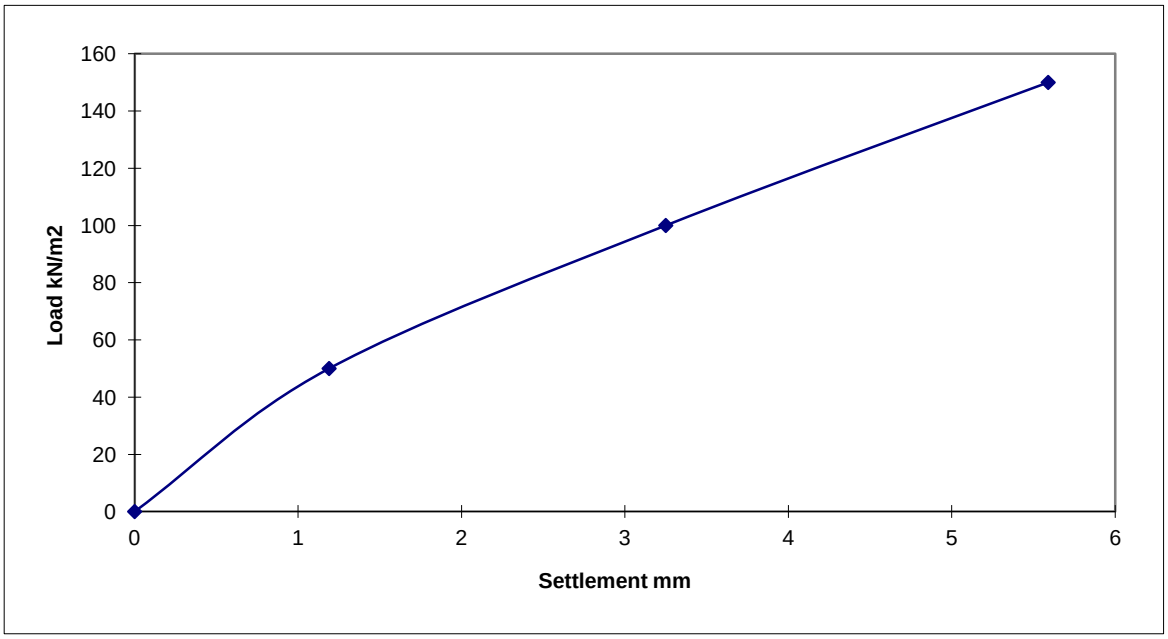
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 7	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.19	50	4
3.25	100	9
5.59	150	20



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

ANNEX F
Groundwater and Reen Chemical Test Results

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-41183

03-Aug-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-41183

Client Reference 12032

Contract Title HERBERT ROAD-ROUND 1

Description 7 Water samples.

Date Received 27-Jul-15

Date Started 27-Jul-15

Date Completed 03-Aug-15

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Richard Bennett
Managing Director

UKAS TESTING
2139

Summary of Chemical Analysis
Water Samples

Our Ref 15-41183
Client Ref 12032
Contract Title HERBERT ROAD-ROUND 1

			Lab No	844518	844519	844520	844521	844522	844523	844524
			Sample ID	BH1	BH2	BH3	BH4	BH5	BH6	REEN
			Depth							
			Other ID							
			Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER
			Sampling Date	23/07/15	23/07/15	23/07/15	23/07/15	23/07/15	23/07/15	23/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	8.1	10	5.2	0.48	1.4	1.4	1.6
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.32	< 0.25	1.3	0.66	< 0.25	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.7	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.38	< 0.09	0.12	< 0.09	< 0.09	< 0.09	0.18
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.3	0.6	1.8	< 0.5	1.0	1.4	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.43	< 0.25	4.3	0.83	3.2	220	2.0
Zinc, Dissolved	DETSC 2306	1.25	ug/l	3.41	3.49	2.45	1.90	10.9	15.1	< 1.25
Inorganics										
Conductivity	DETSC 2009	1	uS/cm	6960	3460	5490	744	1410	5950	590
pH	DETSC 2008			7.1	7.5	7.3	7.8	7.5	7.1	7.6
Total Biochemical Oxygen Demand	DETSC 2031	1	mg/l	13	5.8	1.6	1.2	3.9	9.1	4.6
Total Chemical Oxygen Demand	DETSC 2032	10	mg/l	360	830	710	57	620	880	270
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40	< 40
Hardness	DETSC 2303	0.1	mg/l	954	541	834	254	353	850	188
Sulphate as SO4	DETSC 2055	0.1	mg/l	30	58	70	28	26	120	34
Sulphide	DETSC 2208	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 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	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 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	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 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	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 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	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	1.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	7.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	12	< 1.0	< 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	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	21	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	21	< 10	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	40	28	55	16	68	64	67

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

Summary of Chemical Analysis
Water Samples

Our Ref 15-41183
Client Ref 12032
Contract Title HERBERT ROAD-ROUND 1

			Lab No	844518	844519	844520	844521	844522	844523	844524
			Sample ID	BH1	BH2	BH3	BH4	BH5	BH6	REEN
			Depth							
			Other ID							
			Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER
			Sampling Date	23/07/15	23/07/15	23/07/15	23/07/15	23/07/15	23/07/15	23/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
PAHs										
Naphthalene	DETS 074*	0.01	ug/l	0.03	0.04	0.02	< 0.01	< 0.01	0.06	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	0.04	0.03	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	0.03	0.03	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	0.09	0.03	0.03	< 0.01	< 0.01	0.03	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.21	< 0.01
Pyrene	DETS 074*	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.13	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	0.22	< 0.20	< 0.20	< 0.20	< 0.20	0.42	< 0.20
PCBs										
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
PCB 138	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenols										
Phenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
4-Chloro-3-methylphenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dichlorophenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dimethylphenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
p-cresol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,6-Dimethylphenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,6-Dichlorophenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4,6-Trichlorophenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

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

Information in Support of the Analytical Results

Our Ref 15-41183
Client Ref 12032
Contract HERBERT ROAD-ROUND 1

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
844518	BH1 WATER	23/07/15	GB 1L, GV x2, PB 1L	BOD (2 days)	
844519	BH2 WATER	23/07/15	GB 1L, GV x2, PB 1L	BOD (2 days)	
844520	BH3 WATER	23/07/15	GB 1L, GV x2, PB 1L	BOD (2 days)	
844521	BH4 WATER	23/07/15	GB 1L, GV x2, PB 1L	BOD (2 days)	
844522	BH5 WATER	23/07/15	GB 1L, GV x2, PB 1L	BOD (2 days)	
844523	BH6 WATER	23/07/15	GB 1L, GV x2, PB 1L	BOD (2 days)	
844524	REEN WATER	23/07/15	GB 1L, GV x2, PB 1L	BOD (2 days)	

Key: G-Glass P-Plastic B-Bottle V-Vial

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 and/or inappropriate containers 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.

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

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 16-55306

19-Jan-16

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference	16-55306
Client Reference	12032
Order No	12032
Contract Title	Herbert Road - Round 2
Description	5 Water samples.
Date Received	13-Jan-16
Date Started	13-Jan-16
Date Completed	19-Jan-16
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Water Samples

Our Ref 16-55306
Client Ref 12032
Contract Title Herbert Road - Round 2

			Lab No	926091	926092	926093	926094	926095
			Sample ID	Hole 2	Hole 3	Hole 5	Hole 6	Reen
			Depth					
			Other ID					
			Sample Type	WATER	WATER	WATER	WATER	WATER
			Sampling Date	11/01/16	11/01/16	11/01/16	11/01/16	11/01/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Metals								
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	9.9	31	1.7	4.5	1.6
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.05	0.20	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	3.7	0.35	< 0.25	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.2	1.1	2.6	1.6	1.2
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.13	0.16	0.12	0.13	0.14
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.02	0.01	0.02	0.02	0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	2.9	1.7	1.0	3.9	1.0
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.0	0.71	0.49	0.65	1.2
Zinc, Dissolved	DETSC 2306	1.3	ug/l	58	28	9.1	23	27
Inorganics								
Conductivity	DETSC 2009	1	uS/cm	4510	2640	339	1360	647
pH	DETSC 2008			6.7	7.1	7.5	7.1	7.5
Total Biochemical Oxygen Demand	DETSC 2031	1	mg/l	16	3100	16	1.8	2.0
Total Chemical Oxygen Demand	DETSC 2032	10	mg/l	85	6100	39	78	< 10
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40
Hardness	DETSC 2303	0.1	mg/l	596	309	135	470	280
Sulphate as SO4	DETSC 2055	0.1	mg/l	37	26	39	110	39
Sulphide	DETSC 2208	10	ug/l	< 10	< 10	< 10	< 10	< 10
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	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	24	240	< 10	86	< 10

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

Summary of Chemical Analysis
Water Samples

Our Ref 16-55306
Client Ref 12032
Contract Title Herbert Road - Round 2

			Lab No	926091	926092	926093	926094	926095
			Sample ID	Hole 2	Hole 3	Hole 5	Hole 6	Reen
			Depth					
			Other ID					
			Sample Type	WATER	WATER	WATER	WATER	WATER
			Sampling Date	11/01/16	11/01/16	11/01/16	11/01/16	11/01/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PAHs								
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
PCBs								
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
PCB 138	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenols								
Phenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
4-Chloro-3-methylphenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dichlorophenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dimethylphenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
p-cresol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,6-Dimethylphenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,6-Dichlorophenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4,6-Trichlorophenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

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

Information in Support of the Analytical Results

Our Ref 16-55306
Client Ref 12032
Contract Herbert Road - Round 2

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
926091	Hole 2 WATER	11/01/16	GB 1L x2, GV, PB 1L		
926092	Hole 3 WATER	11/01/16	GB 1L x2, GV, PB 1L		
926093	Hole 5 WATER	11/01/16	GB 1L x2, GV, PB 1L		
926094	Hole 6 WATER	11/01/16	GB 1L x2, GV, PB 1L		
926095	Reen WATER	11/01/16	GB 1L x2, GV, PB 1L		

Key: G-Glass P-Plastic B-Bottle V-Vial

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 and/or inappropriate containers 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.

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

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 16-58182

22-Feb-16

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference	16-58182
Client Reference	12032
Order No	(not supplied)
Contract Title	Herbert Road - Round Three
Description	5 Water samples.
Date Received	15-Feb-16
Date Started	15-Feb-16
Date Completed	22-Feb-16
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Water Samples

Our Ref 16-58182
Client Ref 12032
Contract Title Herbert Road - Round Three

			Lab No	942175	942176	942177	942178	942179
			Sample ID	Hole 2	Hole 3	Hole 5	Hole 6	Reen
			Depth					
			Other ID					
			Sample Type	WATER	WATER	WATER	WATER	WATER
			Sampling Date	10/02/16	10/02/16	10/02/16	10/02/16	10/02/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Metals								
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	12	11	2.1	3.4	1.8
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	0.08	0.04	< 0.03	0.05
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	1.5	< 0.25	< 0.25	0.88
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.0	0.8	2.4	< 0.4	2.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.32	0.16	< 0.09	0.29
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	3.6	5.4	2.0	2.3	2.0
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.50	2.5	1.4	1.8	2.0
Zinc, Dissolved	DETSC 2306	1.3	ug/l	19	10	6.7	13	23
Inorganics								
Conductivity	DETSC 2009	1	uS/cm	2320	2440	473	2000	496
pH	DETSC 2008			7.0	6.9	7.2	7.4	7.4
Total Biochemical Oxygen Demand	DETSC 2031	1	mg/l	3.8	7.8	7.5	2.7	3.1
Total Chemical Oxygen Demand	DETSC 2032	10	mg/l	24	26	21	29	< 10
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40
Hardness	DETSC 2303	0.1	mg/l	328	278	103	271	179
Sulphate as SO4	DETSC 2055	0.1	mg/l	9.8	13	32	120	33
Sulphide	DETSC 2208	10	ug/l	15	17	15	17	19
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	0.5	< 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	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	< 10	< 10	< 10	< 10	< 10

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

Summary of Chemical Analysis
Water Samples

Our Ref 16-58182
Client Ref 12032
Contract Title Herbert Road - Round Three

			Lab No	942175	942176	942177	942178	942179
			Sample ID	Hole 2	Hole 3	Hole 5	Hole 6	Reen
			Depth					
			Other ID					
			Sample Type	WATER	WATER	WATER	WATER	WATER
			Sampling Date	10/02/16	10/02/16	10/02/16	10/02/16	10/02/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PAHs								
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
PCBs								
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
PCB 138	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenols								
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	< 100	< 100	< 100
Phenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
4-Chloro-3-methylphenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dichlorophenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dimethylphenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
p-cresol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,6-Dimethylphenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,6-Dichlorophenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4,6-Trichlorophenol	DETSC 3452*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

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

Information in Support of the Analytical Results

Our Ref 16-58182
Client Ref 12032
Contract Herbert Road - Round Three

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
942175	Hole 2 WATER	10/02/16	GB 1L x2, GV, PB 1L	BOD (2 days)	
942176	Hole 3 WATER	10/02/16	GB 1L x2, GV, PB 1L	BOD (2 days)	
942177	Hole 5 WATER	10/02/16	GB 1L x2, GV, PB 1L	BOD (2 days)	
942178	Hole 6 WATER	10/02/16	GB 1L x2, GV, PB 1L	BOD (2 days)	
942179	Reen WATER	10/02/16	GB 1L, GV, PB 1L	BOD (2 days)	

Key: G-Glass P-Plastic B-Bottle V-Vial

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 and/or inappropriate containers 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.

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