Certificate of Analysis

Certificate Number 19-08261

10-May-19

Client Earth Science Partnership
33 Cardiff Road
Taffs Well
Cardiff
CF15 7RB

Our Reference 19-08261

Client Reference 70486.2

Order No 8010

Contract Title St Marys

Description 18 Soil samples.

Date Received 03-May-19

Date Started 03-May-19

Date Completed 10-May-19

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

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 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. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 19-08261
Client Ref 70486.2
Contract Title St Marys

			Lab No	1496494	1496495	1496496	1496497	1496498	1496499
			Sample ID	HDP1	HDP3	WS1	WS2	WS4	WS4
			Depth	0.65	0.40	0.60	0.55	0.15	0.55
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	25/04/19	25/04/19	25/04/19	25/04/19	25/04/19	25/04/19
			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	17	30	26	9.9	14	12
Barium	DETSC 2301#	1.5	mg/kg	190	750	270	660	200	290
Beryllium	DETSC 2301#	0.2	mg/kg	0.7	0.9	0.6	0.4	0.5	0.9
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.4	0.4	0.5	0.6	0.4	0.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.3	0.3	0.5	0.4	0.3
Chromium	DETSC 2301#	0.15	mg/kg	14	17	20	47	18	15
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	37	84	51	36	32	66
Lead	DETSC 2301#	0.3	mg/kg	89	1700	240	120	87	71
Mercury	DETSC 2325#	0.05	mg/kg	0.47	0.22	0.55	0.14	0.15	0.14
Nickel	DETSC 2301#	1	mg/kg	18	23	23	18	20	20
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6
Vanadium	DETSC 2301#	0.8	mg/kg	27	26	29	25	29	28
Zinc	DETSC 2301#	1	mg/kg	110	320	210	200	120	88
Inorganics									
pH	DETSC 2008#			8.4	8.8	8.1	10.7	7.2	8.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	0.5	< 0.1	0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.7	5.8	4.0	5.1	6.7	11
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	14			94		
Sulphur as S, Total	DETSC 2320	0.01	%	0.04			0.07		
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.06			0.13		
PAHs									
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.05	0.15	< 0.03	0.04	< 0.03	0.07
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	0.09	0.44	0.05	0.07	< 0.03	0.09
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.24	1.4	0.10	0.36	0.09	0.28
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.18	1.1	0.08	0.30	0.08	0.22
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.27	1.8	0.13	0.49	0.13	0.39
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.10	0.63	0.05	0.21	0.04	0.13
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.10	0.72	0.04	0.15	0.05	0.14
Chrysene	DETSC 3303	0.03	mg/kg	0.26	1.5	0.13	0.39	0.10	0.33
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.03	0.22	< 0.03	0.07	< 0.03	0.05
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.59	2.9	0.28	0.67	0.17	0.62
Fluorene	DETSC 3303	0.03	mg/kg	0.05	0.28	< 0.03	0.04	< 0.03	0.06
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.10	0.58	0.04	0.18	0.05	0.12
Naphthalene	DETSC 3303#	0.03	mg/kg	0.07	0.09	0.09	< 0.03	< 0.03	0.16
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.47	2.0	0.28	0.33	0.06	0.53
Pyrene	DETSC 3303#	0.03	mg/kg	0.48	2.2	0.23	0.54	0.14	0.50
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	3.1	16	1.5	3.8	0.91	3.7
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	0.8	< 0.3

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

Summary of Chemical Analysis
Soil Samples

Our Ref 19-08261
Client Ref 70486.2
Contract Title St Marys

			Lab No	1496500	1496501	1496502	1496503	1496504	1496505
			Sample ID	WS4	WS5	WS5	WS6	WS7	WS7
			Depth	1.20	0.20	0.50	0.55	1.50	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	25/04/19	25/04/19	25/04/19	25/04/19	25/04/19	25/04/19
			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	8.8	14	13	14	16	16
Barium	DETSC 2301#	1.5	mg/kg	32	190	170	580	190	370
Beryllium	DETSC 2301#	0.2	mg/kg	0.3	0.6	0.5	0.5	0.6	0.6
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.3	0.3	0.2	0.5	0.3	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.4	0.2	0.4	0.4	0.2
Chromium	DETSC 2301#	0.15	mg/kg	8.1	20	13	18	19	18
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	9.0	33	47	41	34	59
Lead	DETSC 2301#	0.3	mg/kg	18	85	160	340	110	130
Mercury	DETSC 2325#	0.05	mg/kg	0.07	0.14	0.11	0.79	0.18	0.34
Nickel	DETSC 2301#	1	mg/kg	8.5	21	31	15	22	20
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	0.6	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	9.6	30	24	23	31	26
Zinc	DETSC 2301#	1	mg/kg	40	110	97	290	120	130
Inorganics									
pH	DETSC 2008#			9.0	6.5	7.9	8.1	6.5	8.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.3	0.3	0.6	0.3	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.6	8.1	3.7	4.8	8.0	3.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	29			37		
Sulphur as S, Total	DETSC 2320	0.01	%	0.02			0.09		
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.03			0.18		
PAHs									
Acenaphthene	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
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.08	0.04	< 0.03	0.05
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.03	0.04	0.37	0.19	0.10	0.16
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.27	0.17	0.09	0.14
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	0.05	0.48	0.27	0.14	0.22
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.15	0.11	0.05	0.10
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.15	0.10	0.05	0.08
Chrysene	DETSC 3303	0.03	mg/kg	0.03	0.05	0.41	0.21	0.14	0.18
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.06	0.04	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.10	0.78	0.38	0.23	0.33
Fluorene	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	0.15	0.10	0.05	0.08
Naphthalene	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	< 0.03	0.04	0.41	0.21	0.12	0.19
Pyrene	DETSC 3303#	0.03	mg/kg	0.04	0.08	0.57	0.32	0.19	0.28
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.19	0.37	3.9	2.1	1.2	1.8
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.5	< 0.3	< 0.3	0.6	< 0.3

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-08261
Client Ref 70486.2
Contract Title St Marys

			Lab No	1496506	1496507	1496508	1496509	1496510	1496511
			Sample ID	WS7	WS8	WS9	WS10	WS11	WS11
			Depth	1.20	0.60	0.50	0.50	1.50	0.60
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	25/04/19	25/04/19	25/04/19	25/04/19	25/04/19	25/04/19
			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	4.9	15	15	16	14	18
Barium	DETSC 2301#	1.5	mg/kg	14	220	280	250	200	360
Beryllium	DETSC 2301#	0.2	mg/kg	0.3	0.6	0.6	0.7	0.6	0.5
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	< 0.2	< 0.2	0.2	0.4	0.3	0.3
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	0.4	0.2	0.4	0.4	0.3
Chromium	DETSC 2301#	0.15	mg/kg	11	20	18	17	19	15
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	7.8	36	62	78	33	48
Lead	DETSC 2301#	0.3	mg/kg	9.3	98	710	170	90	250
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.18	0.23	0.50	0.14	0.57
Nickel	DETSC 2301#	1	mg/kg	12	21	31	29	20	20
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	13	31	27	34	30	23
Zinc	DETSC 2301#	1	mg/kg	34	120	130	170	120	160
Inorganics									
pH	DETSC 2008#			7.7	6.7	7.8	7.9	6.4	8.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.3	0.1	0.1	0.3	0.2
Organic matter	DETSC 2002#	0.1	%	0.3	7.2	3.7	13	9.4	9.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	< 10					27
Sulphur as S, Total	DETSC 2320	0.01	%	< 0.01					0.07
Sulphate as SO4, Total	DETSC 2321#	0.01	%	< 0.01					0.12
PAHs									
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.15	< 0.03	< 0.03	0.13
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.04	< 0.03	< 0.03	0.14
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.15	0.05	< 0.03	0.35
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.46	0.17	0.08	1.2
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.35	0.12	0.06	1.2
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06	0.61	0.23	0.11	1.7
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.21	0.07	0.05	0.78
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.24	0.09	0.05	0.59
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.06	0.50	0.21	0.09	1.2
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.08	< 0.03	< 0.03	0.22
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	1.0	0.38	0.17	2.1
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.12	< 0.03	< 0.03	0.17
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.20	0.07	0.05	0.68
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.04	0.06	< 0.03	0.17
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.71	0.27	0.08	1.2
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	0.71	0.30	0.15	1.7
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	0.30	5.6	2.0	0.86	14
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.9	0.4	< 0.3	1.1	0.3

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Summary of Asbestos Analysis

Soil Samples

Our Ref 19-08261
Client Ref 70486.2
Contract Title St Marys

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1496494	HDP1 0.65	SOIL	NAD	none	Luke Donaghy
1496495	HDP3 0.40	SOIL	NAD	none	Luke Donaghy
1496496	WS1 0.60	SOIL	NAD	none	Luke Donaghy
1496497	WS2 0.55	SOIL	NAD	none	Luke Donaghy
1496498	WS4 0.15	SOIL	NAD	none	Luke Donaghy
1496499	WS4 0.55	SOIL	NAD	none	Luke Donaghy
1496500	WS4 1.20	SOIL	NAD	none	Luke Donaghy
1496501	WS5 0.20	SOIL	NAD	none	Luke Donaghy
1496502	WS5 0.50	SOIL	NAD	none	Luke Donaghy
1496503	WS6 0.55	SOIL	NAD	none	Luke Donaghy
1496504	WS7 1.50	SOIL	NAD	none	Luke Donaghy
1496505	WS7 0.50	SOIL	NAD	none	Luke Donaghy
1496506	WS7 1.20	SOIL	NAD	none	Luke Donaghy
1496507	WS8 0.60	SOIL	NAD	none	Luke Donaghy
1496508	WS9 0.50	SOIL	NAD	none	Luke Donaghy
1496509	WS10 0.50	SOIL	NAD	none	Luke Donaghy
1496510	WS11 1.50	SOIL	NAD	none	Luke Donaghy
1496511	WS11 0.60	SOIL	NAD	none	Luke Donaghy

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 19-08261
Client Ref 70486.2
Contract St Marys

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1496494	HDP1 0.65 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496495	HDP3 0.40 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496496	WS1 0.60 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496497	WS2 0.55 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496498	WS4 0.15 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496499	WS4 0.55 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496500	WS4 1.20 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496501	WS5 0.20 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496502	WS5 0.50 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496503	WS6 0.55 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496504	WS7 1.50 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496505	WS7 0.50 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496506	WS7 1.20 SOIL	25/04/19	PT 1L	pH + Conductivity (7 days)	Naphthalene, PAH MS
1496507	WS8 0.60 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496508	WS9 0.50 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496509	WS10 0.50 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496510	WS11 1.50 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1496511	WS11 0.60 SOIL	25/04/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	

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

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

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