APPENDIX UES9-4

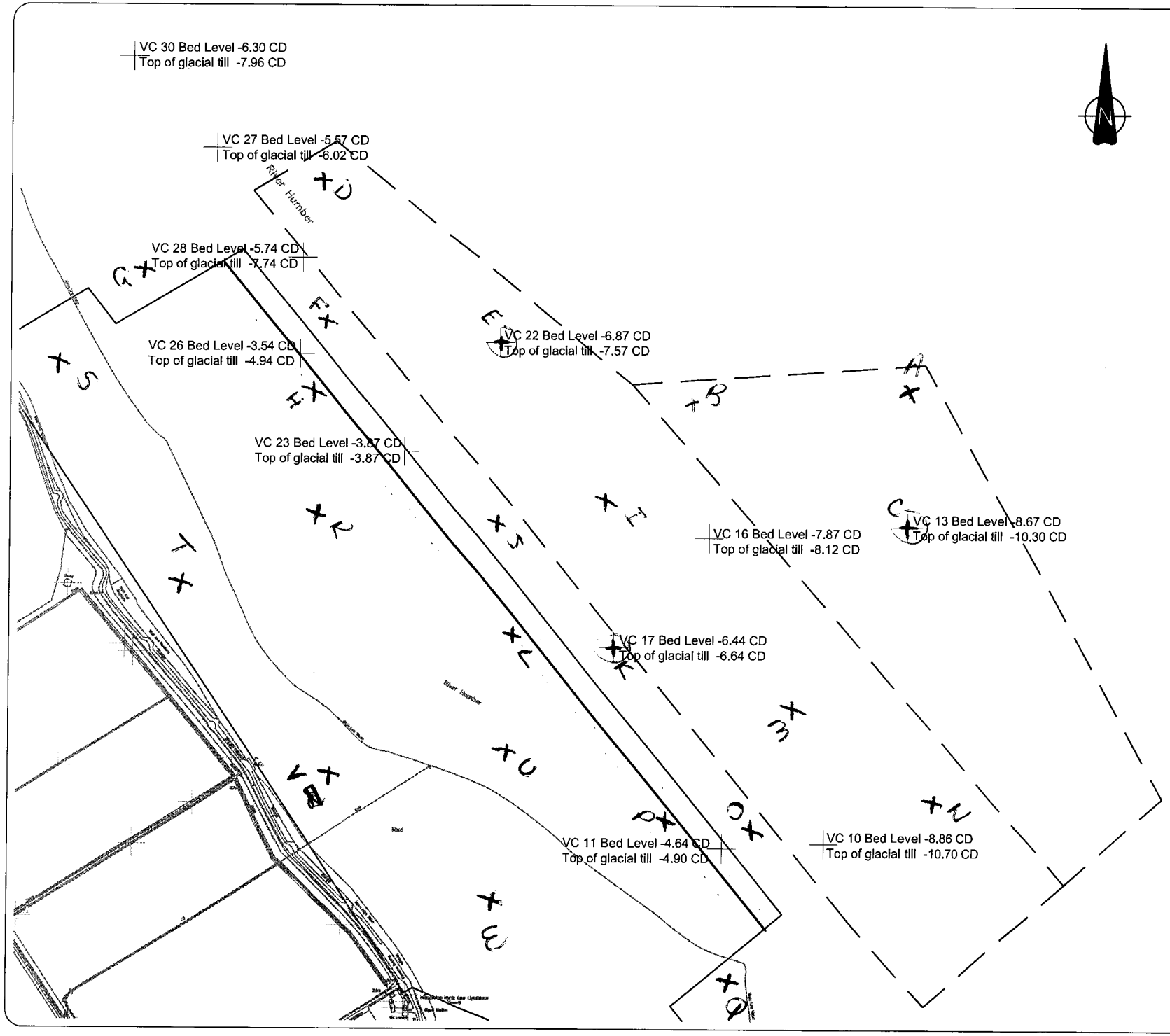
ESTUARY SEDIMENT QUALITY DATA

ABLE MARINE ENERGY PARK
(Material Change 2 – TR030006)

Able Marine Energy Park

Material Change 2

2011 Sediment Sampling Results



KEY

Rev	Date	Description	By	Chk	App
A	11/03/11	Preliminary Issue	SDB	RC	RC

Able UK Ltd
Able House
Billingham
Teesside UK
TS23 1PX
Tel: +44-(0)1642 806080
Fax: +44-(0)1642 655655
email: info@ableuk.com
www.ableuk.com

Project: ABLE MARINE ENERGY PARK

Client: ABLE UK Ltd

Title: Depth of Glacial Till

PRELIMINARY

Scale:	Drawn By	Checked By	Approved By
1:5,000@A3	SDB	R Cram	R Cram
Date:	11/03/2011	11/03/2011	11/03/2011

Drawing No. AME - 06030

Revision: A

CONTRACT:	**LICENSING**
AREA:	**Killingholme**
DAS:	**IPCDC9172**
Sample analysis completed by:	**L. WEBSTER**
Results validated by:	**C. MASON**
No of Samples:	**24**
Deadline:	**31/05/2011**
Method of analysis:	**FULL PSA @ 63 um**

Wet sieve at 63um
Dry sieve >63um
Freeze dry <63um
Lasersize <63um
Visual Description

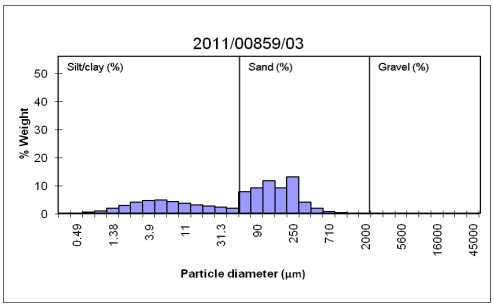
Storage of samples after analysis:
Samples will initially be stored in the sed lab,
Following this, they will be catalogued, and placed in dry storage.

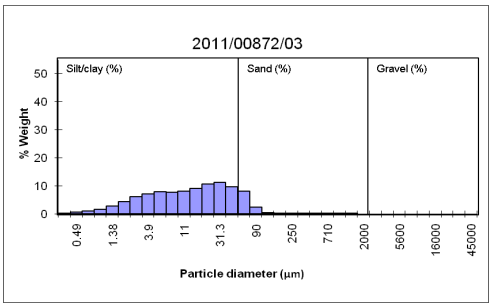
Notes:
New sop used for laser analyses of <63um.

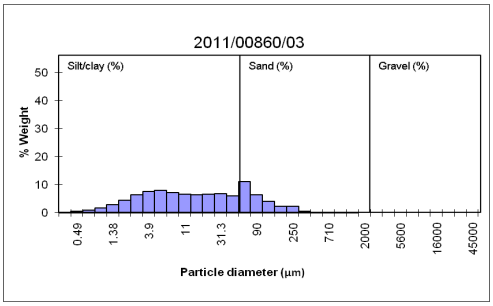
The <63um material was not freeze-dried. A subsample was removed from the wet sediment and laser analyses completed using same Malvern sop as for freeze-dried sample. The subsample weight of the <63um material was derived by water content assessment.

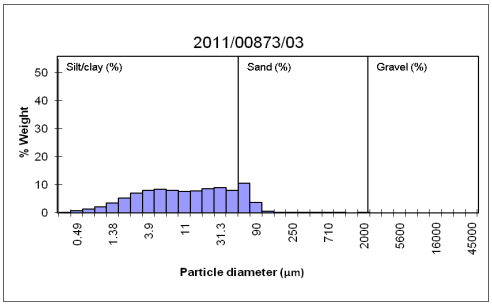
Killingholme	**IPCDC_9172**	%Gravel	%Sand	%Silt/Clay	Very coarse and coarse sand (%)	Medium sand (%)	Fine sand and very fine sand (%)
LSN	**AREA**						
2011/00859/03		0.36	59.51	40.13	3.85	17.40	38.26
2011/00860/03		0.00	27.70	72.30	0.65	2.97	24.08
2011/00861/03		0.09	62.17	37.74	1.33	28.07	32.76
2011/00862/03		0.13	41.02	58.85	0.39	0.65	39.97
2011/00863/03		74.66	18.10	7.25	8.11	2.13	7.85
2011/00864/03		0.00	22.26	77.74	0.10	0.48	21.68
2011/00865/03		0.00	30.88	69.12	0.53	4.00	26.35
2011/00866/03		0.03	49.31	50.66	0.33	1.16	47.83
2011/00867/03		0.06	61.48	38.46	1.87	20.28	39.33
2011/00868/03		0.00	15.50	84.50	0.35	1.30	13.85
2011/00869/03		45.23	46.40	8.37	24.85	13.41	8.13
2011/00871/03		1.90	62.34	35.76	14.03	5.49	42.81
2011/00872/03		0.00	11.38	88.62	0.15	0.15	11.08
2011/00873/03		0.03	14.96	85.01	0.08	0.05	14.83
2011/00874/03		0.38	33.85	65.77	0.75	0.67	32.43
2011/00875/03		0.42	69.03	30.54	0.61	0.66	67.76
2011/00876/03		0.19	82.70	17.11	0.72	59.11	22.87
2011/00877/03		0.00	21.58	78.42	0.17	2.66	18.74
2011/00878/03		25.91	50.93	23.16	15.17	7.17	28.59
2011/00879/03		3.05	71.58	25.37	6.56	49.05	15.97
2011/00880/03		0.00	92.78	7.22	0.10	1.35	91.33
2011/00881/03		4.43	9.81	85.76	2.39	1.10	6.31
2011/00882/03		0.17	14.82	85.02	0.19	0.33	14.29
2011/00883/03		0.03	12.86	87.11	0.09	0.60	12.18

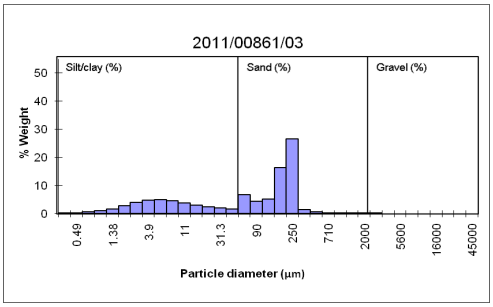
Killingholme	IPCDC_9172	-5.5	-5	-4.5	-4	-3.5	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	>11
LSN	AREA	45mm	31.5mm	22.4mm	16mm	11.2mm	8mm	5.6mm	4mm	2.8mm	2mm	1.4mm	1mm	710um	500um	355um	250um	180um	125um	90um	63um	44.2um	31.3um	22.1um	15.6um	11um	7.8um	5.5um	3.9um	2.75um	1.95um	1.38um	0.98um	0.69um	0.49um	<0.49um
2011/00859/03		0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.14	0.14	0.36	0.56	0.84	2.09	4.24	13.15	9.35	11.78	9.26	7.86	2.07	2.49	2.84	3.24	3.86	4.47	4.99	4.84	4.24	3.09	1.97	1.09	0.62	0.29	0.03
2011/00860/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.24	0.12	0.21	0.62	2.35	2.38	4.14	6.48	11.07	6.06	6.76	6.64	6.37	6.69	7.31	7.94	7.52	6.40	4.54	2.85	1.63	0.99	0.52	0.07
2011/00861/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.07	0.16	0.20	0.36	0.61	1.52	26.56	16.40	5.10	4.42	6.84	1.69	2.08	2.43	2.95	3.77	4.53	5.06	4.75	3.98	2.78	1.74	1.01	0.62	0.32	0.04
2011/00862/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.16	0.03	0.10	0.10	0.26	0.39	0.49	2.08	12.77	24.64	5.56	5.95	5.14	4.41	4.69	5.59	6.60	6.58	5.71	4.01	2.40	1.25	0.65	0.28	0.03
2011/00863/03		0.00	0.00	15.22	26.00	12.66	4.01	2.04	5.48	5.10	4.16	2.97	2.04	1.71	1.39	1.09	1.04	1.08	1.33	2.30	3.15	0.46	0.55	0.61	0.65	0.73	0.79	0.85	0.80	0.69	0.49	0.30	0.17	0.10	0.05	0.00
2011/00864/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.22	0.25	0.73	1.90	5.86	13.20	5.91	6.78	7.06	7.21	7.71	8.20	8.58	7.94	6.75	4.89	3.17	1.84	1.11	0.55	0.06
2011/00865/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.18	0.26	0.44	3.56	4.84	4.77	7.68	9.06	2.47	3.67	4.85	5.94	7.07	7.97	8.71	8.39	7.38	5.44	3.51	1.98	1.13	0.54	0.06
2011/00866/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.05	0.08	0.18	0.25	0.90	2.84	5.97	12.38	26.65	3.94	4.59	4.49	4.23	4.42	4.92	5.54	5.47	4.85	3.55	2.27	1.27	0.73	0.35	0.05
2011/00867/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.22	0.89	0.40	0.35	1.70	18.58	22.08	5.81	3.81	7.64	2.50	2.94	3.18	3.42	3.87	4.29	4.61	4.27	3.56	2.48	1.55	0.89	0.56	0.31	0.05
2011/00868/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.32	0.46	0.84	0.84	1.36	4.29	7.35	4.83	6.37	7.48	8.21	8.95	9.42	9.74	8.93	7.54	5.42	3.51	2.07	1.28	0.66	0.09
2011/00869/03		0.00	0.00	0.00	7.02	0.00	6.99	8.57	9.13	6.45	7.08	6.31	5.59	5.61	7.34	7.30	6.12	3.92	1.83	1.18	1.20	0.28	0.45	0.63	0.77	0.89	0.95	0.98	0.91	0.79	0.60	0.44	0.31	0.22	0.13	0.03
2011/00871/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	1.87	6.62	2.88	2.16	2.37	1.61	3.88	7.05	9.79	14.03	11.95	1.67	1.95	2.20	2.54	3.00	3.38	3.73	3.75	3.65	3.19	2.61	1.92	1.32	0.71	0.14
2011/00872/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.06	0.06	0.09	0.12	0.43	2.47	8.05	9.75	11.21	10.66	9.11	8.10	7.76	7.86	7.21	6.09	4.39	2.88	1.75	1.14	0.62	0.10
2011/00873/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.03	0.03	0.03	0.03	0.08	0.53	3.62	10.61	8.03	8.91	8.52	7.74	7.60	7.93	8.48	8.06	7.01	5.18	3.43	2.07	1.29	0.66	0.10
2011/00874/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.12	0.17	0.17	0.12	0.29	0.20	0.46	0.49	3.59	9.57	18.79	3.11	3.99	4.68	5.49	6.66	7.64	8.30	7.80	6.67	4.83	3.11	1.80	1.08	0.54	0.07
2011/00875/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.11	0.30	0.17	0.06	0.08	0.23	0.42	1.12	8.53	26.23	31.89	4.03	3.82	2.98	2.35	2.42	2.80	3.11	2.90	2.38	1.62	0.99	0.56	0.36	0.20	0.03
2011/00876/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.11	0.08	0.12	0.40	8.44	50.67	18.52	1.62	1.08	1.64	0.71	0.98	1.29	1.66	2.06	2.28	2.30	1.97	1.52	1.00	0.61	0.36	0.23	0.13	0.02
2011/00877/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.14	1.74	0.93	1.51	2.27	6.15	8.81	4.80	6.65	7.84	8.41	8.82	8.87	8.72	7.63	6.20	4.35	2.79	1.66	1.05	0.56	0.08
2011/00878/03		0.00	0.00	0.00	0.00	7.83	2.98	5.16	2.69	3.12	4.12	3.84	3.28	3.69	4.35	3.84	3.33	4.02	7.87	9.37	7.32	1.33	1.67	1.86	2.02	2.28	2.54	2.76	2.62	2.24	1.61	1.04	0.61	0.37	0.20	0.03
2011/00879/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.58	1.81	2.19	1.44	1.36	1.57	9.09	39.96	10.83	1.55	1.30	2.30	1.20	1.61	1.97	2.36	2.83	3.16	3.30	2.92	2.33	1.57	0.96	0.56	0.36	0.20	0.03
2011/00880/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.06	0.03	1.32	28.50	48.81	10.02	4.00	0.27	0.41	0.55	0.70	0.86	0.95	0.97	0.84	0.66	0.44	0.26	0.15	0.09	0.05	0.01
2011/00881/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.59	1.84	1.37	0.31	0.27	0.43	0.39	0.71	0.47	0.72	1.51	3.61	2.74	4.48	6.47	8.46	10.26	11.16	11.34	9.97	8.01	5.49	3.41	1.97	1.24	0.67	0.10
2011/00882/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.06	0.08	0.03	0.03	0.08	0.25	0.36	0.56	2.66	10.72	8.43	9.67	9.45	8.62	8.28	8.23	8.30	7.44	6.13	4.31	2.76	1.65	1.07	0.59	0.09
2011/00883/03		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.03	0.03	0.23	0.37	0.29	0.61	2.37	8.90	8.75	10.29	9.99	8.79	8.19	8.18	8.39	7.58	6.21	4.33	2.78	1.71	1.15	0.64	0.11

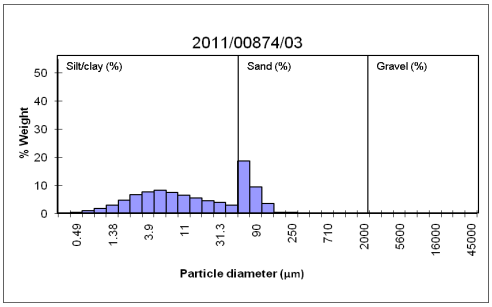

2011/00859/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

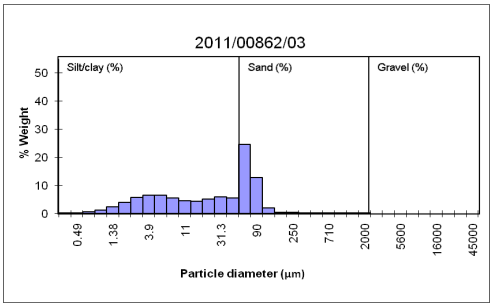

2011/00872/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

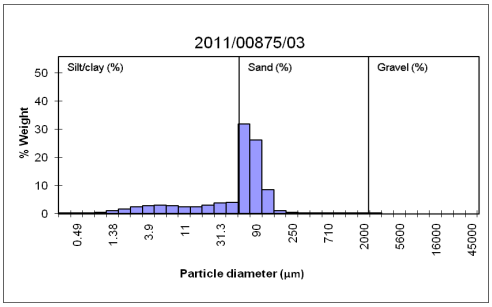

2011/00860/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

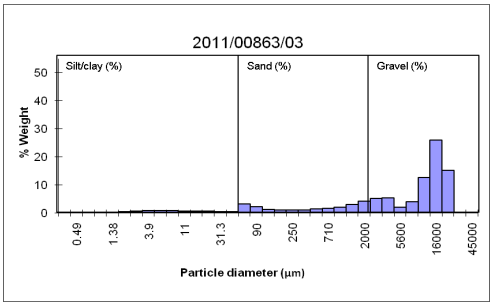

2011/00873/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

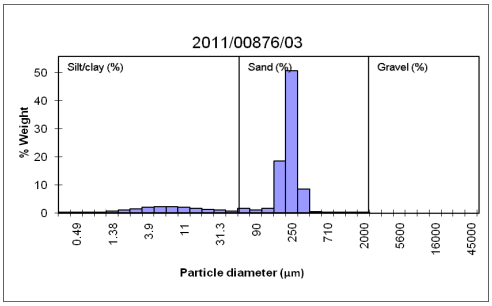

2011/00861/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

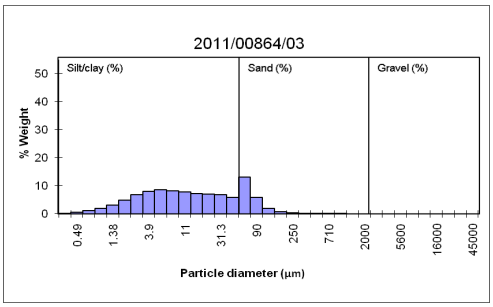

2011/00874/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

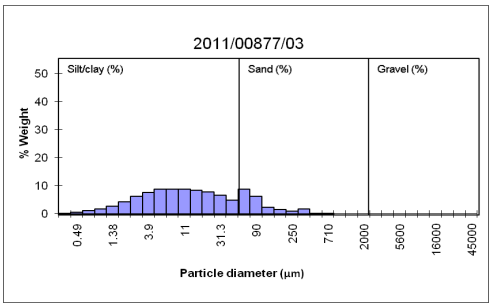

2011/00862/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

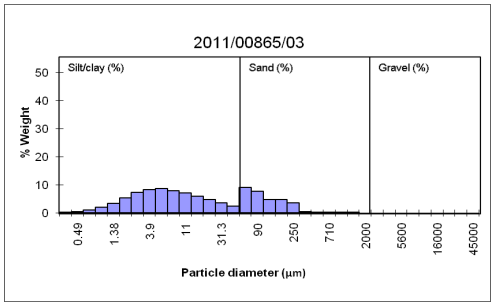

2011/00875/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

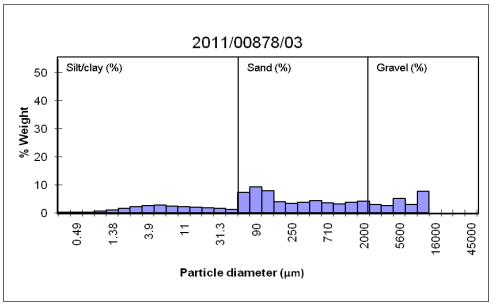

2011/00863/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

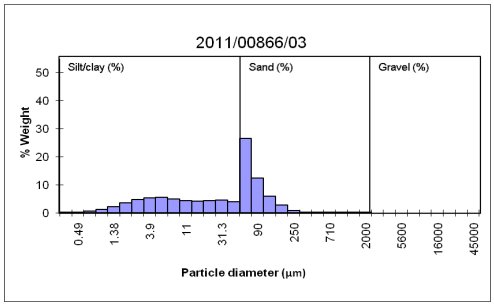

2011/00876/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

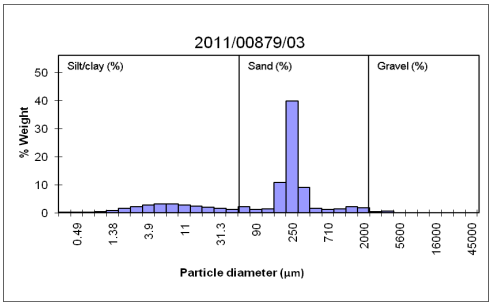

2011/00864/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

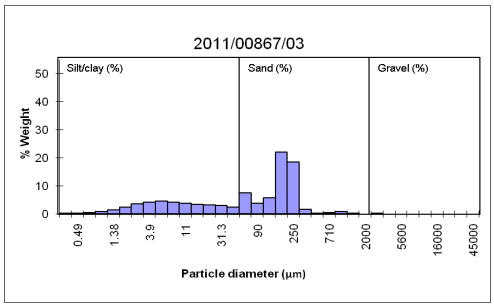

2011/00877/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

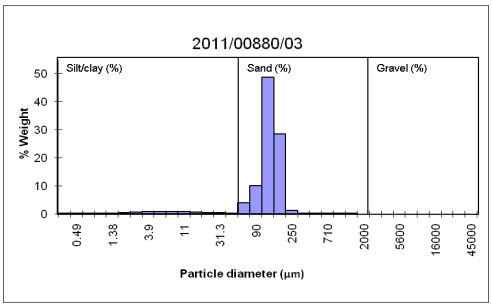

2011/00865/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

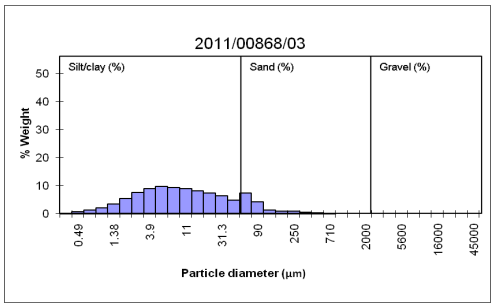

2011/00878/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

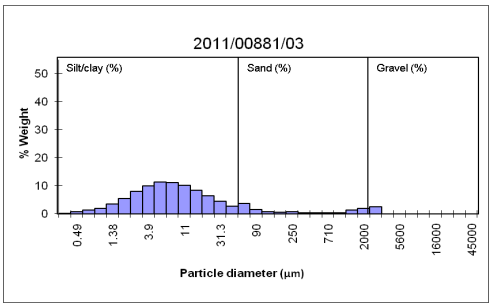

2011/00866/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

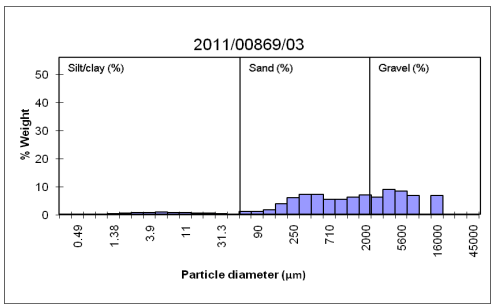

2011/00879/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

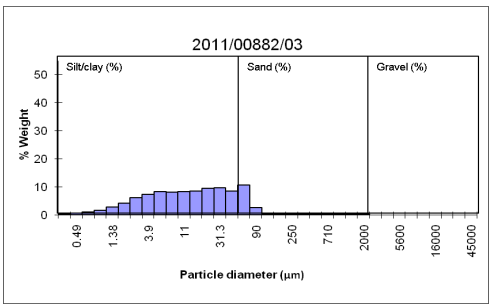

2011/00867/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

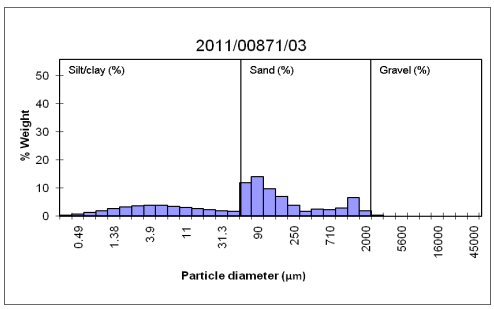

2011/00880/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

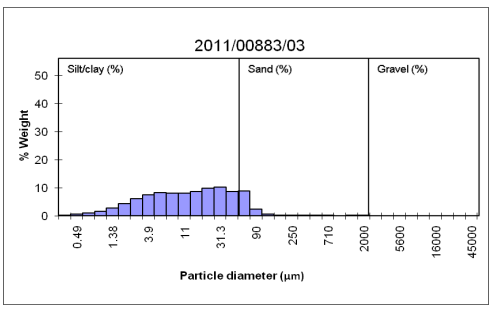

2011/00868/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)


2011/00881/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)


2011/00869/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)


2011/00882/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)


2011/00871/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)


2011/00883/03
Silt/clay (%)
Sand (%)
Gravel (%)
% Weight
0
10
20
30
40
50
0.49
1.38
3.9
11
31.3
90
250
710
2000
5600
16000
45000
Particle diameter (µm)

Killingholme	IPCDC_9172	Visual description
LSN	AREA	
2011/00859/03		Soft, dark brown, muddy sand (micaceous).
2011/00860/03		Thick, dark brown, sandy (slightly micaceous) mud.
2011/00861/03		Soft, orange/brown, muddy sand (micaceous).
2011/00862/03		Soft, brown,sandy (slightly micaceous) mud.
2011/00863/03		Soft, brown, slightly muddy, slightly sandy (micaceous) gravel.
2011/00864/03		Soft, dark brown, slightly sandy (slightly micaceous) mud.
2011/00865/03		Soft, dark brown, sandy (micaceous) mud.
2011/00866/03		Soft, brown, sandy (micaceous) mud.
2011/00867/03		Soft,brown, muddy sand (micaceous).
2011/00868/03		Soft, brown, slightly sandy (slightly micaceous) mud.
2011/00869/03		Soft, slightly muddy gravelly sand (micaceous).
2011/00871/03		Soft, orange/brown, muddy sand (micaceous).
2011/00872/03		Soft, dark brown, slightly sandy (micaceous) mud.
2011/00873/03		Soft, light brown, slighty sandy (micaceous) mud.
2011/00874/03		Soft, dark brown, sandy (micaceous) mud.
2011/00875/03		Soft, dark brown, muddy sand (micaceous).
2011/00876/03		Soft, orange/brown, slightly muddy sand (micaceous).
2011/00877/03		Soft, dark brown, slightly sandy (slightly micaceous) mud.
2011/00878/03		Soft, brown, muddy gravelly sand (micaceous).
2011/00879/03		Soft, orange/brown, muddy sand (micaceous).
2011/00880/03		Soft, dark brown, slightly muddy sand (micaceous).
2011/00881/03		Soft, dark brown, very slightly sandy, slightly gravelly mud.
2011/00882/03		Soft, brown, slightly sandy mud.
2011/00883/03		Soft, orange/brown, slightly sandy (micaceous) mud.

Metals and Tin Results for Defra

Application no: IPCDC9172
Licencee: Able UK Limited
Location: Killingholme
DC/MCU:
Date Sampled: 09/05/2011

mg/kg (ppm) Dry weight

LSN	Sample No.	Location	Excluded	TS%	AS	CD	CR	CU	HG	NI	PB	ZN	DBT	TBT
2011/00859	1+4	Turning Area A+C 0 m		67.558	44	0.45	58	34	0.35	31	79	190	<LOD	0.013
2011/00860	3	Turning Area B 1 m		65.558	33	0.45	68	44	0.29	40	86	225	<LOD	0.025
2011/00861	5	Appr. Ch. D 0 m		66.075	27	0.18	32	22	0.12	24	52	125	<LOD	<LOD
2011/00862	8	Appr. Ch. E 1 m		70.517	21	0.32	40	28	0.15	28	53	146	<LOD	0.011
2011/00863	9	Berthing Pocket F 0 m		82.719	15	0.21	22	16	0.07	23	34	95	<LOD	<LOD
2011/00864	23+25	Beth. P.K+ an.tr. L 0 m		56.2	32	0.4	76	45	0.31	43	93	230	<LOD	0.022
2011/00865	19+26	App. Ch I+anch. Tr.L 1 m		62.191	31	0.35	70	37	0.26	38	87	206	<LOD	0.019
2011/00866	27	Approach Ch. M 0 m		71.547	22	0.33	38	24	0.14	25	49	134	<LOD	0.010
2011/00867	28	Approach Ch. M 1 m		78.156	28	0.12	21	11	0.05	16	37	93	<LOD	<LOD
2011/00868	36	Berthing Pocket Q 0 m		55.34	29	0.35	77	42	0.3	45	89	225	<LOD	0.027
2011/00869	37	Berthing Pocket Q 1 m		87.234	7.5	0.22	15	12	0	23	8.8	56	<LOD	<LOD
2011/00871	40	Reclamation Area R 0 m		80.544	5.2	0.14	15	17	0	20	10	39	<LOD	0.010
2011/00872	45	Reclamation Area T 1 m		62.351	22	0.34	57	34	0.22	38	72	179	<LOD	0.011
2011/00873	46+48+50	Recl. Ar. U+V+W 0 m		57.912	23	0.29	56	36	0.21	39	71	176	<LOD	<LOD
2011/00874	47+49	Recl, Area U+V 1 m		62.035	24	0.39	56	35	0.27	33	70	181	<LOD	0.018
2011/00875	2	Turning Area B 0 m		67.768	31	0.44	40	26	0.15	24	53	146	<LOD	<LOD
2011/00876	7	Appr. Ch. E 0 m		76.619	28	0.12	17	11	0.06	17	40	93	<LOD	<LOD
2011/00877	12	Berthing pocket G 0 m		55.156	36	0.46	90	49	0.36	51	111	265	0.011	0.029
2011/00878	15	Anch. Trench H 0 m		74.253	26	0.25	35	22	0.11	28	41	122	<LOD	<LOD
2011/00879	18	Approach Ch. I 0 m		69.752	50	0.17	25	24	0.1	23	61	123	<LOD	0.020
2011/00880	29	Appr. Ch. N 0 m		77.266	24	0.2	19	13	0.04	14	32	89	<LOD	<LOD
2011/00881	30	Appr. Ch. N 1 m		55.282	39	0.44	96	53	0.34	53	135	287	<LOD	0.036
2011/00882	42	Recl. Area S 0 m		61.758	21	0.33	52	36	0.22	37	76	182	<LOD	0.017
2011/00883	44	Recl. Area T 0 m		56.714	16	0.23	38	26	0.15	29	51	125	<LOD	<LOD
		Mean		67.52	26.45	0.30	46.38	29.04	0.18	30.92	62.12	155.50	0.011	0.019
		AL1 (ppm dry)			20	0.4	40	40	0.3	20	50	130	0.1	0.1
		AL2 (ppm dry)			100	5.0	400	400	3.00	200	500	800	1	1
		Limits of Detection			0.15	0.05	0.15	0.06	0.03	0.15	0.08	0.15	0.002	0.003

Produced by: Luca Doria
Date: 14/06/2011

Metals and Tin Results for Defra

Application no: IPCDC9172
Licencee: Able UK Limited
Location: Killingholme
DC/MCU: 0
Date Sampled: 09/05/2011

mg/kg (ppm)
Wet weight

LSN	Sample No.	Location	Excluded	TS%	AS	CD	CR	CU	HG	NI	PB	ZN	DBT	TBT
2011/00859	1+4	Turning Area A+C 0 m		67.5583	29.7256	0.3040	39.1838	22.9698	0.2365	20.9431	53.3710	128.3607	0.0014	0.0091
2011/00860	3	Turning Area B 1 m		65.5582	21.6342	0.2950	44.5795	28.8456	0.1901	26.2233	56.3800	147.5058	0.0013	0.0166
2011/00861	5	Appr. Ch. D 0 m		66.0753	17.8403	0.1189	21.1441	14.5366	0.0793	15.8581	34.3591	82.5941	0.0013	0.0020
2011/00862	8	Appr. Ch. E 1 m		70.5172	14.8086	0.2257	28.2069	19.7448	0.1058	19.7448	37.3741	102.9551	0.0014	0.0080
2011/00863	9	Berthing Pocket F 0 m		82.719	12.4079	0.1737	18.1982	13.2350	0.0579	19.0254	28.1245	78.5831	0.0017	0.0025
2011/00864	23+25	Beth. P.K+ an.tr. L 0 m		56.2004	17.9841	0.2248	42.7123	25.2902	0.1742	24.1662	52.2663	129.2608	0.0011	0.0124
2011/00865	19+26	App. Ch I+anch. Tr.L 1 m		62.191	19.2792	0.2177	43.5337	23.0107	0.1617	23.6326	54.1062	128.1135	0.0012	0.0121
2011/00866	27	Approach Ch. M 0 m		71.5469	15.7403	0.2361	27.1878	17.1713	0.1002	17.8867	35.0580	95.8729	0.0014	0.0071
2011/00867	28	Approach Ch. M 1 m		78.1555	21.8835	0.0938	16.4127	8.5971	0.0391	12.5049	28.9175	72.6846	0.0016	0.0023
2011/00868	36	Berthing Pocket Q 0 m		55.3396	16.0485	0.1937	42.6115	23.2426	0.1660	24.9028	49.2523	124.5142	0.0011	0.0150
2011/00869	37	Berthing Pocket Q 1 m		87.2336	6.5425	0.1919	13.0850	10.4680	0.0000	20.0637	7.6766	48.8508	0.0017	0.0026
2011/00871	40	Reclamation Area R 0 m		80.5439	4.1883	0.1128	12.0816	13.6925	0.0000	16.1088	8.0544	31.4121	0.0016	0.0078
2011/00872	45	Reclamation Area T 1 m		62.3512	13.7173	0.2120	35.5402	21.1994	0.1372	23.6935	44.8929	111.6087	0.0012	0.0068
2011/00873	46+48+50	Recl. Ar. U+V+W 0 m		57.9122	13.3198	0.1679	32.4308	20.8484	0.1216	22.5857	41.1176	101.9254	0.0012	0.0017
2011/00874	47+49	Recl, Area U+V 1 m		62.0351	14.8884	0.2419	34.7396	21.7123	0.1675	20.4716	43.4246	112.2835	0.0012	0.0111
2011/00875	2	Turning Area B 0 m		67.7681	21.0081	0.2982	27.1072	17.6197	0.1017	16.2643	35.9171	98.9414	0.0014	0.0020
2011/00876	7	Appr. Ch. E 0 m		76.6187	21.4532	0.0919	13.0252	8.4281	0.0460	13.0252	30.6475	71.2554	0.0015	0.0023
2011/00877	12	Berthing pocket G 0 m		55.1559	19.8561	0.2537	49.6403	27.0264	0.1986	28.1295	61.2230	146.1631	0.0059	0.0161
2011/00878	15	Anch. Trench H 0 m		74.2531	19.3058	0.1856	25.9886	16.3357	0.0817	20.7909	30.4438	90.5888	0.0015	0.0022
2011/00879	18	Approach Ch. I 0 m		69.7516	34.8758	0.1186	17.4379	16.7404	0.0698	16.0429	42.5485	85.7945	0.0014	0.0138
2011/00880	29	Appr. Ch. N 0 m		77.2661	18.5439	0.1545	14.6806	10.0446	0.0309	10.8173	24.7252	68.7669	0.0015	0.0023
2011/00881	30	Appr. Ch. N 1 m		55.2821	21.5600	0.2432	53.0708	29.2995	0.1880	29.2995	74.6309	158.6597	0.0011	0.0200
2011/00882	42	Recl. Area S 0 m		61.7584	12.9693	0.2038	32.1144	22.2330	0.1359	22.8506	46.9364	112.4003	0.0012	0.0102
2011/00883	44	Recl. Area T 0 m		56.7137	9.0742	0.1304	21.5512	14.7456	0.0851	16.4470	28.9240	70.8922	0.0011	0.0017
		Mean wet weight for PR details		**67.5210**	**17.4440**	**0.1954**	**29.4277**	**18.6265**	**0.1114**	**20.0616**	**39.5988**	**99.9995**	**0.0016**	**0.0078**

Produced by: Luca Doria
Date: 14-Jun-11

mg/kg (ppb)
Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#101	CB#105	CB#110	CB#118	CB#128	CB#138	CB#141	CB#149	CB#151
2011/00859					2.3	0.29	1.3	0.74	0.22	1.2	0.29	1.3	0.39
2011/00860					1.1	0.25	1.2	0.67	0.21	1.1	0.32	1.1	0.34
2011/00861					0.61	0	0.49	0.3	0	0.43	0	0.47	0
2011/00862					0.89	0	0.67	0.4	0	0.62	0	0.63	0.2
2011/00863					0.75	0	0.88	0.48	0	0.76	0	0.79	0.27
2011/00864					1.2	0.28	1.3	0.76	0.21	1.2	0.37	1.3	0.4
2011/00865					3.8	0.26	1.2	0.7	0	1.2	0.35	1.2	0.37
2011/00866					2.3	0	0.7	0.45	0	0.6	0	0.64	0
2011/00867					16	0.25	1.1	0.77	0.22	1.1	0.31	0.93	0.38
2011/00868					14	0.33	1.3	0.89	0.25	1.3	0.37	1.1	0.42
2011/00869					0.27	0	0.23	0.21	0	0	0	0	0
		Mean			3.92909	0.15091	0.94273	0.57909	0.10091	0.86455	0.18273	0.86000	0.25182

mg/kg (ppb)
Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#153	CB#156	CB#158	CB#170	CB#18	CB#180	CB#183	CB#187	CB#194
2011/00859					1.5	0	0	0.41	0.74	0.98	0.23	0.66	0.31
2011/00860					1.3	0	0	0.34	0.58	0.87	0.21	0.6	0.27
2011/00861					0.54	0	0	0	0.31	0.31	0	0.32	0
2011/00862					0.75	0	0	0	0.37	0.45	0	0.34	0
2011/00863					0.9	0	0	0.22	0.4	0.58	0	0.41	0
2011/00864					1.5	0	0	0.4	0.63	1	0.23	0.74	0.32
2011/00865					1.4	0	0	0.34	0.62	0.87	0	0.65	0.28
2011/00866					0.74	0	0	0	0.45	0.43	0	0.33	0
2011/00867					1.3	0	0	0.36	0.53	0.89	0.2	0.61	0.35
2011/00868					1.5	0	0	0.41	0.64	1	0.22	0.68	0.33
2011/00869					0	0	0	0	0.26	0	0	0	0
		Mean			1.03909	0.00000	0.00000	0.22545	0.50273	0.67091	0.09909	0.48545	0.16909

mg/kg (ppb)
Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#28	CB#31	CB#44	CB#47	CB#49	CB#52	CB#66	TOT25CBS	TOTICES7	HCB	DDE	
2011/00859					1.4	0.82	0.72	1.6	0.69	1.2	0.82	20.11	9.32	1.12	1.59	
2011/00860					1.3	0.72	0.65	1.4	0.63	1.1	0.75	17.01	7.44	0.73	1.57	
2011/00861					0.51	0.33	0.29	0.72	0.29	0.5	0.3	6.72	3.2	0.4	0.62	
2011/00862					0.68	0.44	0.4	0.88	0.39	0.65	0.42	9.18	4.44	0.42	0.81	
2011/00863					0.79	0.44	0.46	2.2	0.4	0.82	0.5	12.05	5.08	0.41	2.53	
2011/00864					1.4	0.81	0.69	1.6	0.68	1.1	0.82	18.94	8.16	0.96	1.63	
2011/00865					1.3	0.75	0.65	1.5	0.66	1.1	0.78	19.98	10.37	0.86	1.5	
2011/00866					0.74	0.49	0.42	0.96	0.42	0.69	0.44	10.8	5.95	0.44	0.85	
2011/00867					1.1	0.64	0.56	0.69	0.53	0.91	0.74	30.47	22.07	0.65	1.6	
2011/00868					1.3	0.74	0.67	0.77	0.62	1	0.87	30.71	20.99	0.77	1.6	
2011/00869					0	0	0.27	0	0.22	0.39	0.23	2.08	0.87	0	0	
		Mean			0.95636	0.56182	0.52545	1.12000	0.50273	0.86000	0.60636	16.18636	8.89909	0.61455	1.30000	#DIV/0!

Polychlorinated Biphenol Results for Defra/DAS:

Application no: IPCDC9172
Licensee: Richard Cram
Location: Killingholme
DC/MCU:
Date Sampled: 24/03/2011

mg/kg (ppm) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#101	CB#105	CB#110	CB#118	CB#128	CB#138	CB#141	CB#149	CB#151
2011/00859	1+4	Turning area A+C Surface		67.5583	0.0023	0.00029	0.0013	0.00074	0.00022	0.0012	0.00029	0.0013	0.00039
2011/00860	3	Turning Area B 1m		65.5582	0.0011	0.00025	0.0012	0.00067	0.00021	0.0011	0.00032	0.0011	0.00034
2011/00861	5	pproach Channel D Surface		66.0753	0.00061	<0.0002	0.00049	0.0003	<0.0002	0.00043	<0.0002	0.00047	<0.0002
2011/00862	8	Approach Channel E 1m		70.5172	0.00089	<0.0002	0.00067	0.0004	<0.0002	0.00062	<0.0002	0.00063	0.0002
2011/00863	9	Berthing Pocket F 0m		82.7190	0.00075	<0.0002	0.00088	0.00048	<0.0002	0.00076	<0.0002	0.00079	0.00027
2011/00864	23+25	Pock K + Anch Trench L 0m		56.2004	0.0012	0.00028	0.0013	0.00076	0.00021	0.0012	0.00037	0.0013	0.0004
2011/00865	19+26	Chan I + Anch Tredge L 1m		62.1910	0.0038	0.00026	0.0012	0.0007	<0.0002	0.0012	0.00035	0.0012	0.00037
2011/00866	27	Approach Channel M 0m		71.5469	0.0023	<0.0002	0.0007	0.00045	<0.0002	0.0006	<0.0002	0.00064	<0.0002
2011/00867	28	Approach Channel M 1m		78.1555	0.016	0.00025	0.0011	0.00077	0.00022	0.0011	0.00031	0.00093	0.00038
2011/00868	36	Berthing Pocket Q 0m		55.3396	0.014	0.00033	0.0013	0.00089	0.00025	0.0013	0.00037	0.0011	0.00042
2011/00869	37	Berthing Pocket Q 1m		87.2336	0.00027	<0.0002	0.00023	0.00021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Mean			0.00393	0.00028	0.00094	0.00058	0.00022	0.00095	0.00034	0.00095	0.00035

mg/kg (ppm) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#153	CB#156	CB#158	CB#170	CB#18	CB#180	CB#183	CB#187	CB#194
2011/00859	1+4	Turning area A+C Surface		67.55828	0.0015	<0.0002	<0.0002	0.00041	0.00074	0.00098	0.00023	0.00066	0.00031
2011/00860	3	Turning Area B 1m		65.558152	0.0013	<0.0002	<0.0002	0.00034	0.00058	0.00087	0.00021	0.0006	0.00027
2011/00861	5	pproach Channel D Surface		66.075269	0.00054	<0.0002	<0.0002	<0.0002	0.00031	0.00031	<0.0002	0.00032	<0.0002
2011/00862	8	Approach Channel E 1m		70.51718	0.00075	<0.0002	<0.0002	<0.0002	0.00037	0.00045	<0.0002	0.00034	<0.0002
2011/00863	9	Berthing Pocket F 0m		82.719045	0.0009	<0.0002	<0.0002	0.00022	0.0004	0.00058	<0.0002	0.00041	<0.0002
2011/00864	23+25	Pock K + Anch Trench L 0m		56.200355	0.0015	<0.0002	<0.0002	0.0004	0.00063	0.001	0.00023	0.00074	0.00032
2011/00865	19+26	Chan I + Anch Tredge L 1m		62.191011	0.0014	<0.0002	<0.0002	0.00034	0.00062	0.00087	<0.0002	0.00065	0.00028
2011/00866	27	Approach Channel M 0m		71.546936	0.00074	<0.0002	<0.0002	<0.0002	0.00045	0.00043	<0.0002	0.00033	<0.0002
2011/00867	28	Approach Channel M 1m		78.155503	0.0013	<0.0002	<0.0002	0.00036	0.00053	0.00089	0.0002	0.00061	0.00035
2011/00868	36	Berthing Pocket Q 0m		55.339626	0.0015	<0.0002	<0.0002	0.00041	0.00064	0.001	0.00022	0.00068	0.00033
2011/00869	37	Berthing Pocket Q 1m		87.233641	<0.0002	<0.0002	<0.0002	<0.0002	0.00026	<0.0002	<0.0002	<0.0002	<0.0002
		Mean			0.00114	#DIV/0!	#DIV/0!	0.00035	0.00050	0.00074	0.00022	0.00053	0.00031

mg/kg (ppm) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#28	CB#31	CB#44	CB#47	CB#49	CB#52	CB#66	TOT25CBS	TOTICES7
2011/00859	1+4	Turning area A+C Surface		67.55828	0.0014	0.00082	0.00072	0.0016	0.00069	0.0012	0.00082	0.02011	0.00932
2011/00860	3	Turning Area B 1m		65.558152	0.0013	0.00072	0.00065	0.0014	0.00063	0.0011	0.00075	0.01701	0.00744
2011/00861	5	pproach Channel D Surface		66.075269	0.00051	0.00033	0.00029	0.00072	0.00029	0.0005	0.0003	0.00672	0.0032
2011/00862	8	Approach Channel E 1m		70.51718	0.00068	0.00044	0.0004	0.00088	0.00039	0.00065	0.00042	0.00918	0.00444
2011/00863	9	Berthing Pocket F 0m		82.719045	0.00079	0.00044	0.00046	0.0022	0.0004	0.00082	0.0005	0.01205	0.00508
2011/00864	23+25	Pock K + Anch Trench L 0m		56.200355	0.0014	0.00081	0.00069	0.0016	0.00068	0.0011	0.00082	0.01894	0.00816
2011/00865	19+26	Chan I + Anch Tredge L 1m		62.191011	0.0013	0.00075	0.00065	0.0015	0.00066	0.0011	0.00078	0.01998	0.01037
2011/00866	27	Approach Channel M 0m		71.546936	0.00074	0.00049	0.00042	0.00096	0.00042	0.00069	0.00044	0.0108	0.00595
2011/00867	28	Approach Channel M 1m		78.155503	0.0011	0.00064	0.00056	0.00069	0.00053	0.00091	0.00074	0.03047	0.02207
2011/00868	36	Berthing Pocket Q 0m		55.339626	0.0013	0.00074	0.00067	0.00077	0.00062	0.001	0.00077	0.03071	0.02099
2011/00869	37	Berthing Pocket Q 1m		87.233641	<0.0002	<0.0002	0.00027	<0.0002	0.00022	0.00039	0.00023	0.00208	0.00087
		Mean			0.00105	0.00062	0.00053	0.00123	0.00050	0.00086	0.00061	0.01619	0.00890
		AL1 (ppm dry)										0.02	0.01
		AL2 (ppm dry)										0.2	

HCB	DDE	
0.00112	0.00159	
0.00073	0.00157	
0.0004	0.00062	
0.00042	0.00081	
0.00041	0.00253	
0.00096	0.00163	
0.00086	0.0015	
0.00044	0.00085	
0.00065	0.0016	
0.00077	0.0016	
<0.0002	<0.0002	
0.00068	0.00143	#DIV/0!

Produced by: R.Faulkner
Date: 01/07/2011

Polychlorinated Biphenol Results for Defra/DAS:

Application no: IPCDC9172
Licensee: Richard Cram
Location: Killingholme
DC/MCU: 0
Date Sampled: 24/03/2011

mg/kg (ppm)
Wet weight

LSN	Sample No.	Location	Excluded	CB#101	CB#105	CB#110	CB#118	CB#128	CB#138	CB#141	CB#149	CB#151
2011/00859	1+4	Turning area A+C Surface		0.00155	0.00020	0.00088	0.00050	0.00015	0.00081	0.00020	0.00088	0.00026
2011/00860	3	Turning Area B 1m		0.00072	0.00016	0.00079	0.00044	0.00014	0.00072	0.00021	0.00072	0.00022
2011/00861	5	Approach Channel D Surface		0.00040	0.00013	0.00032	0.00020	0.00013	0.00028	0.00013	0.00031	0.00013
2011/00862	8	Approach Channel E 1m		0.00063	0.00014	0.00047	0.00028	0.00014	0.00044	0.00014	0.00044	0.00014
2011/00863	9	Berthing Pocket F 0m		0.00062	0.00017	0.00073	0.00040	0.00017	0.00063	0.00017	0.00065	0.00022
2011/00864	23+25	Pock K + Anch Trench L 0m		0.00067	0.00016	0.00073	0.00043	0.00012	0.00067	0.00021	0.00073	0.00023
2011/00865	19+26	Chan I + Anch Tredge L 1m		0.00236	0.00016	0.00075	0.00044	0.00012	0.00075	0.00022	0.00075	0.00023
2011/00866	27	Approach Channel M 0m		0.00165	0.00014	0.00050	0.00032	0.00014	0.00043	0.00014	0.00046	0.00014
2011/00867	28	Approach Channel M 1m		0.01250	0.00020	0.00086	0.00060	0.00017	0.00086	0.00024	0.00073	0.00030
2011/00868	36	Berthing Pocket Q 0m		0.00775	0.00018	0.00072	0.00049	0.00014	0.00072	0.00021	0.00061	0.00023
2011/00869	37	Berthing Pocket Q 1m		0.00024	0.00017	0.00020	0.00018	0.00017	0.00017	0.00017	0.00017	0.00017
		Mean wet weight for PR details ppm		0.00264	0.00017	0.00063	0.00039	0.00015	0.00059	0.00019	0.00059	0.00021

mg/kg (ppm)
Wet weight

LSN	Sample No.	Location	Excluded	CB#153	CB#156	CB#158	CB#170	CB#18	CB#180	CB#183	CB#187	CB#194
2011/00859	1+4	Turning area A+C Surface		0.00101	0.00014	0.00014	0.00028	0.00050	0.00066	0.00016	0.00045	0.00021
2011/00860	3	Turning Area B 1m		0.00085	0.00013	0.00013	0.00022	0.00038	0.00057	0.00014	0.00039	0.00018
2011/00861	5	Approach Channel D Surface		0.00036	0.00013	0.00013	0.00013	0.00021	0.00021	0.00013	0.00021	0.00013
2011/00862	8	Approach Channel E 1m		0.00053	0.00014	0.00014	0.00014	0.00026	0.00032	0.00014	0.00024	0.00014
2011/00863	9	Berthing Pocket F 0m		0.00074	0.00017	0.00017	0.00018	0.00033	0.00048	0.00017	0.00034	0.00017
2011/00864	23+25	Pock K + Anch Trench L 0m		0.00084	0.00011	0.00011	0.00023	0.00035	0.00056	0.00013	0.00042	0.00018
2011/00865	19+26	Chan I + Anch Tredge L 1m		0.00087	0.00012	0.00012	0.00021	0.00039	0.00054	0.00012	0.00040	0.00017
2011/00866	27	Approach Channel M 0m		0.00053	0.00014	0.00014	0.00014	0.00032	0.00031	0.00014	0.00024	0.00014
2011/00867	28	Approach Channel M 1m		0.00102	0.00016	0.00016	0.00028	0.00041	0.00070	0.00016	0.00048	0.00027
2011/00868	36	Berthing Pocket Q 0m		0.00083	0.00011	0.00011	0.00023	0.00035	0.00055	0.00012	0.00038	0.00018
2011/00869	37	Berthing Pocket Q 1m		0.00017	0.00017	0.00017	0.00017	0.00023	0.00017	0.00017	0.00017	0.00017
		Mean wet weight for PR details ppm		0.00071	0.00014	0.00014	0.00020	0.00034	0.00046	0.00014	0.00034	0.00018

mg/kg (ppm)
Wet weight

LSN	Sample No.	Location	Excluded	CB#28	CB#31	CB#44	CB#47	CB#49	CB#52	CB#66	TOT25CBS	TOTICES7
2011/00859	1+4	Turning area A+C Surface		0.00095	0.00055	0.00049	0.00108	0.00047	0.00081	0.00055	0.01360	0.00630
2011/00860	3	Turning Area B 1m		0.00085	0.00047	0.00043	0.00092	0.00041	0.00072	0.00049	0.01120	0.00488
2011/00861	5	Approach Channel D Surface		0.00034	0.00022	0.00019	0.00048	0.00019	0.00033	0.00020	0.00444	0.00211
2011/00862	8	Approach Channel E 1m		0.00048	0.00031	0.00028	0.00062	0.00028	0.00046	0.00030	0.00647	0.00313
2011/00863	9	Berthing Pocket F 0m		0.00065	0.00036	0.00038	0.00182	0.00033	0.00068	0.00041	0.00997	0.00420
2011/00864	23+25	Pock K + Anch Trench L 0m		0.00079	0.00046	0.00039	0.00090	0.00038	0.00062	0.00046	0.01060	0.00459
2011/00865	19+26	Chan I + Anch Tredge L 1m		0.00081	0.00047	0.00040	0.00093	0.00041	0.00068	0.00049	0.01240	0.00645
2011/00866	27	Approach Channel M 0m		0.00053	0.00035	0.00030	0.00069	0.00030	0.00049	0.00032	0.00773	0.00426
2011/00867	28	Approach Channel M 1m		0.00086	0.00050	0.00044	0.00054	0.00041	0.00071	0.00058	0.02380	0.01720
2011/00868	36	Berthing Pocket Q 0m		0.00072	0.00041	0.00037	0.00043	0.00034	0.00055	0.00048	0.01700	0.01160
2011/00869	37	Berthing Pocket Q 1m		0.00017	0.00017	0.00024	0.00017	0.00019	0.00034	0.00020	0.00181	0.00076
		Mean wet weight for PR details ppm		0.00065	0.00039	0.00036	0.00078	0.00034	0.00058	0.00041	0.01080	0.00595

HCB	DDE	
0.00076	0.00107	
0.00048	0.00103	
0.00026	0.00041	
0.00030	0.00057	
0.00034	0.00209	
0.00054	0.00092	
0.00054	0.00093	
0.00032	0.00061	
0.00051	0.00125	
0.00043	0.00089	
0.00017	0.00017	
HCB	DDE	BD109

Produced by: R.Faulkner
Date: 01/07/2011

PCB's, Results for Defra/DAS:

RAW DATA **PPB**

mg/kg (ppb) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#101	CB#105	CB#110	CB#118	CB#128	CB#138	CB#141	CB#149	CB#151
2011/00871					0	0	0	0	0	0	0	0	0
2011/00872					14	0.29	1	0.73	0.22	1	0.29	0.95	0.35
2011/00873					13	0.24	0.84	0.61	0	0.81	0.23	0.73	0.31
2011/00874					2.7	0.22	0.91	0.66	0	0.99	0.31	0.93	0.33
2011/00875					3	0	0.59	0.42	0	0.53	0	0.52	0
2011/00876					1.6	0.28	0.28	0	0	0.24	0	0	0
2011/00877					23	0.54	1.4	0.82	0.37	1.3	0.51	1.1	0.48
2011/00878					12	0.46	1	0.67	0.29	0.85	0.36	0.66	0.31
2011/00879					4.2	0.35	0.59	0.35	0.22	0.57	0.28	0.42	0.21
2011/00880					5	0.35	0.53	0.31	0.23	0.55	0.26	0.38	0
2011/00881					9.5	0.58	1.6	0.92	0.41	1.6	0.57	1.3	0.52
2011/00882					7.2	0.43	0.93	0.55	0.29	0.91	0.37	0.7	0.31
2011/00883					3.2	0.41	0.77	0.51	0.27	0.77	0.32	0.57	0.25
		Mean			7.56923	0.31923	0.80308	0.50385	0.17692	0.77846	0.26923	0.63538	0.23615

mg/kg (ppb) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#153	CB#156	CB#158	CB#170	CB#18	CB#180	CB#183	CB#187	CB#194
2011/00871					0	0	0	0	0	0	0	0	0
2011/00872					1.2	0	0	0.34	0.59	0.85	0.2	0.6	0.43
2011/00873					1	0	0	0.27	0.51	0.67	0	0.48	0.28
2011/00874					1.3	0	0	0.38	0.55	0.97	0.21	0.65	0.56
2011/00875					0.65	0	0	0	0.46	0.39	0	0.28	0
2011/00876					0	0	0	0	0	0.23	0	0	0
2011/00877					1.5	0.37	0	0.44	0	1.1	0.34	0.68	0.32
2011/00878					0.78	0.32	0	0.23	0	0.57	0.22	0.33	0
2011/00879					0.53	0.28	0	0	0	0.44	0	0.23	0
2011/00880					0.48	0.28	0	0	0	0.46	0	0.23	0
2011/00881					1.7	0.39	0	0.51	0.31	1.3	0.4	0.81	0.36
2011/00882					0.96	0.33	0	0.3	0	0.73	0.25	0.44	0.2
2011/00883					0.75	0.31	0	0.25	0	0.59	0.22	0.32	0
		Mean			0.83462	0.17538	0.00000	0.20923	0.18615	0.63846	0.14154	0.38846	0.16538

mg/kg (ppb) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#28	CB#31	CB#44	CB#47	CB#49	CB#52	CB#66	TOT25CBS	TOTICES7
2011/00871					0	0	0	0	0	0	0	0	0
2011/00872					0.99	0.59	0.55	0.75	0.5	0.9	0.7	28.02	19.67
2011/00873					0.81	0.52	0.44	0.66	0.41	0.72	0.58	24.12	17.62
2011/00874					0.88	0.54	0.5	0.69	0.48	0.79	0.66	16.21	8.29
2011/00875					0.57	0.38	0.36	0.47	0.34	0.57	0.42	9.95	6.13
2011/00876					0.29	0	0	0	0	0	0.26	3.18	2.36
2011/00877					1.5	0.92	0.75	1.2	0.65	1	1	41.29	30.22
2011/00878					0.76	0.44	0.37	0.77	0.27	0.57	0.62	22.85	16.2
2011/00879					0.67	0.39	0.31	0.76	0.21	0.37	0.47	11.85	7.13
2011/00880					0.6	0.37	0.21	0.43	0	0.23	0.46	11.36	7.63
2011/00881					1.8	1	0.83	1.2	0.73	1.2	1.1	30.64	18.02
2011/00882					1.1	0.66	0.48	0.81	0.38	0.64	0.73	19.7	12.09
2011/00883					0.82	0.52	0.36	0.6	0.28	0.46	0.59	13.14	7.1
		Mean			0.83000	0.48692	0.39692	0.64154	0.32692	0.57308	0.58385	17.87000	11.72769

HCB	DDE	
0	0	
0.66	1.4	
0.58	1.1	
0.64	1.2	
0.29	0.76	
0	0.58	
0.79	1.9	
0.79	1.1	
0.47	1	
0	0.86	
0.94	2.3	
0.55	1.3	
0.49	1.2	
0.47692	1.13077	#DIV/0!

Polychlorinated Biphenol Results for Defra/DAS:

Application no: IPCDC9172
Licensee: Richard Clam
Location: Killingholme
DC/MCU:
Date Sampled: 24/03/2011

mg/kg (ppm) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#101	CB#105	CB#110	CB#118	CB#128	CB#138	CB#141	CB#149	CB#151
2011/00871	40	Rec Area R 0m		80.5439	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2011/00872	45	Rec Area T 1m		62.3512	0.014	0.00029	0.001	0.00073	0.00022	0.001	0.00029	0.00095	0.00035
2011/00873	46+48+50	Rec Area U, V + W 0m		57.9122	0.013	0.00024	0.00084	0.00061	<0.0002	0.00081	0.00023	0.00073	0.00031
2011/00874	47 +49	Rec Area U +v 1m		62.0351	0.0027	0.00022	0.00091	0.00066	<0.0002	0.00099	0.00031	0.00093	0.00033
2011/00875	2	Turning Area B 0m		67.7681	0.003	<0.0002	0.00059	0.00042	<0.0002	0.00053	<0.0002	0.00052	<0.0002
2011/00876	7	Approach Channel E 0m		76.6187	0.0016	0.00028	0.00028	<0.0002	<0.0002	0.00024	<0.0002	<0.0002	<0.0002
2011/00877	12	Berthing Pocket G 0m		55.1559	0.023	0.00054	0.0014	0.00082	0.00037	0.0013	0.00051	0.0011	0.00048
2011/00878	15	Anchorage Trench H 0m		74.2531	0.012	0.00046	0.001	0.00067	0.00029	0.00085	0.00036	0.00066	0.00031
2011/00879	18	Approach Channel I 0m		69.7516	0.0042	0.00035	0.00059	0.00035	0.00022	0.00057	0.00028	0.00042	0.00021
2011/00880	29	Approach Channel N 0m		77.2661	0.005	0.00035	0.00053	0.00031	0.00023	0.00055	0.00026	0.00038	<0.0002
2011/00881	30	Approach Channel N 1m		55.2821	0.0095	0.00058	0.0016	0.00092	0.00041	0.0016	0.00057	0.0013	0.00052
2011/00882	42	Rec Area S 0m		61.7584	0.0072	0.00043	0.00093	0.00055	0.00029	0.00091	0.00037	0.0007	0.00031
2011/00883	44	Rec Area T 0m		56.7137	0.0032	0.00041	0.00077	0.00051	0.00027	0.00077	0.00032	0.00057	0.00025
		Mean			0.00820	0.00038	0.00087	0.00060	0.00029	0.00084	0.00035	0.00075	0.00034

mg/kg (ppm) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#153	CB#156	CB#158	CB#170	CB#18	CB#180	CB#183	CB#187	CB#194
2011/00871	40	Rec Area R 0m		80.543865	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2011/00872	45	Rec Area T 1m		62.351244	0.0012	<0.0002	<0.0002	0.00034	0.00059	0.00085	0.0002	0.0006	0.00043
2011/00873	46+48+50	Rec Area U, V + W 0m		57.912152	0.001	<0.0002	<0.0002	0.00027	0.00051	0.00067	<0.0002	0.00048	0.00028
2011/00874	47 +49	Rec Area U +v 1m		62.035088	0.0013	<0.0002	<0.0002	0.00038	0.00055	0.00097	0.00021	0.00065	0.00056
2011/00875	2	Turning Area B 0m		67.768092	0.00065	<0.0002	<0.0002	<0.0002	0.00046	0.00039	<0.0002	0.00028	<0.0002
2011/00876	7	Approach Channel E 0m		76.618671	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00023	<0.0002	<0.0002	<0.0002
2011/00877	12	Berthing Pocket G 0m		55.155875	0.0015	0.00037	<0.0002	0.00044	<0.0002	0.0011	0.00034	0.00068	0.00032
2011/00878	15	Anchorage Trench H 0m		74.253076	0.00078	0.00032	<0.0002	0.00023	<0.0002	0.00057	0.00022	0.00033	<0.0002
2011/00879	18	Approach Channel I 0m		69.751647	0.00053	0.00028	<0.0002	<0.0002	<0.0002	0.00044	<0.0002	0.00023	<0.0002
2011/00880	29	Approach Channel N 0m		77.266131	0.00048	0.00028	<0.0002	<0.0002	<0.0002	0.00046	<0.0002	0.00023	<0.0002
2011/00881	30	Approach Channel N 1m		55.282113	0.0017	0.00039	<0.0002	0.00051	0.00031	0.0013	0.0004	0.00081	0.00036
2011/00882	42	Rec Area S 0m		61.758387	0.00096	0.00033	<0.0002	0.0003	<0.0002	0.00073	0.00025	0.00044	0.0002
2011/00883	44	Rec Area T 0m		56.713746	0.00075	0.00031	<0.0002	0.00025	<0.0002	0.00059	0.00022	0.00032	<0.0002
		Mean			0.00099	0.00033	#DIV/0!	0.00034	0.00048	0.00069	0.00026	0.00046	0.00036

mg/kg (ppm) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	CB#28	CB#31	CB#44	CB#47	CB#49	CB#52	CB#66	TOT25CBS	TOTICES7
2011/00871	40	Rec Area R 0m		80.543865	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2011/00872	45	Rec Area T 1m		62.351244	0.00099	0.00059	0.00055	0.00075	0.0005	0.0009	0.0007	0.02802	0.01967
2011/00873	46+48+50	Rec Area U, V + W 0m		57.912152	0.00081	0.00052	0.00044	0.00066	0.00041	0.00072	0.00058	0.02412	0.01762
2011/00874	47 +49	Rec Area U +v 1m		62.035088	0.00088	0.00054	0.0005	0.00069	0.00048	0.00079	0.00066	0.01621	0.00829
2011/00875	2	Turning Area B 0m		67.768092	0.00057	0.00038	0.00036	0.00047	0.00034	0.00057	0.00042	0.00995	0.00613
2011/00876	7	Approach Channel E 0m		76.618671	0.00029	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00026	0.00318	0.00236
2011/00877	12	Berthing Pocket G 0m		55.155875	0.0015	0.00092	0.00075	0.0012	0.00065	0.001	0.001	0.04129	0.03022
2011/00878	15	Anchorage Trench H 0m		74.253076	0.00076	0.00044	0.00037	0.00077	0.00027	0.00057	0.00062	0.02285	0.0162
2011/00879	18	Approach Channel I 0m		69.751647	0.00067	0.00039	0.00031	0.00076	0.00021	0.00037	0.00047	0.01185	0.00713
2011/00880	29	Approach Channel N 0m		77.266131	0.0006	0.00037	0.00021	0.00043	<0.0002	0.00023	0.00046	0.01136	0.00763
2011/00881	30	Approach Channel N 1m		55.282113	0.0018	0.001	0.00083	0.0012	0.00073	0.0012	0.0011	0.03064	0.01802
2011/00882	42	Rec Area S 0m		61.758387	0.0011	0.00066	0.00048	0.00081	0.00038	0.00064	0.00073	0.0197	0.01209
2011/00883	44	Rec Area T 0m		56.713746	0.00082	0.00052	0.00036	0.0006	0.00028	0.00046	0.00059	0.01314	0.0071
		Mean			0.00090	0.00058	0.00047	0.00076	0.00043	0.00068	0.00063	0.01936	0.01271
		AL1 (ppm dry)										0.02	0.01
		AL2 (ppm dry)										0.2	

HCB	DDE	
<0.0002	<0.0002	
0.00066	0.0014	
0.00058	0.0011	
0.00064	0.0012	
0.00029	0.00076	
<0.0002	0.00058	
0.00079	0.0019	
0.00079	0.0011	
0.00047	0.001	
<0.0002	0.00086	
0.00094	0.0023	
0.00055	0.0013	
0.00049	0.0012	
0.00062	0.00123	#DIV/0!

Produced by: R.FAULKNER
Date: 01/07/2011

Polychlorinated Biphenol Results for Defra/DAS:

Application no: IPCDC9172
Licensee: Richard Clam
Location: Killingholme
DC/MCU: 0
Date Sampled: 24/03/2011

mg/kg (ppm)
Wet weight

LSN	Sample No.	Location	Excluded	CB#101	CB#105	CB#110	CB#118	CB#128	CB#138	CB#141	CB#149	CB#151
2011/00871	40	Rec Area R 0m		0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016
2011/00872	45	Rec Area T 1m		0.00873	0.00018	0.00062	0.00046	0.00014	0.00062	0.00018	0.00059	0.00022
2011/00873	46+48+50	Rec Area U, V + W 0m		0.00753	0.00014	0.00049	0.00035	0.00012	0.00047	0.00013	0.00042	0.00018
2011/00874	47 +49	Rec Area U +v 1m		0.00167	0.00014	0.00057	0.00041	0.00012	0.00061	0.00019	0.00058	0.00021
2011/00875	2	Turning Area B 0m		0.00203	0.00014	0.00040	0.00029	0.00014	0.00036	0.00014	0.00035	0.00014
2011/00876	7	Approach Channel E 0m		0.00123	0.00022	0.00022	0.00015	0.00015	0.00018	0.00015	0.00015	0.00015
2011/00877	12	Berthing Pocket G 0m		0.01270	0.00030	0.00077	0.00045	0.00020	0.00072	0.00028	0.00061	0.00027
2011/00878	15	Anchorage Trench H 0m		0.00891	0.00034	0.00074	0.00050	0.00022	0.00063	0.00027	0.00049	0.00023
2011/00879	18	Approach Channel I 0m		0.00293	0.00024	0.00041	0.00024	0.00015	0.00040	0.00020	0.00029	0.00015
2011/00880	29	Approach Channel N 0m		0.00386	0.00027	0.00041	0.00024	0.00018	0.00043	0.00020	0.00029	0.00016
2011/00881	30	Approach Channel N 1m		0.00525	0.00032	0.00089	0.00051	0.00023	0.00089	0.00032	0.00072	0.00029
2011/00882	42	Rec Area S 0m		0.00445	0.00027	0.00057	0.00034	0.00018	0.00056	0.00023	0.00043	0.00019
2011/00883	44	Rec Area T 0m		0.00181	0.00023	0.00044	0.00029	0.00015	0.00044	0.00018	0.00032	0.00014
		Mean wet weight for PR details ppm		0.00471	0.00023	0.00051	0.00034	0.00016	0.00050	0.00020	0.00042	0.00019

mg/kg (ppm)
Wet weight

LSN	Sample No.	Location	Excluded	CB#153	CB#156	CB#158	CB#170	CB#18	CB#180	CB#183	CB#187	CB#194
2011/00871	40	Rec Area R 0m		0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016
2011/00872	45	Rec Area T 1m		0.00075	0.00013	0.00013	0.00021	0.00037	0.00053	0.00013	0.00037	0.00027
2011/00873	46+48+50	Rec Area U, V + W 0m		0.00058	0.00012	0.00012	0.00016	0.00030	0.00039	0.00012	0.00028	0.00016
2011/00874	47 +49	Rec Area U +v 1m		0.00081	0.00012	0.00012	0.00024	0.00034	0.00060	0.00013	0.00040	0.00035
2011/00875	2	Turning Area B 0m		0.00044	0.00014	0.00014	0.00014	0.00031	0.00026	0.00014	0.00019	0.00014
2011/00876	7	Approach Channel E 0m		0.00015	0.00015	0.00015	0.00015	0.00015	0.00018	0.00015	0.00015	0.00015
2011/00877	12	Berthing Pocket G 0m		0.00083	0.00020	0.00011	0.00024	0.00011	0.00061	0.00019	0.00038	0.00018
2011/00878	15	Anchorage Trench H 0m		0.00058	0.00024	0.00015	0.00017	0.00015	0.00042	0.00016	0.00025	0.00015
2011/00879	18	Approach Channel I 0m		0.00037	0.00020	0.00014	0.00014	0.00014	0.00031	0.00014	0.00016	0.00014
2011/00880	29	Approach Channel N 0m		0.00037	0.00022	0.00016	0.00016	0.00016	0.00036	0.00016	0.00018	0.00016
2011/00881	30	Approach Channel N 1m		0.00094	0.00022	0.00011	0.00028	0.00017	0.00072	0.00022	0.00045	0.00020
2011/00882	42	Rec Area S 0m		0.00059	0.00020	0.00012	0.00019	0.00012	0.00045	0.00015	0.00027	0.00012
2011/00883	44	Rec Area T 0m		0.00043	0.00018	0.00011	0.00014	0.00011	0.00034	0.00013	0.00018	0.00011
		Mean wet weight for PR details ppm		0.00054	0.00017	0.00013	0.00018	0.00020	0.00041	0.00015	0.00026	0.00018

mg/kg (ppm)
Wet weight

LSN	Sample No.	Location	Excluded	CB#28	CB#31	CB#44	CB#47	CB#49	CB#52	CB#66	TOT25CBS	TOTICES7
2011/00871	40	Rec Area R 0m		0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016
2011/00872	45	Rec Area T 1m		0.00062	0.00037	0.00034	0.00047	0.00031	0.00056	0.00044	0.01750	0.01230
2011/00873	46+48+50	Rec Area U, V + W 0m		0.00047	0.00030	0.00026	0.00038	0.00024	0.00042	0.00034	0.01400	0.01020
2011/00874	47 +49	Rec Area U +v 1m		0.00055	0.00034	0.00031	0.00043	0.00030	0.00049	0.00041	0.01010	0.00514
2011/00875	2	Turning Area B 0m		0.00039	0.00026	0.00024	0.00032	0.00023	0.00039	0.00029	0.00674	0.00415
2011/00876	7	Approach Channel E 0m		0.00022	0.00015	0.00015	0.00015	0.00015	0.00015	0.00020	0.00244	0.00181
2011/00877	12	Berthing Pocket G 0m		0.00083	0.00051	0.00041	0.00066	0.00036	0.00055	0.00055	0.02280	0.01670
2011/00878	15	Anchorage Trench H 0m		0.00056	0.00033	0.00028	0.00057	0.00020	0.00042	0.00046	0.01700	0.01200
2011/00879	18	Approach Channel I 0m		0.00047	0.00027	0.00022	0.00053	0.00015	0.00026	0.00033	0.00827	0.00497
2011/00880	29	Approach Channel N 0m		0.00046	0.00029	0.00016	0.00033	0.00016	0.00018	0.00036	0.00878	0.00590
2011/00881	30	Approach Channel N 1m		0.00100	0.00055	0.00046	0.00066	0.00040	0.00066	0.00061	0.01690	0.00996
2011/00882	42	Rec Area S 0m		0.00068	0.00041	0.00030	0.00050	0.00024	0.00040	0.00045	0.01220	0.00747
2011/00883	44	Rec Area T 0m		0.00047	0.00030	0.00020	0.00034	0.00016	0.00026	0.00034	0.00745	0.00403
		Mean wet weight for PR details ppm		0.00053	0.00033	0.00027	0.00042	0.00024	0.00038	0.00038	0.01110	0.00729

HCB	DDE	
0.00016	0.00016	
0.00041	0.00087	
0.00034	0.00064	
0.00040	0.00074	
0.00020	0.00052	
0.00015	0.00044	
0.00044	0.00105	
0.00059	0.00082	
0.00033	0.00070	
0.00016	0.00066	
0.00052	0.00127	
0.00034	0.00080	
0.00028	0.00068	
HCB	DDE	BD109

Produced by: R.FAULKNER
Date: 01/07/2011

Polycyclic Aromatic Hydrocarbon Results for Defra

Das: IPCDC9172
Application: Able UK
Location: Killingholme
DC/MCU:
Date Sampled: 24/03/2011

mg/kg (ppm) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	23BA	ACENAPH	ACENAPT	ANTHRAC	BAA	BAP	BBF	BENZGHI	BEP	BKF	C1N	C1PHEN
2011/00859	1+4	Turning Area A+C surface		67.5583	0.000	0.025	0.100	0.141	0.368	0.460	0.487	0.449	0.394	0.263	1.276	1.105
2011/00860	3	Turning Area B 1.0m		65.5582	0.000	0.034	0.119	0.154	0.443	0.518	0.612	0.541	0.471	0.310	1.597	1.261
2011/00861	5	Approach Channel D 0m		66.0753	0.000	0.015	0.049	0.067	0.207	0.224	0.257	0.235	0.224	0.133	0.898	0.768
2011/00862	8	Approach Channel E 1.0m		70.5172	0.000	0.013	0.043	0.056	0.183	0.181	0.240	0.233	0.210	0.123	0.761	0.617
2011/00863	9	Berthing Pocket F 0m		82.7190	0.000	0.019	0.062	0.073	0.238	0.260	0.333	0.305	0.273	0.150	0.573	0.639
2011/00864	23+25	Berthing Pocket K+L 0m		56.2004	0.000	0.028	0.103	0.147	0.432	0.512	0.654	0.541	0.468	0.313	1.640	1.320
2011/00865	19+26	Approach Channel I+L 1.0m		62.1910	0.000	0.025	0.081	0.149	0.368	0.423	0.554	0.430	0.390	0.261	1.363	1.197
2011/00866	27	Approach Channel M 0m		71.5469	0.000	0.015	0.051	0.075	0.212	0.225	0.287	0.237	0.222	0.134	0.869	0.726
2011/00867	28	Approach Channel M 1.0m		78.1555	0.000	0.012	0.041	0.054	0.178	0.204	0.251	0.224	0.196	0.122	0.604	0.534
2011/00868	36	Berthing Pocket Q 0m		55.3396	0.000	0.029	0.087	0.132	0.418	0.512	0.611	0.573	0.511	0.308	1.481	1.223
2011/00869	37	Berthing Pocket Q 1.0m		87.2336	0.000	0.000	0.001	0.002	0.008	0.008	0.013	0.021	0.014	0.004	0.034	0.024
2011/00871	40	Reclamation Area R 0m		80.5439	0.000	0.000	0.024	0.025	0.087	0.110	0.123	0.197	0.125	0.031	0.687	1.129
2011/00872	45	Reclamation Area T 1.0m		62.3512	0.000	0.021	0.091	0.121	0.308	0.470	0.461	0.457	0.349	0.221	1.719	1.464
2011/00873	46+48+50	Reclamation Area U+V+W 0m		57.9122	0.000	0.016	0.082	0.114	0.309	0.430	0.474	0.429	0.333	0.203	1.683	1.328
2011/00874	47+49	Reclamation Area U+V 1m		62.0351	0.000	0.024	0.079	0.123	0.321	0.450	0.492	0.421	0.321	0.213	1.654	1.464
2011/00875	2	Turning Area B 0m		67.7681	0.000	0.009	0.059	0.080	0.155	0.217	0.203	0.195	0.160	0.100	0.789	0.587
2011/00876	7	Approach Channel E 0m		76.6187	0.000	0.003	0.013	0.020	0.066	0.096	0.093	0.093	0.074	0.047	0.317	0.268
2011/00877	12	Berthing Pocket G 0m		55.1559	0.000	0.025	0.098	0.143	0.393	0.576	0.657	0.566	0.441	0.291	1.793	1.682
2011/00878	15	Anchorage Trench H 0m		74.2531	0.000	0.009	0.043	0.067	0.164	0.222	0.225	0.219	0.178	0.096	1.177	0.955
2011/00879	18	Aproach Channel I 0m		69.7516	0.000	0.011	0.088	0.125	0.263	0.325	0.377	0.347	0.288	0.140	2.426	2.323
2011/00880	29	Approach Channel N 0m		77.2661	0.000	0.002	0.010	0.019	0.041	0.053	0.061	0.053	0.044	0.028	0.164	0.139
2011/00881	30	Approach Channel N 1.0m		55.2821	0.000	0.023	0.106	0.149	0.413	0.536	0.674	0.607	0.473	0.304	1.604	1.302
		Mean			0.000	0.016	0.065	0.093	0.253	0.319	0.370	0.335	0.280	0.173	1.141	1.003
	AL1 (ppm dry)				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

mg/kg (ppm) Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	C2N	C3N	CHRYSEN	DBENZAH	FLUORAN	FLUOREN	INDPYR	NAPTH	PERYLEN	PHENANT	PYRENE	THC
2011/00859	1+4	Turning Area A+C surface		67.5583	2.308	2.931	0.297	0.082	0.725	0.155	0.430	0.388	0.187	0.548	0.597	1006
2011/00860	3	Turning Area B 1.0m		65.5582	2.873	3.804	0.361	0.100	0.850	0.205	0.511	0.472	0.253	0.663	0.652	1107
2011/00861	5	Approach Channel D 0m		66.0753	1.589	2.027	0.170	0.040	0.376	0.091	0.200	0.255	0.099	0.376	0.328	591
2011/00862	8	Approach Channel E 1.0m		70.5172	1.481	1.828	0.138	0.032	0.300	0.080	0.188	0.226	0.090	0.318	0.256	478
2011/00863	9	Berthing Pocket F 0m		82.7190	1.149	1.521	0.203	0.049	0.384	0.080	0.277	0.195	0.089	0.351	0.357	483
2011/00864	23+25	Berthing Pocket K+L 0m		56.2004	2.909	3.689	0.316	0.095	0.821	0.192	0.492	0.489	0.229	0.692	0.639	1114
2011/00865	19+26	Approach Channel I+L 1.0m		62.1910	2.428	3.065	0.289	0.072	0.705	0.160	0.405	0.388	0.188	0.579	0.581	914
2011/00866	27	Approach Channel M 0m		71.5469	1.436	1.856	0.166	0.037	0.393	0.103	0.207	0.246	0.106	0.362	0.299	601
2011/00867	28	Approach Channel M 1.0m		78.1555	1.124	1.371	0.136	0.035	0.308	0.080	0.206	0.187	0.101	0.261	0.237	450
2011/00868	36	Berthing Pocket Q 0m		55.3396	2.670	3.194	0.323	0.094	0.773	0.176	0.527	0.440	0.240	0.657	0.602	794
2011/00869	37	Berthing Pocket Q 1.0m		87.2336	0.038	0.055	0.006	0.002	0.010	0.003	0.009	0.010	0.003	0.013	0.009	79
2011/00871	40	Reclamation Area R 0m		80.5439	1.339	2.603	0.071	0.021	0.140	0.068	0.059	0.100	0.044	0.355	0.173	788
2011/00872	45	Reclamation Area T 1.0m		62.3512	2.756	3.892	0.242	0.076	0.675	0.193	0.400	0.456	0.212	0.611	0.499	955
2011/00873	46+48+50	Reclamation Area U+V+W 0m		57.9122	2.519	3.585	0.253	0.070	0.630	0.189	0.363	0.437	0.202	0.594	0.478	995
2011/00874	47+49	Reclamation Area U+V 1m		62.0351	2.350	3.316	0.256	0.074	0.694	0.185	0.381	0.442	0.193	0.578	0.586	968
2011/00875	2	Turning Area B 0m		67.7681	1.127	1.605	0.124	0.033	0.362	0.099	0.182	0.224	0.097	0.298	0.281	516
2011/00876	7	Approach Channel E 0m		76.6187	0.420	0.659	0.052	0.016	0.125	0.030	0.080	0.078	0.042	0.136	0.094	279
2011/00877	12	Berthing Pocket G 0m		55.1559	2.733	3.938	0.326	0.096	0.839	0.210	0.525	0.486	0.272	0.687	0.632	1064
2011/00878	15	Anchorage Trench H 0m		74.2531	1.707	2.650	0.136	0.035	0.315	0.099	0.177	0.295	0.099	0.366	0.249	588
2011/00879	18	Aproach Channel I 0m		69.7516	4.129	6.456	0.226	0.054	0.537	0.164	0.233	0.568	0.129	0.848	0.523	1127
2011/00880	29	Approach Channel N 0m		77.2661	0.243	0.334	0.033	0.009	0.092	0.021	0.048	0.052	0.027	0.074	0.070	174
2011/00881	30	Approach Channel N 1.0m		55.2821	2.557	3.516	0.371	0.104	0.797	0.202	0.535	0.460	0.276	0.733	0.669	1230
		Mean			1.904	2.632	0.204	0.056	0.493	0.127	0.293	0.313	0.145	0.459	0.400	741
	AL1 (ppm dry)				0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100

Produced by: ARB
Date: 06/07/2011

Polycyclic Aromatic Hydrocarbon Results for Defra

Das: IPCDC9172
Application: Able UK
Location: Killingholme
DC/MCU: 0
Date Sampled: 24/03/2011

ug/kg (ppb) Wet weight

LSN	Sample No.	Location	Excluded	23BA	ACENAPH	ACENAPT	ANTHRAC	BAA	BAP	BBF	BENZGHI	BEP	BKF	C1N	C1PHEN
2011/00859	1+4	Turning Area A+C surface		0	17.1	67.2	95.2	249	311	329	303	266	177	862	747
2011/00860	3	Turning Area B 1.0m		0	22	77.7	101	291	339	401	355	309	203	1050	827
2011/00861	5	Approach Channel D 0m		0	9.7	32.5	44	137	148	170	156	148	88.1	594	507
2011/00862	8	Approach Channel E 1.0m		0	8.91	30.6	39.4	129	127	169	164	148	86.7	536	435
2011/00863	9	Berthing Pocket F 0m		0	16	51.4	60.8	197	215	275	252	226	124	474	529
2011/00864	23+25	Berthing Pocket K+L 0m		0	15.8	57.9	82.7	243	287	368	304	263	176	922	742
2011/00865	19+26	Approach Channel I+L 1.0m		0	15.7	50.3	93	229	263	344	267	242	163	848	744
2011/00866	27	Approach Channel M 0m		0	10.6	36.4	53.9	151	161	205	169	159	95.6	621	520
2011/00867	28	Approach Channel M 1.0m		0	9.11	32	42.4	139	160	196	175	153	95.7	472	418
2011/00868	36	Berthing Pocket Q 0m		0	16.1	48.3	72.9	231	283	338	317	283	170	820	677
2011/00869	37	Berthing Pocket Q 1.0m		0	0.305	0.698	1.33	7.34	7.37	11.6	18.4	11.9	3.79	29.4	21.2
2011/00871	40	Reclamation Area R 0m		0	0	19	20.2	70.1	88.8	98.9	158	101	24.9	553	909
2011/00872	45	Reclamation Area T 1.0m		0	12.8	56.5	75.6	192	293	287	285	218	138	1070	913
2011/00873	46+48+50	Reclamation Area U+V+W 0m		0	9.49	47.3	66.3	179	249	274	249	193	118	975	769
2011/00874	47+49	Reclamation Area U+V 1m		0	14.8	48.7	76.5	199	279	305	261	199	132	1030	908
2011/00875	2	Turning Area B 0m		0	6.28	40	54	105	147	138	132	108	68	535	398
2011/00876	7	Approach Channel E 0m		0	2.5	10	15.4	50.5	73.9	71.5	71.5	56.3	35.9	243	205
2011/00877	12	Berthing Pocket G 0m		0	13.6	54.1	79	217	318	362	312	243	161	989	928
2011/00878	15	Anchorage Trench H 0m		0	6.53	31.7	50	122	165	167	163	132	71.4	874	709
2011/00879	18	Aproach Channel I 0m		0	7.4	61	87	184	226	263	242	201	97.3	1690	1620
2011/00880	29	Approach Channel N 0m		0	1.92	7.98	14.5	32	40.7	47.3	40.8	33.9	21.9	127	108
2011/00881	30	Approach Channel N 1.0m		0	12.6	58.6	82.3	228	296	372	336	261	168	887	720
		Mean wet weight for PR details ppb (THC ppm)		0	10.4	41.8	59.4	163	204	236	215	180	110	736	652

ug/kg (ppb) Wet weight — mg/kg (ppm)

LSN	Sample No.	Location	Excluded	C2N	C3N	CHRYSEN	DBENZAH	FLUORAN	FLUOREN	INDPYR	NAPTH	PERYLEN	PHENANT	PYRENE	THC
2011/00859	1+4	Turning Area A+C surface		1560	1980	201	55.7	489	105	291	262	126	370	403	680
2011/00860	3	Turning Area B 1.0m		1880	2490	237	65.4	557	134	335	309	166	435	427	726
2011/00861	5	Approach Channel D 0m		1050	1340	112	26.7	248	60.1	132	168	65.4	249	216	391
2011/00862	8	Approach Channel E 1.0m		1040	1290	97.3	22.5	212	56.6	132	160	63.8	224	181	337
2011/00863	9	Berthing Pocket F 0m		951	1260	168	40.3	317	66	230	161	73.6	290	295	400
2011/00864	23+25	Berthing Pocket K+L 0m		1640	2070	178	53.6	461	108	277	275	129	389	359	626
2011/00865	19+26	Approach Channel I+L 1.0m		1510	1910	180	45	439	99.4	252	241	117	360	361	568
2011/00866	27	Approach Channel M 0m		1030	1330	119	26.7	282	74	148	176	76	259	214	430
2011/00867	28	Approach Channel M 1.0m		879	1070	107	27.6	241	62.6	161	146	78.7	204	185	352
2011/00868	36	Berthing Pocket Q 0m		1480	1770	179	52.1	428	97.5	292	243	133	364	333	439
2011/00869	37	Berthing Pocket Q 1.0m		33.1	47.6	4.93	1.92	8.71	2.9	8.01	8.33	2.43	11.1	8.04	68.9
2011/00871	40	Reclamation Area R 0m		1080	2100	57	16.7	113	55.1	47.8	80.2	35.4	286	139	635
2011/00872	45	Reclamation Area T 1.0m		1720	2430	151	47.2	421	121	249	285	132	381	311	595
2011/00873	46+48+50	Reclamation Area U+V+W 0m		1460	2080	146	40.8	365	110	210	253	117	344	277	576
2011/00874	47+49	Reclamation Area U+V 1m		1460	2060	159	45.6	431	115	236	274	120	358	363	600
2011/00875	2	Turning Area B 0m		764	1090	83.7	22.4	245	67.4	123	152	65.9	202	190	350
2011/00876	7	Approach Channel E 0m		322	505	39.9	11.9	95.8	23.2	61.6	60	32.5	104	72.1	214
2011/00877	12	Berthing Pocket G 0m		1510	2170	180	53	463	116	289	268	150	379	349	587
2011/00878	15	Anchorage Trench H 0m		1270	1970	101	26	234	73.5	132	219	73.3	272	185	437
2011/00879	18	Aproach Channel I 0m		2880	4500	158	37.7	375	114	163	396	90.1	592	365	786
2011/00880	29	Approach Channel N 0m		188	258	25.4	6.93	70.8	16	37	39.8	20.6	57.4	53.8	134
2011/00881	30	Approach Channel N 1.0m		1410	1940	205	57.5	441	112	296	254	153	405	370	680
		Mean wet weight for PR details ppb (THC ppm)		1230	1710	131	35.6	315	81.3	186	201	91.9	297	257	482

Produced by: ARB
Date: 06/07/2011

Polycyclic Aromatic Hydrocarbon Results for Defra

Das: IPCDC9172
Application: Able UK
Location: Killingholme
DC/MCU:
Date Sampled: 24/03/2011

mg/kg (ppm)
Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	23BA	ACENAPH	ACENAPT	ANTHRAC	BAA	BAP	BBF	BENZGHI	BEP	BKF	C1N	C1PHEN
2011/00882	42	Reclamation Area S 0m		61.7584	0.000	0.018	0.085	0.128	0.347	0.406	0.485	0.448	0.357	0.231	1.458	1.159
2011/00883	44	Reclamation Area T 0m		56.7137	0.000	0.014	0.070	0.099	0.283	0.317	0.411	0.402	0.323	0.186	1.262	1.139
		Mean			0.000	0.016	0.078	0.114	0.315	0.361	0.448	0.425	0.340	0.208	1.360	1.149
	AL1 (ppm dry)				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

mg/kg (ppm)
Dry weight

LSN	Sample No.	Location	Excluded	TS (%)	C2N	C3N	CHRYSEN	DBENZAH	FLUORAN	FLUOREN	INDPYR	NAPTH	PERYLEN	PHENANT	PYRENE	THC
2011/00882	42	Reclamation Area S 0m		61.7584	2.431	3.452	0.308	0.076	0.671	0.162	0.374	0.427	0.180	0.668	0.567	1018
2011/00883	44	Reclamation Area T 0m		56.7137	2.326	3.005	0.280	0.066	0.513	0.136	0.296	0.398	0.144	0.644	0.440	952
		Mean			2.378	3.229	0.294	0.071	0.592	0.149	0.335	0.413	0.162	0.656	0.504	985
	AL1 (ppm dry)				0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100

Produced by: ARB
Date: 06/07/2011

Polycyclic Aromatic Hydrocarbon Results for Defra

Das: IPCDC9172
Application: Able UK
Location: Killingholme
DC/MCU: 0
Date Sampled: 24/03/2011

ug/kg (ppb) Wet weight

LSN	Sample No.	Location	Excluded	23BA	ACENAPH	ACENAPT	ANTHRAC	BAA	BAP	BBF	BENZGHI	BEP	BKF	C1N	C1PHEN
2011/00882	42	Reclamation Area S 0m		0	11.4	52.6	79	214	251	300	277	221	143	901	716
2011/00883	44	Reclamation Area T 0m		0	7.98	39.7	56.2	160	180	233	228	183	105	716	646
Mean wet weight for PR details ppb (THC ppm)				0	9.69	46.2	67.6	187	216	267	253	202	124	809	681

ug/kg (ppb) Wet weight — mg/kg (ppm)

LSN	Sample No.	Location	Excluded	C2N	C3N	CHRYSEN	DBENZAH	FLUORAN	FLUOREN	INDPYR	NAPTH	PERYLEN	PHENANT	PYRENE	THC
2011/00882	42	Reclamation Area S 0m		1500	2130	190	46.7	415	100	231	264	111	413	350	629
2011/00883	44	Reclamation Area T 0m		1320	1700	159	37.5	291	76.9	168	226	81.8	365	250	540
Mean wet weight for PR details ppb (THC ppm)				1410	1920	175	42.1	353	88.5	200	245	96.4	389	300	585

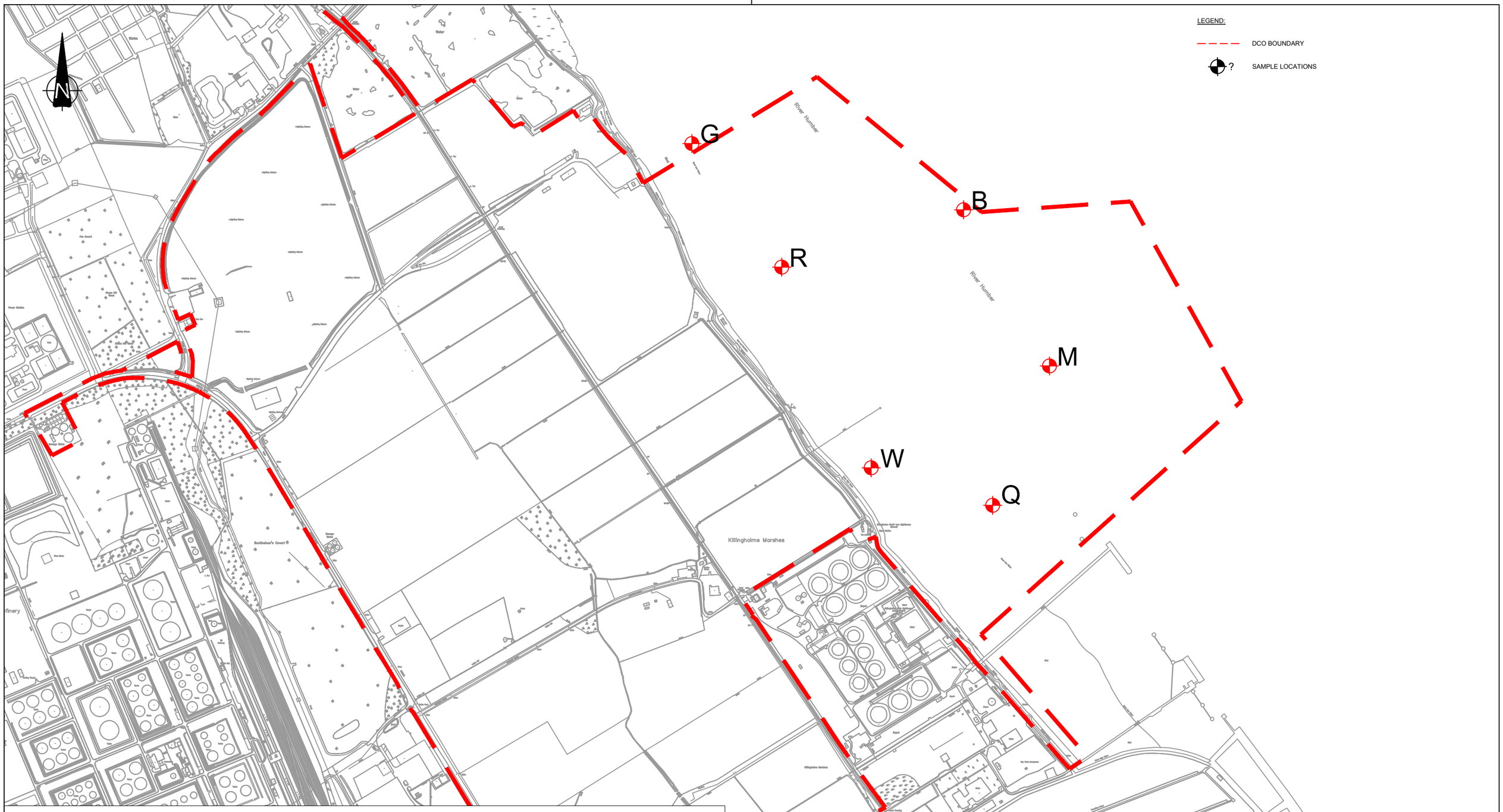
Produced by: ARB
Date: 06/07/2011

F002_V5_SP_24/06/10

Able Marine Energy Park

Material Change 2

2017 Sediment Sampling Results



Station (CEFAS 2011)	Sample Number (CEFAS 2011)	Sample Location	Sediment depth	Lat (WGS84)	Long (WGS84)
B	2	Turning Area B	Surface	53.6568	-0.2134
G	12	Berthing Pocket G	Surface	53.6586	-0.2246
M	27	Approach Channel M	Surface	53.6529	-0.21
Q	36	Berthing Pocket Q	Surface	53.6495	-0.21253
R	40	Reclamation Area R	Surface	53.65549	-0.22102
W	50	Reclamation Area W	Surface	53.65053	-0.21751

PLAN, 1:10,000
CONTAMINATION SAMPLING

No.:	Revision:	Date:	Init.:	Check:	Approved:
Job:	AMEP: DESIGN OF WORKS No.1 & ASSOCIATED DEVELOPMENTS	Job no.:	222257		
		Date:	2017-04-10		
Title:	CONTAMINATION SAMPLING 2017	Dwg No.:	FIGURE		Rev.:
Cad File:	Sampling Figure.dwg	Init.: ACW	Check: SMZ	Appr.: BNC	Scale: 1:10,000

able NIRAS
Sortemosevej 19
DK-3450 Allerod
Denmark
Phone +45 4810 4200
Telefax +45 4810 4300
E-mail niras@niras.dk

Print: 10/04/2017 14:38:56

Sample Description	Site B	Site G	Site J	Site M	Site Q	Site R	Site T	Site W	CCSX	CCSY	CCSZ
THC (Total Hydrocarbon Content)	10	1220	1110	132	1110	1050	1120	1110	1080	782	1260
Acenaphthylene*	0.11	17.3	13.8	2.24	13.9	13.1	13.3	13	14.2	13.1	18.5
Acenapthene*	0.981	71.3	60.4	8.63	70.3	67.2	53.9	62.7	72.1	52.9	94.4
Anthracene*	1.23	135	92.9	12.8	102	113	81.9	97.6	122	82	152
Benz[a] anthracene*	3.11	308	236	33.4	236	281	210	241	310	231	367
Benzo[a]pyrene*	3.55	385	313	34.5	289	328	265	275	363	298	404
Benzo[b] fluoranthene*	4.08	439	390	43.7	340	390	321	327	442	378	498
Benzo[g,h,i] perylene*	3.7	389	390	43.7	299	338	294	267	351	361	408
Benzo[e] pyrene*	3.52	407	376	41.5	318	364	300	291	386	350	455
Benzo[k] fluoranthene*	1.57	192	166	15.4	142	159	129	131	179	158	194
methyl naphthalenes*	10.8	1580	1210	128	1290	1530	1300	1400	1450	1240	2500
methyl phenanthrene*	8.59	1000	845	116	783	1070	772	814	1060	793	1590
dimethyl naphthalenes*	13.9	2150	1730	202	1730	2090	1790	1930	2040	1600	3530
trimethyl naphthalenes*	19.4	2740	2300	303	2210	2730	2360	2490	2620	2100	4500
Chrysene*	2.57	240	185	26.2	199	227	167	204	254	194	327
Dibenz[a,h] anthracene*	0.706	75.7	66.1	6.89	55.4	59.9	52.3	52.6	68.2	61.5	77.1
Fluoranthene*	7.02	712	500	58.1	509	629	448	511	702	487	809
Fluorene*	1.41	125	100	12.1	103	106	94.6	105	122	90.4	197
Indeno[1,2,3- cd] pyrene*	3.96	383	356	36.6	285	317	272	258	329	338	361
Naphthalene*	2.95	462	326	34	362	429	359	398	427	287	694
Perylene*	1.46	151	141	14.6	116	137	114	110	142	130	158
Phenanthrene*	5.08	601	460	60.7	467	602	429	468	638	445	906
Pyrene*	7.23	616	460	82.3	464	574	410	452	603	448	697

Method SOP: SOP 1597 and 1598

Unit: PAHs in µg/kg (dry weight)

Unit: THC in mg/kg (dry weight)

Sample Description	Site B	Site G	Site J	Site M	Site Q	Site R	Site T	Site W	CCSX	CCSY	CCSZ
Total Solids	76.1	49.8	47.3	78.7	48	47.8	50.2	59.4	59.5	53.2	48.1
Arsenic	34.2	28.7	28.5	33.9	26.2	22.7	25.4	16.1	20.6	25.5	26.6
Cadmium	0.08	0.38	0.25	0.11	0.29	0.28	0.29	0.3	0.21	0.2	0.27
Chromium	19.7	94.9	100	22.4	98.4	85.2	91.9	60.8	70.9	112	86.7
Copper	4.89	38	35.5	21.3	36.6	40.9	35.2	27.4	27.5	38.3	36.5
Mercury	<0.033	0.24	0.21	<0.025	0.24	0.19	0.25	0.21	0.2	0.23	0.28
Nickel	14.3	41.6	49.1	21.1	47.5	41.4	45.5	32.5	36.9	48.8	44.8
Lead	31.8	80.9	85.2	26.8	80.8	64.4	74.3	51.7	53.5	88.4	68
Zinc	97	208	215	115	218	188	202	155	155	202	194

Method SOP: SOP 2037, 2043 and 2161

Unit: mg/kg (dry weight), total solids in %

Sample ID	Lat (WGS84)	Long (WGS84)	Date/Time
Site B	53.656718	-0.212948	08/09/2017 09:08
Site G	53.658637	-0.224692	05/09/2017 19:44
Site J	53.655277	-0.217208	05/09/2017 19:28
Site M	53.652892	-0.211098	05/09/2017 17:25
Site Q	53.649475	-0.212478	05/09/2017 17:50
Site R	53.655447	-0.221018	05/09/2017 19:10
Site T	53.654590	-0.223863	08/09/2017 08:05
Site W	53.650523	-0.217502	08/09/2017 07:31
CCS X	53.658598	-0.145805	12/09/2017 14:24
CCS Y	53.658298	-0.144494	12/09/2017 14:00
CCS Z	53.657413	-0.144102	12/09/2017 14:51

Sediment Type	phi	Site B	Site G	Site J	Site M	Site Q	Site R	Site T	Site W	CCS X	CCS Y	CCS Z
Cobble	-6.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	-6.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Very Coarse Gravel	-5.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	-5.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3185	0.0000
Coarse Gravel	-4.5	0.0000	0.0000	0.0000	0.0000	0.0000	3.9205	0.0000	0.0000	0.0194	0.0000	0.0000
	-4.0	0.0000	0.0000	0.0000	0.0000	0.0000	6.8861	0.0000	0.0000	0.0000	0.0000	0.0000
Medium Gravel	-3.5	0.0000	0.0000	0.0000	0.2777	0.0000	7.8468	0.0000	0.0000	0.0065	0.0637	0.0000
	-3.0	0.0000	0.9842	0.0000	1.0553	0.0000	2.9945	0.0000	0.0000	0.0065	0.0000	0.0000
Fine Gravel	-2.5	0.0000	0.1544	0.0000	1.1208	0.0000	1.0010	0.0000	0.0000	0.0065	0.0106	0.0000
	-2.0	0.0000	0.1575	0.0000	2.1563	0.0000	0.9203	0.0000	0.0000	0.1486	0.0106	0.0000
Very Fine Gravel	-1.5	0.0000	0.2725	0.0000	2.2872	0.0000	0.6924	0.0000	0.0000	0.0065	0.0106	0.0000
	-1.0	0.0000	0.1393	0.0000	2.4737	0.0000	0.3837	0.0000	0.0000	0.0452	0.0106	0.0000
Very Coarse Sand	-0.5	0.0000	0.1423	0.0000	2.9398	0.0000	0.4010	0.0027	0.0000	0.0517	0.0637	0.0000
	0.0	0.0000	0.0727	0.0000	3.2255	0.0000	0.2914	0.0027	0.0000	0.0388	0.0425	0.0000
Coarse Sand	0.5	0.0000	0.2212	0.6403	3.4038	0.0764	0.1114	0.0611	0.0402	0.0482	0.0005	0.0529
	1.0	0.0000	1.3770	2.2211	8.5641	0.8648	0.4558	0.4527	0.4235	0.1345	0.3516	0.4716
Medium Sand	1.5	0.0000	2.2219	2.8022	9.6810	1.9200	0.8372	1.3553	1.2005	0.3762	1.2192	1.3583
	2.0	8.8128	2.2878	2.3783	6.0077	2.2211	1.2745	1.8830	1.7071	0.9071	1.4454	2.0697
Fine Sand	2.5	33.7828	2.3852	2.0051	1.9681	2.1720	1.8777	1.9792	1.9198	1.1138	1.3652	2.5004
	3.0	41.9899	3.8846	2.7464	0.9724	3.3480	3.4111	2.9148	3.3694	1.9906	1.8668	4.1315
Very Fine Sand	3.5	14.0846	5.1136	3.3188	1.5544	4.5116	4.3646	3.8936	5.5925	4.0770	2.3059	6.0951
	4.0	1.3294	7.0453	4.5460	2.4419	6.4109	5.6204	6.0692	9.8532	9.1974	3.5828	10.0248
Very Coarse Silt	4.5	0.0005	7.1620	4.9451	2.5557	6.6627	5.3911	7.1592	11.4212	12.6939	4.7005	11.2693
	5.0	0.0000	8.3941	6.5882	3.3273	8.0322	6.1980	9.3305	12.9349	15.7594	7.2849	12.4384
Coarse Silt	5.5	0.0000	8.1862	7.4984	3.9622	8.1551	6.0986	9.3536	10.3605	12.5020	8.7339	9.6327
	6.0	0.0000	8.1567	8.5080	4.8165	8.4455	6.1354	9.0410	7.9666	8.6042	9.6372	7.3005
Medium Silt	6.5	0.0000	7.9609	9.1284	5.5845	8.5191	6.0402	8.5059	6.3432	5.9576	9.8357	6.0492
	7.0	0.0000	7.9289	9.6183	6.3608	8.7256	6.1087	8.4375	5.9469	5.4298	10.1003	6.0448
Fine Silt	7.5	0.0000	7.9753	9.9077	6.9140	8.9618	6.2530	8.7197	6.1946	5.9581	10.5433	6.4217
	8.0	0.0000	7.4644	9.3767	6.6923	8.5253	5.9345	8.4225	6.0387	6.0136	10.2872	6.1393
Very Fine Silt	8.5	0.0000	5.7074	7.3254	5.2563	6.6936	4.6289	6.6450	4.7485	4.8110	8.3314	4.6327
	9.0	0.0000	3.2296	4.3715	3.0649	3.9603	2.7082	3.9406	2.7458	2.8256	5.2233	2.4752
Clay	9.5	0.0000	1.2944	1.9262	1.2492	1.6735	1.1335	1.7046	1.1193	1.1849	2.4473	0.8729
	10.0	0.0000	0.0806	0.1478	0.0865	0.1204	0.0797	0.1253	0.0738	0.0857	0.2067	0.0191
	10.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	11.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0003	0.0000

SAMPLE	PARAMETER	Site B	Site G	Site J	Site M	Site Q	Site R	Site T	Site W	CCS X	CCS Y	CCS Z
SAMPLE TYPE:		Unimodal, Well Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted	Unimodal, Very Poorly Sorted	Trimodal, Extremely Poorly Sorted	Bimodal, Poorly Sorted	Bimodal, Poorly Sorted	Bimodal, Poorly Sorted	Unimodal, Poorly Sorted	Bimodal, Poorly Sorted
TEXTURAL GROUP:		Sand	Slightly Gravelly Sandy Mud	Sandy Mud	Gravelly Mud	Sandy Mud	Gravelly Mud	Sandy Mud	Sandy Mud	Slightly Gravelly Sandy Mud	Slightly Gravelly Sandy Mud	Sandy Mud
SEDIMENT NAME:		Well Sorted Fine Sand	Slightly Medium Gravelly Very Fine Sandy Coarse Silt	Very Fine Sandy Fine Silt	Very Fine Gravelly Fine Silt	Very Fine Sandy Fine Silt	Medium Gravelly Coarse Silt	Very Fine Sandy Coarse Silt	Very Fine Sandy Very Coarse Silt	Slightly Fine Gravelly Very Fine Sandy Very Coarse Silt	Slightly Very Coarse Gravelly Very Fine Sandy Fine Silt	Very Fine Sandy Very Coarse Silt
FOLK AND WARD METHOD (µm)	MEDIAN GRAIN SIZE D_{50} (µm)	168.8	22.33	14.60	63.7	17.6	41.657	17.9	29.7	28.5	12.2	31.7
	MEAN GRAIN SIZE (µm)	170.5	23.35	17.8	69.1	18.9	146.8	18.092	24.593	22.519	13.29	26.2
	SORTING	1.376	4.586	4.63	10.808	4.181	26.0	3.886	3.642	3.252	3.656	3.763
	SKEWNESS	0.025	0.104	0.245	0.092	0.120	0.450	0.063	-0.161	-0.251	0.163	-0.150
	KURTOSIS	0.986	0.927	0.999	0.706	0.895	0.729	0.910	0.937	0.935	1.007	0.922
FOLK AND WARD METHOD (phi)	MEDIAN GRAIN SIZE D_{50} (phi):	2.566	5.485	6.098	3.972	5.832	4.6	5.805	5.071	5.132	6.354	4.980
	MEAN GRAIN SIZE (phi):	2.552	5.420	5.812	3.855	5.723	2.8	5.788	5.346	5.473	6.234	5.252
	SORTING	0.461	2.197	2.210	3.434	2.064	4.7	1.958	1.865	1.701	1.870	1.912
	SKEWNESS	-0.025	-0.104	-0.245	-0.092	-0.120	-0.450	-0.063	0.161	0.251	-0.163	0.150
	KURTOSIS	0.986	0.927	0.999	0.706	0.895	0.729	0.910	0.937	0.935	1.007	0.922
FOLK AND WARD METHOD (Description)	MEAN:	Fine Sand	Coarse Silt	Coarse Silt	Very Fine Sand	Coarse Silt	Fine Sand	Coarse Silt	Coarse Silt	Coarse Silt	Medium Silt	Coarse Silt
	SORTING:	Well Sorted	Very Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Extremely Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted
	SKEWNESS:	Symmetrical	Coarse Skewed	Coarse Skewed	Symmetrical	Coarse Skewed	Very Coarse Skewed	Symmetrical	Fine Skewed	Fine Skewed	Coarse Skewed	Fine Skewed
	KURTOSIS:	Mesokurtic	Mesokurtic	Mesokurtic	Platykurtic	Platykurtic	Platykurtic	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic
BULK GRAIN SIZE	% GRAVEL:	0.000	1.708	0.000	9.371	0.000	24.645	0.000	0.000	0.239	0.425	0.000
	% SAND:	100.000	24.752	20.658	40.759	21.525	18.645	18.614	24.106	17.935	12.243	26.704
	% MUD:	0.000	73.540	79.342	49.870	78.475	56.710	81.386	75.894	81.826	87.332	73.296
	% V COARSE GRAVEL:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000
	% COARSE GRAVEL:	0.000	0.000	0.000	0.000	0.000	10.807	0.000	0.000	0.019	0.014	0.000
	% MEDIUM GRAVEL:	0.000	0.984	0.000	1.333	0.000	10.841	0.000	0.000	0.013	0.064	0.000
	% FINE GRAVEL:	0.000	0.312	0.000	3.277	0.000	1.921	0.000	0.000	0.155	0.021	0.000
	% V FINE GRAVEL:	0.000	0.412	0.000	4.761	0.000	1.076	0.000	0.000	0.052	0.021	0.000
	% V COARSE SAND:	0.000	0.215	0.000	6.165	0.000	0.692	0.005	0.000	0.090	0.106	0.000
	% COARSE SAND:	0.000	1.603	2.868	11.991	0.946	0.569	0.517	0.467	0.184	0.355	0.528
	% MEDIUM SAND:	8.924	4.512	5.180	15.672	4.144	2.116	3.242	2.911	1.286	2.666	3.433
	% FINE SAND:	75.720	6.283	4.759	2.940	5.531	5.301	4.903	5.306	3.117	3.237	6.649
	% V FINE SAND:	15.356	12.138	7.851	3.990	10.904	9.967	9.947	15.423	13.258	5.879	16.095
	% V COARSE SILT:	0.000	15.601	11.574	5.905	14.739	11.622	16.541	24.413	28.522	12.033	23.760
	% COARSE SILT:	0.000	16.306	15.974	8.762	16.564	12.206	18.351	18.276	21.043	18.332	16.886
	% MEDIUM SILT:	0.000	15.875	18.729	11.934	17.229	12.138	16.928	12.279	11.377	19.918	12.083
	% FINE SILT:	0.000	15.463	19.314	13.627	17.514	12.206	17.168	12.252	11.990	20.863	12.579
	% V FINE SILT:	0.000	8.906	11.657	8.293	10.617	7.312	10.549	7.468	7.610	13.508	7.084
	% CLAY:	0.000	1.390	2.094	1.350	1.812	1.226	1.848	1.206	1.284	2.678	0.903

Report to: Able UK Ltd

Able Marine Energy Park: Sediment Sampling 2017.

Date: January 2017

Report ref: P018-01-0080\MEPS17

Report Name: Able Marine Energy Park: Sediment Sampling 2017.

Client Name: Able UK Ltd

Date: January 2018

Report ref: P018-01-0080\AMEPSed17

Author(s): James Allen

Document Revision:	Date of Issue	Document Details:	
1	17/01/2018	Survey Report	
Document Approval		**Signature**	**Date**
Project Manager	NV Proctor	[redacted]	17/01/2018
Project Manager	JH Allen	[redacted]	17/01/2018

Precision Marine Survey Ltd
Church Farm, Main Road
Thorngumbald
Hull, East Yorkshire
HU12 9NE

Tel: +44 (0) 1964 624423
Fax: +44 (0) 1964 623352
Email:
info@precisionmarine.co.uk
Web: www.precisionmarine.co.uk

Report Title: Able Marine Energy Park: Sediment Sampling 2017.

Contents

Page

List of Tables

Page

List of Figures

Page

1. Introduction

Able UK Ltd. has been granted a Development Consent Order (DCO) to construct the Able Marine Energy Park (AMEP) near Immingham on the southern bank of the Humber Estuary. The AMEP Sampling Plan (v3) includes a series of proposals to inform the update of the dredging and disposal strategy baseline in relation to dredging works which are planned to be undertaken as part of the AMEP construction. This included sediment sampling and analysis at six locations in the Humber Estuary and draft proposals for sediment sampling to update the existing baseline were submitted to the Marine Management Organisation (MMO) for approval. The MMO subsequently provided confirmation of revised requirements for sampling and analysis (Letter dated 30 May 2017, Ref: SAM/2017/00027) which recommended increasing the number of samples to 11 including three samples from Cherry Cobb Sands on the north bank of the Humber. MMO also requested analysis for trace metals, total hydrocarbons (THC), polycyclic aromatic hydrocarbons (PAHs) and particle size analysis (PSA) and confirmed that analysis was required for PCBs, organotins or pesticides. The positions of the proposed sample locations were provided by CEFAS and Precision Marine Survey Ltd were commissioned to undertake collection of the sediment samples and arrange subsequent analysis.

2. Methods

2.1 Sample Collection

As outlined above a total of 11 sample sites were surveyed at pre-defined locations provided by CEFAS. This included eight sample sites in the vicinity of the AMEP construction/dredging footprint off North Killingholme (Sites B, G, J, M, Q, R, T and W) and three intertidal samples in the vicinity of the breach location at Cherry Cobb Sands on the north bank of the Humber (sites CCS X, CCS Y and CCS Z). The sampling stations at North Killingholme were sampled remotely using a stainless steel 0.1m^2 day grab from the PMSL survey vessel 'Precision 1' which was deployed from Hull Marina on the 5th and 9th September 2017 whilst the intertidal samples at Cherry Cobb Sands were sampled on foot on the 12th September 2017.

Methodologies for grab sampling followed standard methodologies e.g. Marine Monitoring Handbook procedural guideline 3-9 (Davies *et al*, 2001) and other best practice guidelines (Ware & Kenny, 2011; Worsfold & Hall, 2010). Collection of contaminant sub-samples followed CEFAS guidance as outlined in MMO letter Ref: SAM/2017/00027. At each pre-determined station position the vessel was taken out of gear and the 0.1m^2 Day grab was lowered by winch into the water. The winch was then used to lower the grab to the seabed at a rate of approximately 1 m/s and the winch slowed as the length of warp indicated it was approaching the seabed. Once the grab had landed, as evident by the slackening of the winch wire, the winch was stopped and the position of the grab was taken from the GPS along with time and water depth and recorded on the grab logsheet. The winch was then used to raise the grab off the seabed and docked into the retrieval frame on board the survey vessel and slowly bought aboard and lowered onto a metal frame with a sample box placed beneath.

With the grab resting on the frame, the grab was inspected to assess whether it had deployed correctly and to ensure that adequate material was retained for sub-sampling. Grabs with inadequate sample volumes or those with material such as stones caught in the jaws of the grab (or where the grab jaws had not fully closed) were discarded. When samples were within the prescribed limits, each grab sample was photographed and surface sub-samples from the upper layer of in-situ sediment collected using a non-metallic / stainless steel scoop as per MMO guidance.

Sub-samples collected for PSA were placed in an appropriately labelled plastic container whilst sub-samples for contaminant analysis were placed in labelled, contaminant free, glass jars (filled approximately ¾ full) provided by CEFAS as per MMO/CEFAS guidance provided in Appendix 1. No pooling of samples from separate grabs was undertaken and each PSA/contaminant sub-sample collected at a survey site was taken from a single discrete grab sample. Sampling from Cherry Cobb Sands undertaken on foot followed a similar procedure with sediment sub-samples taken directly from the intertidal sediment surface. All sampling equipment (grab/scoops) were carefully washed and dried between samples and the sediment samples were placed in the refrigerated cool boxes for transit to PMSL premises whereupon they were immediately frozen prior to analysis.

A full survey log was maintained throughout the survey detailing time of sampling, GPS position, number of attempts required, station number, water depth, physical characteristics of the sample and presence of any other relevant features. Survey positions and other sampling details are provided in Table 1 and the spatial distribution of sample locations is shown in Figure 1. All samples were collected during survey were within 10m of the target position.

Table 1. Sampling positions and survey log.

Sample ID	Lat (WGS84)	Long (WGS84)	Date/Time	Recorded Water Depth (m)	Water Depth (m CD)	Attempts	Sediment Notes
Site B	53.656718	-0.212948	08/09/2017 09:08	13.93	7.63	3	Sand
Site G	53.658637	-0.224692	05/09/2017 19:44	6.95	1.05	1	Sandy Mud (some gravel/stones)
Site J	53.655277	-0.217208	05/09/2017 19:28	11.37	5.27	1	Sandy Mud
Site M	53.652892	-0.211098	05/09/2017 17:25	14.97	9.17	2	Slightly Gravelly Sand & Mud/Clay
Site Q	53.649475	-0.212478	05/09/2017 17:50	5.06	-1.04	1	Sandy Mud
Site R	53.655447	-0.221018	05/09/2017 19:10	6.04	-0.17	3	Sandy Mud with stones/gravel
Site T	53.654590	-0.223863	08/09/2017 08:05	0.79	-6.11	3	Sandy Mud
Site W	53.650523	-0.217502	08/09/2017 07:31	1.71	-5.09	2	Sandy Mud
CCS X	53.658598	-0.145805	12/09/2017 14:24	N/A	N/A	1	Sandy Mud
CCS Y	53.658298	-0.144494	12/09/2017 14:00	N/A	N/A	1	Sandy Mud
CCS Z	53.657413	-0.144102	12/09/2017 14:51	N/A	N/A	1	Sandy Mud

2.2 Laboratory Analysis

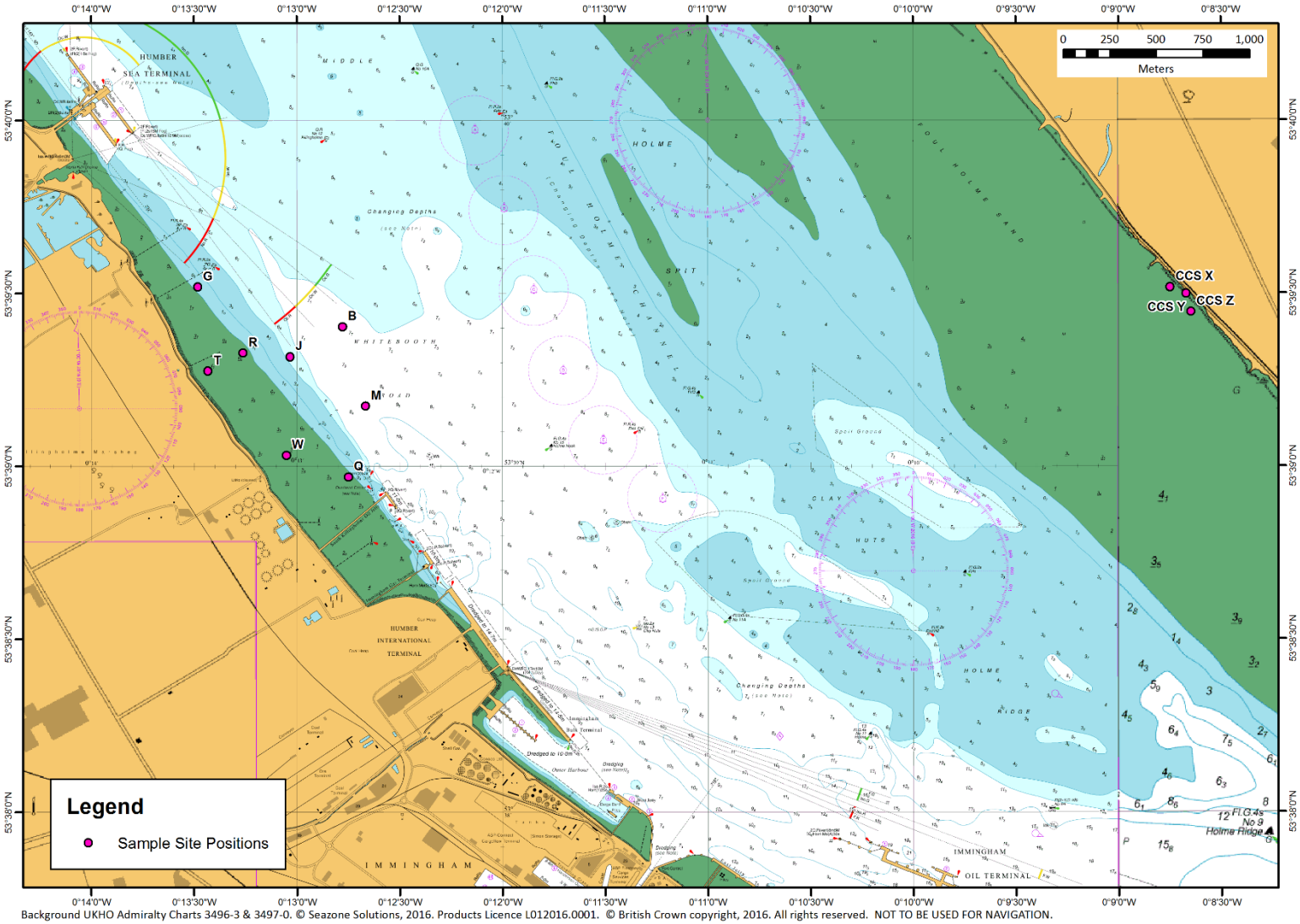
2.2.1 Particle Size Analysis (PSA)

Particle Size Analysis (PSA) was compliant with the latest NMBAQC guidance (Mason, 2016) and undertaken by Precision Marine Survey Ltd who are members of the NMBAQC scheme and participate in the PSA ring test component. Prior to processing each of the sediment samples were visually assessed and the sample was mixed thoroughly until homogeneity is reached. PSA was undertaken using a combination of laser granulometry (Malvern Mastersizer 3000) and dry sieving. Any sample containing sediment greater than 1mm was processed using laser granulometry for the <1mm fraction and dry sieving for the >1mm fraction. Samples with no coarse fraction (>1mm) were processed by laser granulometry alone. A small sub-sample (approx. 100ml) was taken for laser granulometry and screened through a 1mm mesh sieve prior to analysis. If any evidence of coarser material was found then the remaining PSA sample was wet sieved through a 1mm sieve. The <1mm fraction was left to settle for 24 hours and the sediment then oven dried and weighed. The coarser sediment fraction (>1mm) was also oven dried and then dry sieved using an Endecotts sieve shaker for 20 minutes using a nest of sieves at 0.5 phi intervals and each fraction weighed.

Data generated from these methods was analysed separately but for visualisation purposes the finer fractions were also merged to the coarse fraction (if present) to provide an overall grain size distribution for each sample following NMBAQC protocols. The combined data generated from the analysis of both the coarse and the fine fractions was subject to further analysis using the software programme Gradistat. Each sample was assigned a description based on the Folk and/or the Wentworth classification system. Statistics relating to particle size distribution including mean/median grain size, skewness, kurtosis, sorting coefficient and bulk sediment classes (e.g. % silt, sand & gravel) were also calculated using the Gradistat software. These methods are consistent with the procedures identified at NMBAQC PSA workshops on laboratory methods and those used for NMBAQC ring tests. The results of particle size analysis are provided in Tables 2 and 3.

2.2.2 Contaminant Analysis

The samples jars containing sediments for contaminant analysis were kept frozen until dispatch and then placed in a refrigerated cool box and driven directly to the CEFAS laboratory by PMSL staff on the 14th September. Analysis procedures follow CEFAS dredge material SOPs (MMO approved) for trace metals, total hydrocarbons (THC) and polycyclic aromatic hydrocarbons (PAHs). The results are provided of contaminant analysis provided by CEFAS are provided in Tables 4 and 5.



Background UKHO Admiralty Charts 3496-3 & 3497-0. © Seazone Solutions, 2016. Products Licence L012016.0001. © British Crown copyright, 2016. All rights reserved. NOT TO BE USED FOR NAVIGATION.

Figure 1. Location of survey samples.

3. Results

Table 2. Particle Size Analysis

Sediment Type	phi	Site B	Site G	Site J	Site M	Site Q	Site R	Site T	Site W	CCS X	CCS Y	CCS Z
Cobble	-6.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	-6.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Very Coarse Gravel	-5.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	-5.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3185	0.0000
Coarse Gravel	-4.5	0.0000	0.0000	0.0000	0.0000	0.0000	3.9205	0.0000	0.0000	0.0194	0.0000	0.0000
	-4.0	0.0000	0.0000	0.0000	0.0000	0.0000	6.8861	0.0000	0.0000	0.0000	0.0000	0.0000
Medium Gravel	-3.5	0.0000	0.0000	0.0000	0.2777	0.0000	7.8468	0.0000	0.0000	0.0065	0.0637	0.0000
	-3.0	0.0000	0.9842	0.0000	1.0553	0.0000	2.9945	0.0000	0.0000	0.0065	0.0000	0.0000
Fine Gravel	-2.5	0.0000	0.1544	0.0000	1.1208	0.0000	1.0010	0.0000	0.0000	0.0065	0.0106	0.0000
	-2.0	0.0000	0.1575	0.0000	2.1563	0.0000	0.9203	0.0000	0.0000	0.1486	0.0106	0.0000
Very Fine Gravel	-1.5	0.0000	0.2725	0.0000	2.2872	0.0000	0.6924	0.0000	0.0000	0.0065	0.0106	0.0000
	-1.0	0.0000	0.1393	0.0000	2.4737	0.0000	0.3837	0.0000	0.0000	0.0452	0.0106	0.0000
Very Coarse Sand	-0.5	0.0000	0.1423	0.0000	2.9398	0.0000	0.4010	0.0027	0.0000	0.0517	0.0637	0.0000
	0.0	0.0000	0.0727	0.0000	3.2255	0.0000	0.2914	0.0027	0.0000	0.0388	0.0425	0.0000
Coarse Sand	0.5	0.0000	0.2212	0.6403	3.4038	0.0764	0.1114	0.0611	0.0402	0.0482	0.0005	0.0529
	1.0	0.0000	1.3770	2.2211	8.5641	0.8648	0.4558	0.4527	0.4235	0.1345	0.3516	0.4716
Medium Sand	1.5	0.0000	2.2219	2.8022	9.6810	1.9200	0.8372	1.3553	1.2005	0.3762	1.2192	1.3583
	2.0	8.8128	2.2878	2.3783	6.0077	2.2211	1.2745	1.8830	1.7071	0.9071	1.4454	2.0697
Fine Sand	2.5	33.7828	2.3852	2.0051	1.9681	2.1720	1.8777	1.9792	1.9198	1.1138	1.3652	2.5004
	3.0	41.9899	3.8846	2.7464	0.9724	3.3480	3.4111	2.9148	3.3694	1.9906	1.8668	4.1315
Very Fine Sand	3.5	14.0846	5.1136	3.3188	1.5544	4.5116	4.3646	3.8936	5.5925	4.0770	2.3059	6.0951
	4.0	1.3294	7.0453	4.5460	2.4419	6.4109	5.6204	6.0692	9.8532	9.1974	3.5828	10.0248
Very Coarse Silt	4.5	0.0005	7.1620	4.9451	2.5557	6.6627	5.3911	7.1592	11.4212	12.6939	4.7005	11.2693
	5.0	0.0000	8.3941	6.5882	3.3273	8.0322	6.1980	9.3305	12.9349	15.7594	7.2849	12.4384
Coarse Silt	5.5	0.0000	8.1862	7.4984	3.9622	8.1551	6.0986	9.3536	10.3605	12.5020	8.7339	9.6327
	6.0	0.0000	8.1567	8.5080	4.8165	8.4455	6.1354	9.0410	7.9666	8.6042	9.6372	7.3005
Medium Silt	6.5	0.0000	7.9609	9.1284	5.5845	8.5191	6.0402	8.5059	6.3432	5.9576	9.8357	6.0492
	7.0	0.0000	7.9289	9.6183	6.3608	8.7256	6.1087	8.4375	5.9469	5.4298	10.1003	6.0448
Fine Silt	7.5	0.0000	7.9753	9.9077	6.9140	8.9618	6.2530	8.7197	6.1946	5.9581	10.5433	6.4217
	8.0	0.0000	7.4644	9.3767	6.6923	8.5253	5.9345	8.4225	6.0387	6.0136	10.2872	6.1393
Very Fine Silt	8.5	0.0000	5.7074	7.3254	5.2563	6.6936	4.6289	6.6450	4.7485	4.8110	8.3314	4.6327
	9.0	0.0000	3.2296	4.3715	3.0649	3.9603	2.7082	3.9406	2.7458	2.8256	5.2233	2.4752
Clay	9.5	0.0000	1.2944	1.9262	1.2492	1.6735	1.1335	1.7046	1.1193	1.1849	2.4473	0.8729
	10.0	0.0000	0.0806	0.1478	0.0865	0.1204	0.0797	0.1253	0.0738	0.0857	0.2067	0.0191
	10.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	11.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0003	0.0000

Table 3. PSA Summary Statistics

SAMPLE	PARAMETER	Site B	Site G	Site J	Site M	Site Q	Site R
SAMPLE TYPE:		Unimodal, Well Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted	Unimodal, Very Poorly Sorted	Trimodal, Extremely Poorly Sorted
TEXTURAL GROUP:		Sand	Slightly Gravelly Sandy Mud	Sandy Mud	Gravelly Mud	Sandy Mud	Gravelly Mud
SEDIMENT NAME:		Well Sorted Fine Sand	Slightly Medium Gravelly Very Fine Sandy Coarse Silt	Very Fine Sandy Fine Silt	Very Fine Gravelly Fine Silt	Very Fine Sandy Fine Silt	Medium Gravelly Coarse Silt
FOLK AND WARD METHOD (µm)	MEDIAN GRAIN SIZE D_{50} (µm)	168.8	22.33	14.60	63.7	17.6	41.657
	MEAN GRAIN SIZE (µm)	170.5	23.35	17.8	69.1	18.9	146.8
	SORTING	1.376	4.586	4.63	10.808	4.181	26.0
	SKEWNESS	0.025	0.104	0.245	0.092	0.120	0.450
	KURTOSIS	0.986	0.927	0.999	0.706	0.895	0.729
FOLK AND WARD METHOD (phi)	MEDIAN GRAIN SIZE D_{50} (phi):	2.566	5.485	6.098	3.972	5.832	4.6
	MEAN GRAIN SIZE (phi):	2.552	5.420	5.812	3.855	5.723	2.8
	SORTING	0.461	2.197	2.210	3.434	2.064	4.7
	SKEWNESS	-0.025	-0.104	-0.245	-0.092	-0.120	-0.450
	KURTOSIS	0.986	0.927	0.999	0.706	0.895	0.729
FOLK AND WARD METHOD (Description)	MEAN:	Fine Sand	Coarse Silt	Coarse Silt	Very Fine Sand	Coarse Silt	Fine Sand
	SORTING:	Well Sorted	Very Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Extremely Poorly Sorted
	SKEWNESS:	Symmetrical	Coarse Skewed	Coarse Skewed	Symmetrical	Coarse Skewed	Very Coarse Skewed
	KURTOSIS:	Mesokurtic	Mesokurtic	Mesokurtic	Platykurtic	Platykurtic	Platykurtic
BULK GRAIN SIZE	% GRAVEL:	0.000	1.708	0.000	9.371	0.000	24.645
	% SAND:	100.000	24.752	20.658	40.759	21.525	18.645
	% MUD:	0.000	73.540	79.342	49.870	78.475	56.710
	% V COARSE GRAVEL:	0.000	0.000	0.000	0.000	0.000	0.000
	% COARSE GRAVEL:	0.000	0.000	0.000	0.000	0.000	10.807
	% MEDIUM GRAVEL:	0.000	0.984	0.000	1.333	0.000	10.841
	% FINE GRAVEL:	0.000	0.312	0.000	3.277	0.000	1.921
	% V FINE GRAVEL:	0.000	0.412	0.000	4.761	0.000	1.076
	% V COARSE SAND:	0.000	0.215	0.000	6.165	0.000	0.692
	% COARSE SAND:	0.000	1.603	2.868	11.991	0.946	0.569
	% MEDIUM SAND:	8.924	4.512	5.180	15.672	4.144	2.116
	% FINE SAND:	75.720	6.283	4.759	2.940	5.531	5.301
	% V FINE SAND:	15.356	12.138	7.851	3.990	10.904	9.967
	% V COARSE SILT:	0.000	15.601	11.574	5.905	14.739	11.622
	% COARSE SILT:	0.000	16.306	15.974	8.762	16.564	12.206
	% MEDIUM SILT:	0.000	15.875	18.729	11.934	17.229	12.138
	% FINE SILT:	0.000	15.463	19.314	13.627	17.514	12.206
	% V FINE SILT:	0.000	8.906	11.657	8.293	10.617	7.312
	% CLAY:	0.000	1.390	2.094	1.350	1.812	1.226

SAMPLE	PARAMETER	Site T	Site W	CCS X	CCS Y	CCS Z
SAMPLE TYPE:		Bimodal, Poorly Sorted	Bimodal, Poorly Sorted	Bimodal, Poorly Sorted	Unimodal, Poorly Sorted	Bimodal, Poorly Sorted
TEXTURAL GROUP:		Sandy Mud	Sandy Mud	Slightly Gravelly Sandy Mud	Slightly Gravelly Sandy Mud	Sandy Mud
SEDIMENT NAME:		Very Fine Sandy Coarse Silt	Very Fine Sandy Very Coarse Silt	Slightly Fine Gravelly Very Fine Sandy Very Coarse Silt	Slightly Very Coarse Gravelly Very Fine Sandy Fine Silt	Very Fine Sandy Very Coarse Silt
FOLK AND WARD METHOD (µm)	MEDIAN GRAIN SIZE D_{50} (µm)	17.9	29.7	28.5	12.2	31.7
	MEAN GRAIN SIZE (µm)	18.092	24.593	22.519	13.29	26.2
	SORTING	3.886	3.642	3.252	3.656	3.763
	SKEWNESS	0.063	-0.161	-0.251	0.163	-0.150
	KURTOSIS	0.910	0.937	0.935	1.007	0.922
FOLK AND WARD METHOD (phi)	MEDIAN GRAIN SIZE D_{50} (phi):	5.805	5.071	5.132	6.354	4.980
	MEAN GRAIN SIZE (phi):	5.788	5.346	5.473	6.234	5.252
	SORTING	1.958	1.865	1.701	1.870	1.912
	SKEWNESS	-0.063	0.161	0.251	-0.163	0.150
	KURTOSIS	0.910	0.937	0.935	1.007	0.922
FOLK AND WARD METHOD (Description)	MEAN:	Coarse Silt	Coarse Silt	Coarse Silt	Medium Silt	Coarse Silt
	SORTING:	Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted
	SKEWNESS:	Symmetrical	Fine Skewed	Fine Skewed	Coarse Skewed	Fine Skewed
	KURTOSIS:	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic
BULK GRAIN SIZE	% GRAVEL:	0.000	0.000	0.239	0.425	0.000
	% SAND:	18.614	24.106	17.935	12.243	26.704
	% MUD:	81.386	75.894	81.826	87.332	73.296
	% V COARSE GRAVEL:	0.000	0.000	0.000	0.304	0.000
	% COARSE GRAVEL:	0.000	0.000	0.019	0.014	0.000
	% MEDIUM GRAVEL:	0.000	0.000	0.013	0.064	0.000
	% FINE GRAVEL:	0.000	0.000	0.155	0.021	0.000
	% V FINE GRAVEL:	0.000	0.000	0.052	0.021	0.000
	% V COARSE SAND:	0.005	0.000	0.090	0.106	0.000
	% COARSE SAND:	0.517	0.467	0.184	0.355	0.528
	% MEDIUM SAND:	3.242	2.911	1.286	2.666	3.433
	% FINE SAND:	4.903	5.306	3.117	3.237	6.649
	% V FINE SAND:	9.947	15.423	13.258	5.879	16.095
	% V COARSE SILT:	16.541	24.413	28.522	12.033	23.760
	% COARSE SILT:	18.351	18.276	21.043	18.332	16.886
	% MEDIUM SILT:	16.928	12.279	11.377	19.918	12.083
	% FINE SILT:	17.168	12.252	11.990	20.863	12.579
	% V FINE SILT:	10.549	7.468	7.610	13.508	7.084
	% CLAY:	1.848	1.206	1.284	2.678	0.903

Table 4. Trace Metals

Sample Description	Site B	Site G	Site J	Site M	Site Q	Site R	Site T	Site W	CCSX	CCSY	CCSZ
Total Solids	76.1	49.8	47.3	78.7	48	47.8	50.2	59.4	59.5	53.2	48.1
Arsenic	34.2	28.7	28.5	33.9	26.2	22.7	25.4	16.1	20.6	25.5	26.6
Cadmium	0.08	0.38	0.25	0.11	0.29	0.28	0.29	0.3	0.21	0.2	0.27
Chromium	19.7	94.9	100	22.4	98.4	85.2	91.9	60.8	70.9	112	86.7
Copper	4.89	38	35.5	21.3	36.6	40.9	35.2	27.4	27.5	38.3	36.5
Mercury	<0.033	0.24	0.21	<0.025	0.24	0.19	0.25	0.21	0.2	0.23	0.28
Nickel	14.3	41.6	49.1	21.1	47.5	41.4	45.5	32.5	36.9	48.8	44.8
Lead	31.8	80.9	85.2	26.8	80.8	64.4	74.3	51.7	53.5	88.4	68
Zinc	97	208	215	115	218	188	202	155	155	202	194

Method SOP: SOP 2037, 2043 and 2161
Unit: mg/kg (dry weight), total solids in %

Table 5. Hydrocarbons

Sample Description	Site B	Site G	Site J	Site M	Site Q	Site R	Site T	Site W	CCSX	CCSY	CCSZ
THC (Total Hydrocarbon Content)	10	1220	1110	132	1110	1050	1120	1110	1080	782	1260
Acenaphthylene*	0.11	17.3	13.8	2.24	13.9	13.1	13.3	13	14.2	13.1	18.5
Acenapthene*	0.981	71.3	60.4	8.63	70.3	67.2	53.9	62.7	72.1	52.9	94.4
Anthracene*	1.23	135	92.9	12.8	102	113	81.9	97.6	122	82	152
Benz[a] anthracene*	3.11	308	236	33.4	236	281	210	241	310	231	367
Benzo[a]pyrene*	3.55	385	313	34.5	289	328	265	275	363	298	404
Benzo[b] fluoranthene*	4.08	439	390	43.7	340	390	321	327	442	378	498
Benzo[g,h,i] perylene*	3.7	389	390	43.7	299	338	294	267	351	361	408
Benzo[e] pyrene*	3.52	407	376	41.5	318	364	300	291	386	350	455
Benzo[k] fluoranthene*	1.57	192	166	15.4	142	159	129	131	179	158	194
methyl naphthalenes*	10.8	1580	1210	128	1290	1530	1300	1400	1450	1240	2500
methyl phenanthrene*	8.59	1000	845	116	783	1070	772	814	1060	793	1590
dimethyl naphthalenes*	13.9	2150	1730	202	1730	2090	1790	1930	2040	1600	3530
trimethyl naphthalenes*	19.4	2740	2300	303	2210	2730	2360	2490	2620	2100	4500
Chrysene*	2.57	240	185	26.2	199	227	167	204	254	194	327
Dibenz[a,h] anthracene*	0.706	75.7	66.1	6.89	55.4	59.9	52.3	52.6	68.2	61.5	77.1
Fluoranthene*	7.02	712	500	58.1	509	629	448	511	702	487	809
Fluorene*	1.41	125	100	12.1	103	106	94.6	105	122	90.4	197
Indeno[1,2,3- cd] pyrene*	3.96	383	356	36.6	285	317	272	258	329	338	361
Naphthalene*	2.95	462	326	34	362	429	359	398	427	287	694
Perylene*	1.46	151	141	14.6	116	137	114	110	142	130	158
Phenanthrene*	5.08	601	460	60.7	467	602	429	468	638	445	906
Pyrene*	7.23	616	460	82.3	464	574	410	452	603	448	697

Method SOP: SOP 1597 and 1598
Unit: PAHs in µg/kg (dry weight)
Unit: THC in mg/kg (dry weight)

4. References

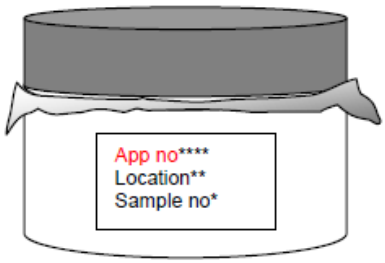
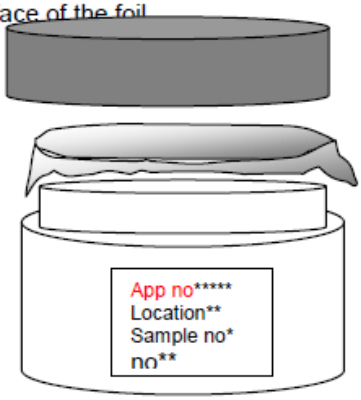
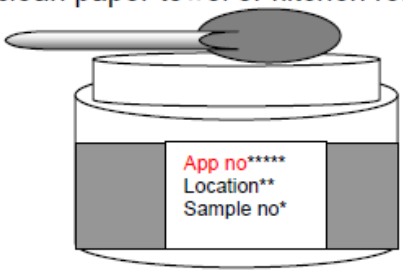
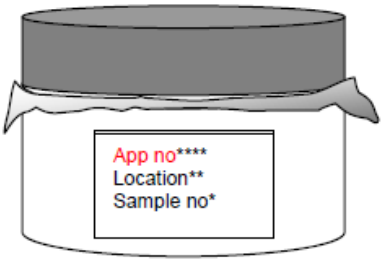
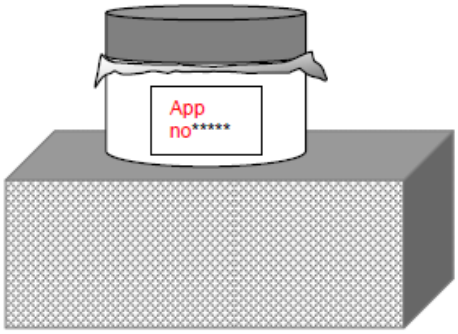
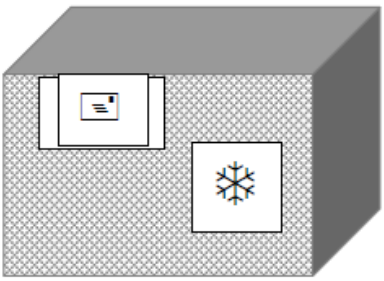
Davies, J., Baxter, J., Bradley, M., Connor, D., Khan, J., Murray, E., Sanderson, W., Turnbull, C. & Vincent, M., (2001), Marine Monitoring Handbook, 405 pp, ISBN 1 85716 550 0.

Mason, C. 2016. NMBAQC's Best Practice Guidance: Particle Size Analysis (PSA) for Supporting Biological Analysis (version 18_01_2016). NE Atlantic Marine Biological AQC Coordinating Committee.

Ware, S.J. & Kenny, A.J. 2011. Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites (2nd Edition). Marine Aggregate Levy Sustainability Fund, 80 pp.

Worsfold, T & Hall, D. 2010. Guidelines for processing marine macrobenthic invertebrate samples: A Processing Requirements Protocol. NMBAQC.

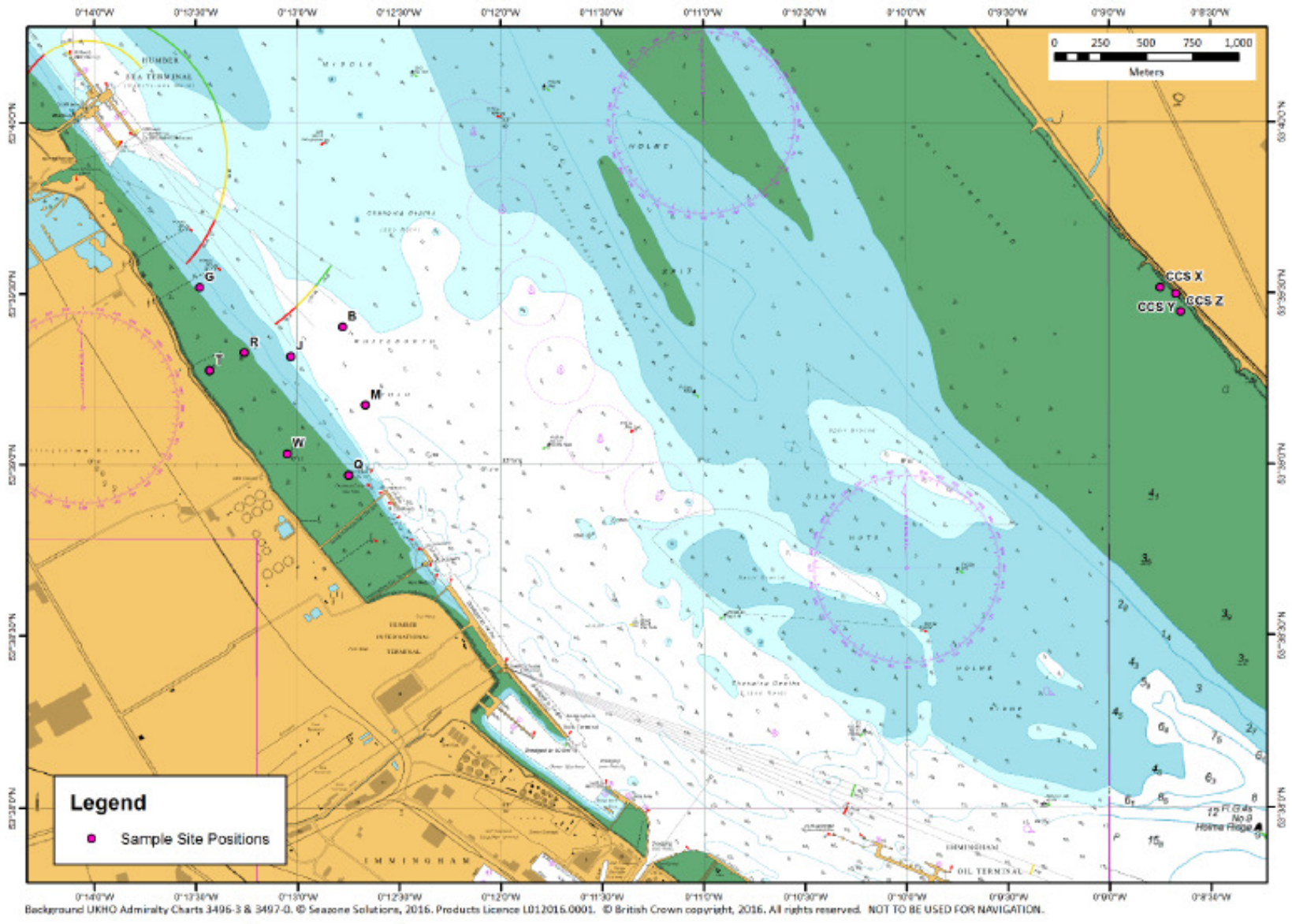
Appendix 1. Procedure for taking samples of material to be dredged using glass jars and metals scoops (from MMO/CEFAS).

<table>
<tr>
<td>1. Take the correctly labelled sample jar for the location about to be sampled. The jars must have been treated to ensure that they are contaminant free (request new jars if any are broken – do not substitute).
 
</td>
<td>2. Remove the lid and the foil from the sample jar, being careful not to touch the internal surface of the foil
 
</td>
</tr>
<tr>
<td>3. Use a stainless steel scoop to <u>fill the jar 3/4 full</u>. <u>Do not smoke or eat</u> whilst sampling. Wash the scoop thoroughly between samples, with a clean paper towel or kitchen roll
 
</td>
<td>4. Replace the foil and lid
 
</td>
</tr>
<tr>
<td>5. Pack carefully to minimise the risk of sample jar breakage.
 
</td>
<td>6. Dispatch samples straight away ensuring they are frozen first, and put in a cool box with frozen ice packs. If this is not possible keep in a freezer until dispatch.
  </td>
</tr>
</table>

Able Marine Energy Park

Material Change 2

2020 Sediment Sampling Results



Proposed Sample Site Positions 2020, Able Marine Energy Park

Instructions:

1. All applicants and laboratories should refer to the most recent guidance on sediment analysis in support of marine licence applications
   Sediment analysis guidance
2. Full information must be provided under each relevant sheet of the workbook. Grey highlighted cells indicate where information can be entered.
3. Where information cannot be provided, the applicant should consult with the MMO prior to submission.
4. Worksheets are protected to prevent accidental amendments to calculated values. If amendments are required please consult with the MMO.
5. Sample IDs used through the data output worksheets should correspond to Sample IDs provided on this worksheet.

6 Where more than 6 dredge areas or 30 samples are required, please contact MMO.

7. Macros must be enabled to use this workbook

Marine licence applicant information:

Applicant:	
Application number:	
Application title:	
Date sampled:	15/12/2020
Sampling location:	Humber Estuary

Dredge area tonnages:

Dredge Area	Dredging tonnages	% total dredged material	Total dredged material
Area i			0
Area ii			
Area iii			
Area iv			
Area v			
Area vi			

MMO use only

Sample numbers and locations

Sample ID	Excluded sample (MMO use)	Sample location (decimal degrees, WGS84)		Location name (as per sampling plan)	Sampling depth (m)	Dredge area
		Position latitude	Position longitude			
Site B		53.656688	-0.212977	Site B	0	
Site G		53.658597	-0.224615	Site G	0	
Site J		53.655285	-0.217165	Site J	0	
Site M		53.652893	-0.211033	Site M	0	
Site Q		53.649503	-0.212520	Site Q	0	
Site R		53.655522	-0.221008	Site R	0	
Site T		53.654632	-0.223865	Site T	0	
Site W		53.650522	-0.217458	Site W	0	
CCS X		53.658598	-0.145794	CCS X	0	
CCS Y		53.658315	-0.144559	CCS Y	0	
CCS Z		53.657397	-0.144084	CCS Z	0	

Physical characteristics data

Instructions:
1. Record the laboratory/contractor responsible for analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Where copying and pasting entries please use paste values only
5. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor: Ocean Ecology Ltd
Date of analysis: 06/01/2021

Physical characteristics analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Visual appearance*	Exempt from chemical analysis◦	Total Solids (% total sediments)	Organic matter (total organic carbon)	-5.5 45mm	-5.0 31.5mm	-4.5 22.4mm	-4.0 16mm	-3.5 11.2mm	-3.0 8mm
MAR00881.001		Site B	Odourless Brown Gravelly Muddy Sand.		78.00		0.00	0.00	0.00	0.00	0.00	0.07
MAR00881.002		Site G	Odourless Brown Gravelly Mud with Shell Fragments.		45.20		0.00	0.00	0.00	3.91	5.64	3.25
MAR00881.003		Site J	Odourless Brown Gravelly Mud with Organic Matter.		46.10		0.00	0.00	4.79	5.15	0.00	0.00
MAR00881.004		Site M	Odourless Brown Muddy Sand.		74.10		0.00	0.00	0.00	0.00	0.00	0.00
MAR00881.005		Site Q	Brown Mud with a Sea Odour.		54.00		0.00	0.00	0.00	0.00	0.00	0.00
MAR00881.006		Site R	Odourless Brown Gravelly Mud with Shell Fragments.		40.40		0.00	5.60	0.00	13.10	7.12	3.74
MAR00881.007		Site T	Brown Mud with a Sea Odour.		59.00		0.00	0.00	0.00	0.00	0.00	0.00
MAR00881.008		Site W	Odourless Brown Mud.		62.80		0.00	0.00	0.00	0.00	0.00	0.00
MAR00881.009		CCS X	Brown Mud with Organic Matter and an Earthy Odour.		63.40		0.00	0.00	0.00	0.00	0.00	0.00
MAR00881.010		CCS Y	ud with Shell Fragments and Organic Matter and an Earthy Odour.		44.60		0.00	0.00	0.00	0.01	0.01	0.02
MAR00881.011		CCS Z	Brown Mud with Organic Matter and an Earthy Odour.		57.80		0.00	0.00	0.00	0.00	0.00	0.00

Particle size distribution (% at 0.5 phi intervals)

Laboratory sample number	-2.5 5.6mm	-2.0 4mm	-1.5 2.8mm	-1.0 2mm	-0.5 1.4mm	0.0 1mm	0.5 707µm	1.0 500µm	1.5 353.6µm	2.0 250µm	2.5 176.8µm	3.0 125µm	3.5 88.39µm	4.0 63µm	4.5 44.2µm	5.0 31.3µm	5.5 22.1µm	6.0 15.6µm	6.5 11µm	7.0 7.8µm	7.5 5.5µm
MAR00881.001	0.02	0.18	0.26	0.26	0.37	0.55	1.41	5.09	26.14	38.54	15.63	3.30	0.99	0.10	0.57	0.52	0.64	0.55	0.77	0.87	0.82
MAR00881.002	2.89	1.28	0.77	0.43	0.33	0.24	0.00	0.00	0.00	0.00	0.07	2.41	1.76	0.67	5.07	6.18	6.75	7.40	8.13	8.88	8.66
MAR00881.003	0.00	0.00	0.04	0.04	0.06	0.04	0.00	0.00	0.01	0.70	1.57	2.97	7.49	4.64	6.02	6.41	6.53	6.07	6.63	7.67	7.66
MAR00881.004	0.00	0.00	0.00	0.00	0.03	0.74	0.47	0.04	9.39	35.38	16.11	1.49	2.32	0.93	1.42	2.52	2.77	2.57	3.07	3.48	3.57
MAR00881.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	3.56	2.80	1.78	8.78	9.39	9.55	8.49	7.45	7.72	7.99
MAR00881.006	2.30	1.00	0.63	0.41	0.38	0.32	0.00	0.00	0.00	0.00	0.08	2.26	1.10	0.40	3.77	4.83	5.16	5.62	6.06	6.91	7.06
MAR00881.007	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	4.12	0.77	5.43	13.88	14.64	12.35	8.15	6.30	5.76	5.43
MAR00881.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	4.03	1.89	7.88	14.49	13.30	11.17	7.53	5.77	5.39	5.22
MAR00881.009	0.00	0.01	0.04	0.05	0.05	0.03	0.00	0.00	0.00	0.00	0.12	2.23	0.99	0.65	8.08	13.04	11.82	8.75	7.45	7.09	6.86
MAR00881.010	0.11	0.14	0.15	0.19	0.18	0.17	0.00	0.00	0.00	0.00	0.04	2.53	2.75	0.10	0.98	6.76	9.29	8.62	9.53	9.88	9.69
MAR00881.011	0.00	0.01	0.01	0.02	0.03	0.02	0.00	0.00	0.00	0.00	0.11	3.76	2.17	1.39	10.85	14.11	11.29	7.77	6.95	6.29	5.94

Laboratory sample number	8.0 3.9µm	8.5 2.75µm	9.0 1.95µm	9.5 1.38µm	10.0 0.98µm	10.5 0.69µm	11.0 0.49µm	11.5 0.34µm	12.0 0.24µm	12.5 0.17µm	13.0 0.12µm	13.5 0.09µm	14.0 0.06µm	14.5 0.04µm	>14.5 <0.04µm
MAR00881.001	0.64	0.41	0.25	0.22	0.22	0.19	0.15	0.10	0.07	0.04	0.03	0.02	0.01	0.00	0.00
MAR00881.002	6.93	4.63	2.80	1.98	1.75	1.63	1.49	1.28	1.04	0.76	0.54	0.33	0.13	0.02	0.00
MAR00881.003	6.33	4.48	3.03	2.36	2.03	1.75	1.50	1.26	1.02	0.75	0.54	0.33	0.13	0.02	0.00
MAR00881.004	3.12	2.34	1.63	1.27	1.11	0.99	0.86	0.73	0.59	0.44	0.32	0.20	0.08	0.01	0.00
MAR00881.005	7.04	5.24	3.69	3.02	2.75	2.49	2.20	1.88	1.52	1.11	0.78	0.47	0.18	0.02	0.00
MAR00881.006	5.87	4.02	2.49	1.80	1.58	1.46	1.32	1.14	0.92	0.67	0.48	0.29	0.11	0.01	0.00
MAR00881.007	4.64	3.58	2.62	2.11	1.88	1.71	1.51	1.29	1.05	0.78	0.57	0.35	0.14	0.02	0.00
MAR00881.008	4.55	3.56	2.68	2.24	2.03	1.83	1.59	1.34	1.07	0.79	0.57	0.35	0.14	0.02	0.00
MAR00881.009	6.09	4.88	3.82	3.33	3.04	2.70	2.35	2.01	1.64	1.22	0.88	0.54	0.21	0.02	0.00
MAR00881.010	8.38	6.37	4.59	3.69	3.22	2.85	2.53	2.20	1.82	1.36	0.98	0.60	0.24	0.03	0.00
MAR00881.011	5.42	4.52	3.58	3.04	2.69	2.36	2.04	1.73	1.41	1.06	0.77	0.48	0.19	0.02	0.00

* **Visual appearance**: Incude a description of what the material looks like and what it contains, e.g. sandy material containing brick fragments, or black silt, or foreign man made matter caught in the sample.

◦ **Exempt from chemical analysis:** enter 'y' where sediment samples contain glacial material or are too coarse and thus exempt from chemical analysis.

Trace metal data

Instructions:

1. Record the laboratory/contractor responsible for trace metal analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Trace metal analysis results should be reported in mg/kg (ppm) dry weight
5. Enter methdological limit of detection for each trace metal prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	SOCOTEC
Date of analysis:	24/12/2020

Determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Total solids (%)	Metals as mg/kg dry weight							
				Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)	Zinc (Zn)
MAR00881.001		Site B	78	16.8	0.37	47	31.6	0.18	34.4	64	159
MAR00881.002		Site G	45.2	15.4	0.31	42	27.8	0.16	30.4	56.4	137
MAR00881.003		Site J	46.1	30.6	0.16	8.7	9.5	0.05	11.6	27.8	63.5
MAR00881.004		Site M	74.1	18.5	0.43	49.7	34	0.22	34.2	69.2	167
MAR00881.005		Site Q	54	18.7	0.37	49.4	33.3	0.18	38.3	67.7	174
MAR00881.006		Site R	40.4	16.4	0.46	45.9	36.2	0.24	32.2	61.6	163
MAR00881.007		Site T	59	27.5	0.22	18.5	15	0.11	16.8	41.6	88.6
MAR00881.008		Site W	62.8	15.3	0.34	41.8	28	0.16	31.7	52.2	129
MAR00881.009		CCS X	63.4	18.5	0.33	54.2	33	0.19	39.5	72.6	176
MAR00881.010		CCS Y	44.6	15	0.32	44.5	28.8	0.18	33.2	52.9	137
MAR00881.011		CCS Z	57.8	15	0.4	43.4	32.7	0.2	29.7	55.1	152
Limits of detection (mg/kg dry weight):				0.5	0.04	0.5	0.5	0.01	0.5	0.5	2

Organotin data

Instructions:

1. Record the laboratory/contractor responsible for organotin analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Organotin analysis results should be reported in mg/kg (ppm) dry weight
5. Enter methdological limit of detection for each organotin prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	SOCOTEC
Date of analysis:	14/01/2021

determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Total solids (%)	Organotins as mg/kg dry weight	
				Dibutyltine (DBT)	Tributyltin (TBT)
MAR00881.001		Site B	78	<LOD	<LOD
MAR00881.002		Site G	45.2	<LOD	<LOD
MAR00881.003		Site J	46.1	<LOD	<LOD
MAR00881.004		Site M	74.1	<LOD	<LOD
MAR00881.005		Site Q	54	<LOD	<LOD
MAR00881.006		Site R	40.4	<LOD	<LOD
MAR00881.007		Site T	59	<LOD	<LOD
MAR00881.008		Site W	62.8	<LOD	<LOD
MAR00881.009		CCS X	63.4	<LOD	<LOD
MAR00881.010		CCS Y	44.6	<LOD	<LOD
MAR00881.011		CCS Z	57.8	<LOD	<LOD
			Limits of detection (mg/kg dry weight):	0.005	0.005

Polyaromatic hydrocarbon data

Instructions:

1. Record the laboratory/contractor responsible for PAH analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Analysis results for individual PAHs should be reported in µg/kg (ppb) dry weight. THC should be reported as mg/kg (ppm)
5. Enter methdological limit of detection for each PAH prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form IDs should be separated by a comma

Analysis information:

Laboratory/contractor: SOCOTEC

Date of analysis: 14/01/2021

determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Total Solids (%)	PAHs as dry weight (µg/kg dry weight)																					Total hydrocarbon content (mg/kg)
				Acenapthene	Acenaphthylene	Anthracene	Benz[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[e]pyrene	Benzo[k]fluoranthene	C1-Napthalenes	C1-Phenanthrenes	C2-Napthalenes	C3-Napthalenes	Chrysene	Dibenz[a,h]anthracene	Fluoranthene	Fluorene	Indeno[123-c,d]pyrene	Naphthalene	Perylene	Phenanthrene	Pyrene	
MAR00881.001		Site B	78	226	368	344	1230	1180	775	452	696	539	466	360	453	268	1100	114	808	153	509	233	298	196	856	21.1
MAR00881.002		Site G	45.2	48.5	43.3	122	261	341	309	289	311	169	624	438	477	367	244	51.5	504	71	243	218	135	425	504	113
MAR00881.003		Site J	46.1	39	28.1	91.4	187	238	234	235	240	107	566	365	428	388	181	40.7	351	60.5	190	197	108	342	365	91.5
MAR00881.004		Site M	74.1	11.7	5.13	28	47	52.7	47.2	49.5	58.2	20.4	173	196	159	168	56.6	8.41	108	17.6	34.9	59.7	29.1	157	133	92.2
MAR00881.005		Site Q	54	79.3	41.9	157	316	416	362	355	381	177	1030	655	801	693	335	62.6	666	118	307	356	164	616	666	47.4
MAR00881.006		Site R	40.4	46.2	32.6	102	194	266	258	272	275	106	663	430	509	405	221	45.6	388	68.1	221	232	131	385	405	60.9
MAR00881.007		Site T	59	74.9	41.5	165	331	425	371	337	374	179	962	625	733	633	363	60.6	668	114	302	355	185	626	668	32.6
MAR00881.008		Site W	62.8	87.4	42.5	202	418	535	406	370	418	209	860	543	653	549	428	72.8	766	123	363	342	198	617	742	76
MAR00881.009		CCS X	63.4	40	34.9	96	197	257	248	244	252	118	677	433	514	431	198	41.5	373	67.2	193	235	111	384	378	12
MAR00881.010		CCS Y	44.6	39.6	28.1	87.2	212	282	273	273	286	141	604	399	471	33.8	239	47.6	415	61	232	213	122	369	413	37.8
MAR00881.011		CCS Z	57.8	43	24.5	92	189	253	242	237	247	119	679	438	536	444	229	37.7	389	67.7	187	248	107	404	391	79.6
Limits of detection (µg/kg dry weight)				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Polychlorinated biphenyl data

Instructions:

1. Record the laboratory/contractor responsible for PCB analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Analysis results should be reported in mg/kg (ppm) dry weight.
5. Enter methdological limit of detection for each PCB prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. ICES 7 PCBs are highlighted in bold
8. Where copying and pasting entries please use paste values only
9. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	SOCOTEC
Date of analysis:	12/01/2021

determinand analysis outputs:

PCBs as mg/kg dry weight

Laboratory sample number	Dredge Area	Sample ID(s)	Total Solids (%)	2,2',4,5,5'-Pentachlorobiphenyl CB101	2,3,3',4,4'-Pentachlorobiphenyl CB105	2,3,3',4',6-Pentachlorobiphenyl CB110	2,3',4,4',5-Pentachlorobiphenyl CB118	2,2',3,3',4,4'-Hexachlorobiphenyl CB128
MAR00881.001		Site B	78	0.00013	<LOD	<LOD	<LOD	<LOD
MAR00881.002		Site G	45.2	0.00064	0.00019	0.00087	0.00031	0.00012
MAR00881.003		Site J	46.1	0.00054	0.00019	0.00068	0.00043	0.00013
MAR00881.004		Site M	74.1	0.02085	0.00819	0.02113	0.0245	0.01305
MAR00881.005		Site Q	54	0.00075	0.00024	0.0009	0.0005	0.00021
MAR00881.006		Site R	40.4	0.00069	0.00021	0.00072	0.00053	0.00008
MAR00881.007		Site T	59	0.00077	0.0002	0.0009	0.00054	0.00018
MAR00881.008		Site W	62.8	0.00069	0.00019	0.00079	0.00039	0.00016
MAR00881.009		CCS X	63.4	0.00058	0.00019	0.00067	0.00041	0.00009
MAR00881.010		CCS Y	44.6	0.00064	0.00017	0.00074	0.00056	0.00015
MAR00881.011		CCS Z	57.8	0.00058	0.00014	0.0006	0.0004	0.00011
Limits of detection (mg/kg dry weight):				0.00008	0.00008	0.00008	0.00008	0.00008

Laboratory sample number	2,2',3,4,4',5'-Hexachlorobiphenyl CB138	2,2',3,4,5,5'-Hexachlorobiphenyl CB141	2,2',3,4',5',6-Hexachlorobiphenyl CB149	2,2',3,5,5',6-Hexachlorobiphenyl CB151	2,2',4,4',5,5'-Hexachlorobiphenyl CB153	2,3,3',4,4',5-Hexachlorobiphenyl CB156	2,3,3',4,4',6-Hexachlorobiphenyl CB158	2,2',3,3',4,4',5-Heptachlorobiphenyl CB170
MAR00881.001	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
MAR00881.002	0.00105	0.00022	0.00067	0.00021	0.00096	<LOD	0.00011	0.00019
MAR00881.003	0.00086	0.0001	0.00051	0.00014	0.00084	<LOD	<LOD	0.00011
MAR00881.004	0.05398	0.00963	0.03129	0.0094	0.0589	0.00656	0.00211	0.02792
MAR00881.005	0.00127	<LOD	0.00073	0.00028	0.00108	<LOD	0.0001	0.00021
MAR00881.006	0.00106	0.00016	0.00052	0.00016	0.00082	<LOD	0.00015	0.00021
MAR00881.007	0.00081	0.00012	0.0007	0.00015	0.00095	0.00009	0.00015	0.00025
MAR00881.008	0.00085	<LOD	0.00055	0.00017	0.00094	<LOD	<LOD	0.00013
MAR00881.009	0.00082	<LOD	0.00054	0.00015	0.00066	<LOD	0.00009	0.00016
MAR00881.010	0.00098	0.0002	0.00066	0.00018	0.00099	<LOD	<LOD	0.00021
MAR00881.011	0.00053	0.00009	0.0005	0.00012	0.00068	<LOD	<LOD	0.00013
Limits of detection (mg/kg dry weight):	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008

Laboratory sample number	2,2',5- Trichlorobiphenyl CB18	2,2',3,4,4',5,5'-Heptachlorobiphenyl CB180	2,2',3,4,4',5',6-Heptachlorobiphenyl CB183	2,2',3,4',5,5',6-Heptachlorobiphenyl CB187	2,2',3,3',4,4',5,5'-Octachlorobiphenyl CB194
MAR00881.001	0.00025	<LOD	<LOD	<LOD	<LOD
MAR00881.002	0.00043	0.00057	0.00014	0.00036	0.00015
MAR00881.003	0.00035	0.00056	0.00011	0.00029	0.00011
MAR00881.004	0.00025	0.06172	0.01069	0.03748	0.04183
MAR00881.005	0.00076	0.0007	0.00017	0.00047	0.00014
MAR00881.006	0.00039	0.00056	0.00014	0.00031	0.0001
MAR00881.007	0.00061	0.00054	0.00012	0.00033	0.00015
MAR00881.008	0.00065	0.00047	0.0001	0.00034	0.00011
MAR00881.009	0.00099	0.00048	0.00011	0.00025	0.00009
MAR00881.010	0.00052	0.00068	0.00019	0.00047	0.00016
MAR00881.011	0.00071	0.00044	<LOD	0.00028	<LOD
Limits of detection (mg/kg dry weight):	0.00008	0.00008	0.00008	0.00008	0.00008

Laboratory sample number	2,4,4'-Trichlorobiphenyl CB28	2,4',5-Trichlorobiphenyl CB31	2,2',3,5'-Tetrachlorobiphenyl CB44	2,2',4,4'-Tetrachlorobiphenyl CB47	2,2',4,5'-Tetrachlorobiphenyl CB49	2,2',5,5'-Tetrachlorobiphenyl CB52	2,3',4,4'-Tetrachlorobiphenyl CB66
MAR00881.001	0.00015	0.00024	0.0002	<LOD	0.00015	0.00024	<LOD
MAR00881.002	0.00063	0.00084	0.00057	0.00019	0.00042	0.00073	0.00071
MAR00881.003	0.00053	0.00076	0.00054	0.00018	0.0004	0.00069	0.00071
MAR00881.004	0.00027	0.00032	0.00154	0.00068	0.0018	0.00512	0.00374
MAR00881.005	0.00081	0.00129	0.00064	0.00042	0.00059	0.00104	0.00089
MAR00881.006	0.00058	0.00071	0.00049	0.00274	0.00049	0.00074	0.00078
MAR00881.007	0.00076	0.00199	0.00062	0.00019	0.00055	0.00088	0.00076
MAR00881.008	0.00077	0.00108	0.00058	0.00019	0.00051	0.00087	0.00068
MAR00881.009	0.0008	0.00144	0.00064	0.00022	0.00061	0.00096	0.0007
MAR00881.010	0.00067	0.00094	0.00046	0.00017	0.00041	0.00073	0.00066
MAR00881.011	0.00069	0.00099	0.00054	0.00018	0.00049	0.00085	0.00068
Limits of detection (mg/kg dry weight):	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008

Organochlorine data

Instructions:

1. Record the laboratory/contractor responsible for analysis
2. Record the date the samples were analysed.

3. Enter full dataset for each sample in the analysis results table

4. Analysis results should be reported in mg/kg (ppm) dry weight.
5. Enter methdological limit of detection for each Organochlorine prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	SOCOTEC
Date of analysis:	12/01/2021

determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Total Solids (%)	**Organochlorine pesticides as mg/kg dry weight**							
				alpha-hexachlorocyclohexane (AHCH)	beta-hexachlorocyclohexane (BHCH)	gamma-hexachlorocyclohexane (GHCH)	Dieldrin	Hexachlorobenzene (HCB)	1,1-Dichloro-2,2-bis(p-chlorophenyl) ethylene (PPDDE)	Dichlorodiphenyltrichloroethane (PPDDT)	1,1-dichloro-2,2-bis(p-chlorophenyl)ethane (PPTDE)
MAR00881.001		Site B	78	<LOD	<LOD	<LOD	0.0001	0.0002	0.0002	<LOD	0.0009
MAR00881.002		Site G	45.2	<LOD	0.0001	<LOD	0.0009	0.0005	0.0014	0.0035	0.0068
MAR00881.003		Site J	46.1	<LOD	<LOD	<LOD	0.0003	0.0006	0.0011	0.0034	0.0055
MAR00881.004		Site M	74.1	<LOD	<LOD	<LOD	0.0003	0.0002	0.0003	0.0002	0.0018
MAR00881.005		Site Q	54	<LOD	<LOD	<LOD	0.0008	0.0008	0.0015	0.0021	0.0079
MAR00881.006		Site R	40.4	<LOD	0.0002	<LOD	0.0008	0.0006	0.0014	0.0016	0.0066
MAR00881.007		Site T	59	<LOD	0.0001	<LOD	0.001	0.0007	0.0015	0.0016	0.0074
MAR00881.008		Site W	62.8	<LOD	<LOD	<LOD	0.0008	0.0006	0.0011	0.0037	0.0067
MAR00881.009		CCS X	63.4	<LOD	<LOD	0.0001	0.0005	0.0006	0.0013	0.0016	0.005
MAR00881.010		CCS Y	44.6	<LOD	<LOD	<LOD	0.0008	0.0007	0.0012	0.0052	0.006
MAR00881.011		CCS Z	57.8	<LOD	<LOD	<LOD	0.0005	0.0006	0.001	<LOD	0.0047
Limits of detection (mg/kg dry weight):				0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Brominated flame retardant data

Instructions:

1. Record the laboratory/contractor responsible for analysis
2. Record the date the samples were analysed.

3. Enter full dataset for each sample in the analysis results table

4. Analysis results should be reported in mg/kg (ppm) dry weight.
5. Enter methdological limit of detection for each BDE prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	
Date of analysis:	

determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Total Solids (%)	Brominated flame retardants as mg/kg dry weight											
				2,2′,4,4′,6-penta-bromodiphenyl ether (BDE100)	Hexabromodiphenyl ether (BDE138)	2,2′,4,4′,5,5′-hexa-bromodiphenyl ether (BDE153)	2,2′,4,4′,5,6′-hexa-bromodiphenyl ether (BDE154)	2,2´,4-tri-bromodiphenylether (BDE17)	2,2′,3,4,4′,5′,6-heptabromodiphenyl ether (BDE183)	2,2',3,3',4,4',5,5',6,6'-decabrominated diphenyl ether (BDE 209)	2,4,4'-tribromodiphenyl ether (BDE28)	2,2′,4,4′-Tetrabromodiphenyl ether (BDE47)	2,3',4,4'-Tetrabromodiphenyl ether (BDE66)	2,2',3,4,4'-Pentabromodiphenyl ether (BDE85)	2,2',4,4',5-pentabromodiphenyl ether (BDE99)
Limits of detection (mg/kg dry weight):															

Report to: Able UK Ltd

Able Marine Energy Park: Sediment Sampling 2020.

Date: April 2021

Report ref: P11195-AMEP-ME-TR-000142-01

Report Name: Able Marine Energy Park: Sediment Sampling 2020.

Client Name: Able UK Ltd

Date: April 2021

Report ref: P11195-AMEP-ME-TR-000142-01

Author(s): James Allen

Document Revision:	Date of Issue	Document Details:	
1	21/04/2021	Survey Report	
Document Approval		**Signature**	**Date**
Project Manager	NV Proctor	[redacted]	21/04/2021
Project Manager	JH Allen	[redacted]	21/04/2021

Precision Marine Survey Ltd
Church Farm, Main Road
Thorngumbald
Hull, East Yorkshire
HU12 9NE

Tel: +44 (0) 1964 624423
Fax: +44 (0) 1964 623352
Email:
info@precisionmarine.co.uk
Web: www.precisionmarine.co.uk

Report Title: Able Marine Energy Park: Sediment Sampling 2020.

Contents

Page

List of Tables

Page

List of Figures

Page

1. Introduction

Able UK Ltd. has been granted a Development Consent Order (DCO) to construct the Able Marine Energy Park (AMEP) near Immingham on the southern bank of the Humber Estuary. The AMEP Sampling Plan (v3) includes a series of proposals to inform the update of the dredging and disposal strategy baseline in relation to dredging works which are planned to be undertaken as part of the AMEP construction. This included sediment sampling and analysis at six locations in the Humber Estuary and draft proposals for sediment sampling to update the existing baseline were submitted to the Marine Management Organisation (MMO) for approval. In 2017 MMO provided confirmation of revised requirements for sampling and analysis (Letter dated 30 May 2017, Ref: SAM/2017/00027) which recommended increasing the number of samples to 11 including three samples from Cherry Cobb Sands on the north bank of the Humber. These samples were collected in 2017 and subsequently processed by CEFAS and PMSL. In 2020, MMO requested that the 2017 sampling regime be repeated (letter dated 10th September 2020 Ref: SAM/2020/00052) with the same suite of determinands to be analysed along with the addition of PCBs and organotins. The positions of the proposed sample locations were provided by CEFAS/MMO and Precision Marine Survey Ltd were commissioned to undertake collection of the sediment samples and arrange subsequent analysis with an MMO approved laboratory (SOCOTEC Ltd).

2. Methods

2.1 Sample Collection

As outlined above a total of 11 sample sites were surveyed at pre-defined locations provided by CEFAS. This included eight sample sites in the vicinity of the AMEP construction/dredging footprint off North Killingholme (Sites B, G, J, M, Q, R, T and W) and three intertidal samples in the vicinity of the breach location at Cherry Cobb Sands on the north bank of the Humber (sites CCS X, CCS Y and CCS Z). The sampling stations at North Killingholme were sampled remotely using a stainless steel 0.1m^2 day grab from the PMSL survey vessel 'Precision 1' which was deployed from Hull Marina on the 12th December 2020 whilst the intertidal samples at Cherry Cobb Sands were sampled on foot on the 15th December 2020.

Methodologies for grab sampling followed standard methodologies e.g. Marine Monitoring Handbook procedural guideline 3-9 (Davies *et al*, 2001) and other best practice guidelines (Ware & Kenny, 2011; Worsfold & Hall, 2010). Collection of contaminant sub-samples followed guidance outlined in MMO letter Ref: SAM/2020/00052. At each pre-determined station position the vessel was taken out of gear and the 0.1m^2 Day grab was lowered by winch into the water. The winch was then used to lower the grab to the seabed at a rate of approximately 1 m/s and the winch slowed as the length of warp indicated it was approaching the seabed. Once the grab had landed, as evident by the slackening of the winch wire, the winch was stopped and the position of the grab was taken from the GPS along with time and water depth and recorded on the grab logsheet. The winch was then used to raise the grab off the seabed and docked into the retrieval frame on board the survey vessel and slowly bought aboard and lowered onto a metal frame with a sample box placed beneath.

With the grab resting on the frame, the grab was inspected to assess whether it had deployed correctly and to ensure that adequate material was retained for sub-sampling. Grabs with inadequate sample volumes or those with material such as stones caught in the jaws of the grab (or where the grab jaws had not fully closed) were discarded. When samples were within the prescribed limits, each grab sample was photographed and surface sub-samples from the upper layer of in-situ sediment collected using a non-metallic / stainless steel scoop as per MMO guidance.

Sub-samples collected for PSA were placed in an appropriately labelled plastic container whilst sub-samples for contaminant analysis were placed in labelled, contaminant free, glass jars (filled approximately ¾ full) provided by SOCOTEC as per MMO/CEFAS guidance. No pooling of samples from separate grabs was undertaken and each PSA/contaminant sub-sample collected at a survey site was taken from a single discrete grab sample. Sampling from Cherry Cobb Sands undertaken on foot followed a similar procedure with sediment sub-samples taken directly from the intertidal sediment surface. All sampling equipment (grab/scoops) were carefully washed and dried between samples and the sediment samples were placed in the refrigerated cool boxes for transit to PMSL premises and then transported whereupon they were immediately frozen prior to transport to SOCOTEC Ltd premises for analysis.

A full survey log was maintained throughout the survey detailing time of sampling, GPS position, number of attempts required, station number, water depth, physical characteristics of the sample and presence of any other relevant features. Survey positions and other sampling details are provided in Table 1 and the spatial distribution of sample locations is shown in Figure 1. All samples were collected during survey were within 10m of the target position.

Table 1. Sampling positions and survey log.

Sample ID	Lat (WGS84)	Long (WGS84)	Date/Time	Recorded Water Depth (m)	Water Depth (m CD)	Attempts	Sediment Notes
Site B	53.656688	-0.212977	12/12/2020 10:52	10.41	8.606	2	(Gravelly) Muddy Sand
Site G	53.658597	-0.224615	12/12/2020 11:53	4.10	1.197	1	Gravelly Mud with shell debris
Site J	53.655285	-0.217165	12/12/2020 11:28	8.61	6.208	5	Gravelly Mud with some stones
Site M	53.652893	-0.211033	12/12/2020 10:17	10.74	9.341	2	Muddy sand
Site Q	53.649503	-0.212520	12/12/2020 12:21	3.18	-0.218	1	Mud/Clay
Site R	53.655522	-0.221008	12/12/2020 13:28	4.98	-0.019	13	Gravelly Mud with shell debris
Site T	53.654632	-0.223865	12/12/2020 15:32	1.20	-5.599	1	Mud/Clay
Site W	53.650522	-0.217458	12/12/2020 14:43	1.66	-4.642	1	Mud/Clay
CCS X	53.658598	-0.145794	15/12/2020 13:00	N/A	N/A	1	Mud & organic/plant debris
CCS Y	53.658315	-0.144559	15/12/2020 14:23	N/A	N/A	1	Mud & organic/plant debris
CCS Z	53.657397	-0.144084	15/12/2020 13:39	N/A	N/A	1	Mud & organic/plant debris

2.2 Laboratory Analysis

2.2.1 Sample Analysis

The samples jars containing sediments for contaminant analysis and PSA were transported in a refrigerated cool box to the SOCOTEC laboratory laboratory by PMSL staff on the 16th December. The following analysis was undertaken by SOCOTEC or their MMO approved sub-contractor:

- Trace metals;
- Organotins;
- Total Hydrocarbons (THC);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Polychlorinated Biphenyls (PCBs);
- Organochlorine Pesticides (OCs); and
- Particle Size Analysis (PSA)#

Analysed by Ocean Ecology

All analytical procedures followed MMO approved dredge material SOPs. The results of the analysis provided within the SOCOTEC Certificate of Analysis appended in Appendix 1.

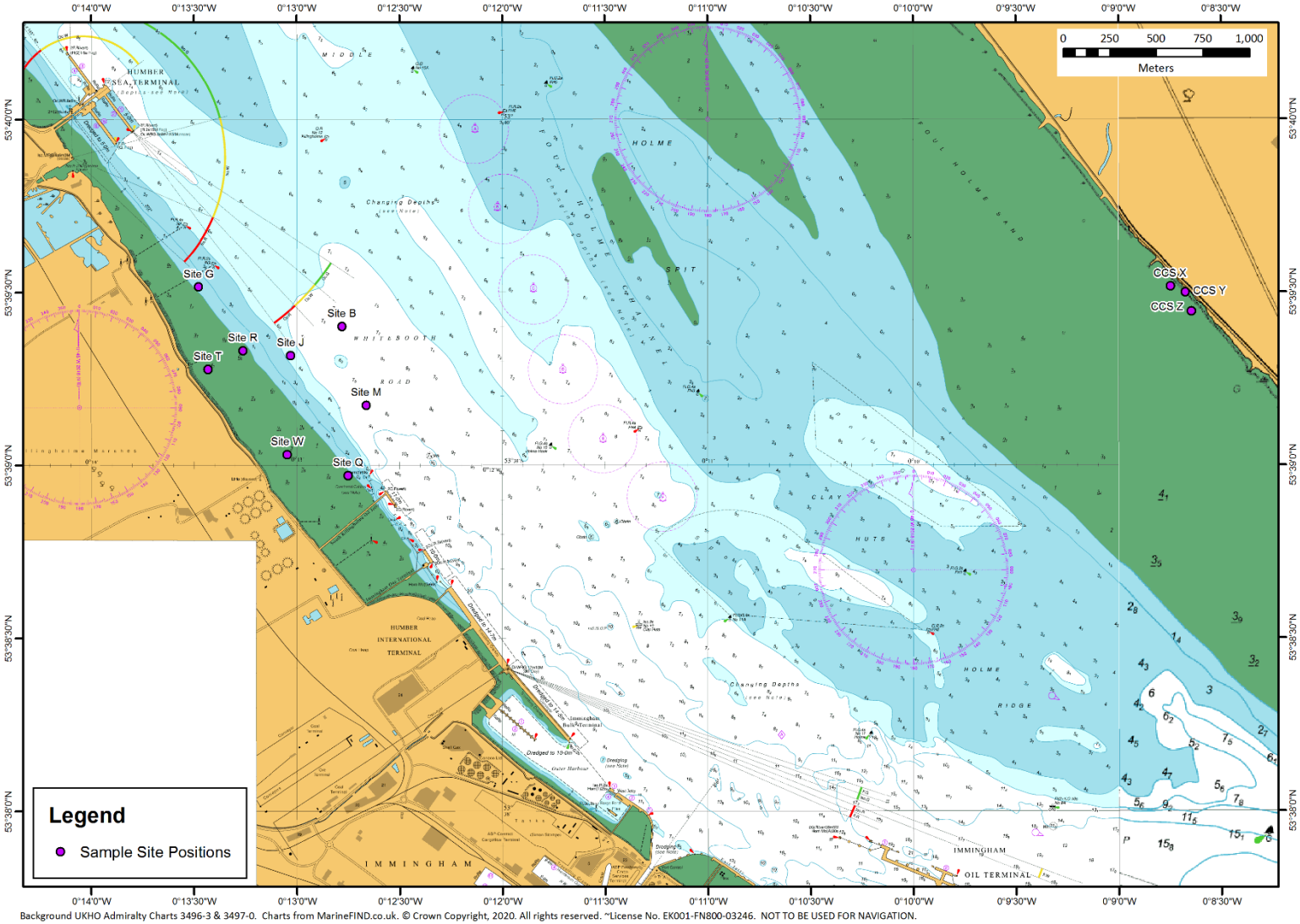


Figure 1. Location of survey samples

3. References

Davies, J., Baxter, J., Bradley, M., Connor, D., Khan, J., Murray, E., Sanderson, W., Turnbull, C. & Vincent, M., (2001), Marine Monitoring Handbook, 405 pp, ISBN 1 85716 550 0.

Mason, C. 2016. NMBAQC's Best Practice Guidance: Particle Size Analysis (PSA) for Supporting Biological Analysis (version 18_01_2016). NE Atlantic Marine Biological AQC Coordinating Committee.

Ware, S.J. & Kenny, A.J. 2011. Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites (2nd Edition). Marine Aggregate Levy Sustainability Fund, 80 pp.

Worsfold, T & Hall, D. 2010. Guidelines for processing marine macrobenthic invertebrate samples: A Processing Requirements Protocol. NMBAQC.

Appendix 1. SOCOTEC Certificate of Analysis

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	**MAR00881**	
Issue Version	1	
Customer	Precision Marine Survey Limited, Church Farm, Main Road, Thorngumbald, East Yorkshire, HU12 9NE	
Customer Reference	MMO Marine Sediment Analysis	
Date Sampled	12 & 15-Dec-20	
Date Received	16-Dec-20	
Date Reported	21-Jan-21	
Condition of samples	Cold	Satisfactory

Authorised by: Marya Hubbard

Position: Laboratory Manager

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO
			45mm	31.5mm	22.4mm	16mm	11.2mm
Client Reference:	SOCOTEC Ref:	Matrix	-5.5	-5.0	-4.5	-4.0	-3.5
Site B	MAR00881.001	Sediment	0.00	0.00	0.00	0.00	0.00
Site G	MAR00881.002	Sediment	0.00	0.00	0.00	3.91	5.64
Site J	MAR00881.003	Sediment	0.00	0.00	4.79	5.15	0.00
Site M	MAR00881.004	Sediment	0.00	0.00	0.00	0.00	0.00
Site Q	MAR00881.005	Sediment	0.00	0.00	0.00	0.00	0.00
Site R	MAR00881.006	Sediment	0.00	5.60	0.00	13.10	7.12
Site T	MAR00881.007	Sediment	0.00	0.00	0.00	0.00	0.00
Site W	MAR00881.008	Sediment	0.00	0.00	0.00	0.00	0.00
CCS X	MAR00881.009	Sediment	0.00	0.00	0.00	0.00	0.00
CCS Y	MAR00881.010	Sediment	0.00	0.00	0.00	0.01	0.01
CCS Z	MAR00881.011	Sediment	0.00	0.00	0.00	0.00	0.00

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO
			8mm	5.6mm	4mm	2.8mm	2mm	1.4mm
Client Reference:	SOCOTEC Ref:	Matrix	-3.0	-2.5	-2.0	-1.5	-1.0	-0.5
Site B	MAR00881.001	Sediment	0.07	0.02	0.18	0.26	0.26	0.37
Site G	MAR00881.002	Sediment	3.25	2.89	1.28	0.77	0.43	0.33
Site J	MAR00881.003	Sediment	0.00	0.00	0.00	0.04	0.04	0.06
Site M	MAR00881.004	Sediment	0.00	0.00	0.00	0.00	0.00	0.03
Site Q	MAR00881.005	Sediment	0.00	0.00	0.00	0.00	0.00	0.00
Site R	MAR00881.006	Sediment	3.74	2.30	1.00	0.63	0.41	0.38
Site T	MAR00881.007	Sediment	0.00	0.00	0.00	0.00	0.00	0.00
Site W	MAR00881.008	Sediment	0.00	0.00	0.00	0.00	0.00	0.00
CCS X	MAR00881.009	Sediment	0.00	0.00	0.01	0.04	0.05	0.05
CCS Y	MAR00881.010	Sediment	0.02	0.11	0.14	0.15	0.19	0.18
CCS Z	MAR00881.011	Sediment	0.00	0.00	0.01	0.01	0.02	0.03

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO
			1mm	707µm	500µm	353.6µm	250µm	176.8µm
Client Reference:	SOCOTEC Ref:	Matrix	0.0	0.5	1.0	1.5	2.0	2.5
Site B	MAR00881.001	Sediment	0.55	1.41	5.09	26.14	38.54	15.63
Site G	MAR00881.002	Sediment	0.24	0.00	0.00	0.00	0.00	0.07
Site J	MAR00881.003	Sediment	0.04	0.00	0.00	0.01	0.70	1.57
Site M	MAR00881.004	Sediment	0.74	0.47	0.04	9.39	35.38	16.11
Site Q	MAR00881.005	Sediment	0.00	0.00	0.00	0.00	0.00	0.09
Site R	MAR00881.006	Sediment	0.32	0.00	0.00	0.00	0.00	0.08
Site T	MAR00881.007	Sediment	0.00	0.00	0.00	0.00	0.00	0.91
Site W	MAR00881.008	Sediment	0.00	0.00	0.00	0.00	0.00	0.58
CCS X	MAR00881.009	Sediment	0.03	0.00	0.00	0.00	0.00	0.12
CCS Y	MAR00881.010	Sediment	0.17	0.00	0.00	0.00	0.00	0.04
CCS Z	MAR00881.011	Sediment	0.02	0.00	0.00	0.00	0.00	0.11

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO
			125µm	**88.39µm**	**63µm**	**44.2µm**	**31.3µm**	**22.1µm**
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**3.0**	**3.5**	**4.0**	**4.5**	**5.0**	**5.5**
Site B	MAR00881.001	Sediment	3.30	0.99	0.10	0.57	0.52	0.64
Site G	MAR00881.002	Sediment	2.41	1.76	0.67	5.07	6.18	6.75
Site J	MAR00881.003	Sediment	2.97	7.49	4.64	6.02	6.41	6.53
Site M	MAR00881.004	Sediment	1.49	2.32	0.93	1.42	2.52	2.77
Site Q	MAR00881.005	Sediment	3.56	2.80	1.78	8.78	9.39	9.55
Site R	MAR00881.006	Sediment	2.26	1.10	0.40	3.77	4.83	5.16
Site T	MAR00881.007	Sediment	4.12	0.77	5.43	13.88	14.64	12.35
Site W	MAR00881.008	Sediment	4.03	1.89	7.88	14.49	13.30	11.17
CCS X	MAR00881.009	Sediment	2.23	0.99	0.65	8.08	13.04	11.82
CCS Y	MAR00881.010	Sediment	2.53	2.75	0.10	0.98	6.76	9.29
CCS Z	MAR00881.011	Sediment	3.76	2.17	1.39	10.85	14.11	11.29

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO	MMO
			15.6µm	11µm	7.8µm	5.5µm	3.9µm	2.75µm
Client Reference:	SOCOTEC Ref:	Matrix	6.0	6.5	7.0	7.5	8.0	8.5
Site B	MAR00881.001	Sediment	0.55	0.77	0.87	0.82	0.64	0.41
Site G	MAR00881.002	Sediment	7.40	8.13	8.88	8.66	6.93	4.63
Site J	MAR00881.003	Sediment	6.07	6.63	7.67	7.66	6.33	4.48
Site M	MAR00881.004	Sediment	2.57	3.07	3.48	3.57	3.12	2.34
Site Q	MAR00881.005	Sediment	8.49	7.45	7.72	7.99	7.04	5.24
Site R	MAR00881.006	Sediment	5.62	6.06	6.91	7.06	5.87	4.02
Site T	MAR00881.007	Sediment	8.15	6.30	5.76	5.43	4.64	3.58
Site W	MAR00881.008	Sediment	7.53	5.77	5.39	5.22	4.55	3.56
CCS X	MAR00881.009	Sediment	8.75	7.45	7.09	6.86	6.09	4.88
CCS Y	MAR00881.010	Sediment	8.62	9.53	9.88	9.69	8.38	6.37
CCS Z	MAR00881.011	Sediment	7.77	6.95	6.29	5.94	5.42	4.52

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO
			1.95µm	**1.38µm**	**0.98µm**	**0.69µm**	**0.49µm**
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**9.0**	**9.5**	**10.0**	**10.5**	**11.0**
Site B	MAR00881.001	Sediment	0.25	0.22	0.22	0.19	0.15
Site G	MAR00881.002	Sediment	2.80	1.98	1.75	1.63	1.49
Site J	MAR00881.003	Sediment	3.03	2.36	2.03	1.75	1.50
Site M	MAR00881.004	Sediment	1.63	1.27	1.11	0.99	0.86
Site Q	MAR00881.005	Sediment	3.69	3.02	2.75	2.49	2.20
Site R	MAR00881.006	Sediment	2.49	1.80	1.58	1.46	1.32
Site T	MAR00881.007	Sediment	2.62	2.11	1.88	1.71	1.51
Site W	MAR00881.008	Sediment	2.68	2.24	2.03	1.83	1.59
CCS X	MAR00881.009	Sediment	3.82	3.33	3.04	2.70	2.35
CCS Y	MAR00881.010	Sediment	4.59	3.69	3.22	2.85	2.53
CCS Z	MAR00881.011	Sediment	3.58	3.04	2.69	2.36	2.04

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO	MMO	MMO
			0.34µm	**0.24µm**	**0.17µm**	**0.12µm**	**0.09µm**
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**11.5**	**12.0**	**12.5**	**13.0**	**13.5**
Site B	MAR00881.001	Sediment	0.10	0.07	0.04	0.03	0.02
Site G	MAR00881.002	Sediment	1.28	1.04	0.76	0.54	0.33
Site J	MAR00881.003	Sediment	1.26	1.02	0.75	0.54	0.33
Site M	MAR00881.004	Sediment	0.73	0.59	0.44	0.32	0.20
Site Q	MAR00881.005	Sediment	1.88	1.52	1.11	0.78	0.47
Site R	MAR00881.006	Sediment	1.14	0.92	0.67	0.48	0.29
Site T	MAR00881.007	Sediment	1.29	1.05	0.78	0.57	0.35
Site W	MAR00881.008	Sediment	1.34	1.07	0.79	0.57	0.35
CCS X	MAR00881.009	Sediment	2.01	1.64	1.22	0.88	0.54
CCS Y	MAR00881.010	Sediment	2.20	1.82	1.36	0.98	0.60
CCS Z	MAR00881.011	Sediment	1.73	1.41	1.06	0.77	0.48

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	% (at 0.5phi intervals)	% (at 0.5phi intervals)	% (at 0.5phi intervals)
		Method No	*SUB_01	*SUB_01	*SUB_01
		Accreditation	MMO	MMO	MMO
			0.06µm	0.04µm	<0.04µm
Client Reference:	SOCOTEC Ref:	Matrix	14.0	14.5	>14.5
Site B	MAR00881.001	Sediment	0.01	0.00	0.00
Site G	MAR00881.002	Sediment	0.13	0.02	0.00
Site J	MAR00881.003	Sediment	0.13	0.02	0.00
Site M	MAR00881.004	Sediment	0.08	0.01	0.00
Site Q	MAR00881.005	Sediment	0.18	0.02	0.00
Site R	MAR00881.006	Sediment	0.11	0.01	0.00
Site T	MAR00881.007	Sediment	0.14	0.02	0.00
Site W	MAR00881.008	Sediment	0.14	0.02	0.00
CCS X	MAR00881.009	Sediment	0.21	0.02	0.00
CCS Y	MAR00881.010	Sediment	0.24	0.03	0.00
CCS Z	MAR00881.011	Sediment	0.19	0.02	0.00

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)							
		Method No	SOCOTEC Env Chem*							
		Limit of Detection	0.5	0.04	0.5	0.5	0.01	0.5	0.5	2
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic (As)**	**Cadmium (Cd)**	**Chromium (Cr)**	**Copper (Cu)**	**Mercury (Hg)**	**Nickel (Ni)**	**Lead (Pb)**	**Zinc (Zn)**
Site B	MAR00881.001	Sediment	16.8	0.37	47.0	31.6	0.18	34.4	64.0	159
Site G	MAR00881.002	Sediment	15.4	0.31	42.0	27.8	0.16	30.4	56.4	137
Site J	MAR00881.003	Sediment	30.6	0.16	8.7	9.5	0.05	11.6	27.8	63.5
Site M	MAR00881.004	Sediment	18.5	0.43	49.7	34.0	0.22	34.2	69.2	167
Site Q	MAR00881.005	Sediment	18.7	0.37	49.4	33.3	0.18	38.3	67.7	174
Site R	MAR00881.006	Sediment	16.4	0.46	45.9	36.2	0.24	32.2	61.6	163
Site T	MAR00881.007	Sediment	27.5	0.22	18.5	15.0	0.11	16.8	41.6	88.6
Site W	MAR00881.008	Sediment	15.3	0.34	41.8	28.0	0.16	31.7	52.2	129
CCS X	MAR00881.009	Sediment	18.5	0.33	54.2	33.0	0.19	39.5	72.6	176
CCS Y	MAR00881.010	Sediment	15.0	0.32	44.5	28.8	0.18	33.2	52.9	137
CCS Z	MAR00881.011	Sediment	15.0	0.40	43.4	32.7	0.20	29.7	55.1	152
Certified Reference Material SETOC 774 (% Recovery)			91	106	97	98	91	99	96	99
QC Blank			<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	0.001	0.001
		Accreditation	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
Site B	MAR00881.001	Sediment	<0.005	<0.005
Site G	MAR00881.002	Sediment	<0.005	<0.005
Certified Reference Material BCR-646 (% Recovery)			96	75
QC Blank			<0.001	<0.001

* See report notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	0.001	0.001
		Accreditation	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
Site J	MAR00881.003	Sediment	<0.005	<0.005
Site M	MAR00881.004	Sediment	<0.005	<0.005
Site Q	MAR00881.005	Sediment	<0.005	<0.005
Site R	MAR00881.006	Sediment	<0.005	<0.005
Site T	MAR00881.007	Sediment	<0.005	<0.005
Site W	MAR00881.008	Sediment	<0.005	<0.005
CCS X	MAR00881.009	Sediment	<0.005	<0.005
CCS Y	MAR00881.010	Sediment	<0.005	<0.005
CCS Z	MAR00881.011	Sediment	<0.005	<0.005
		Certified Reference Material BCR-646 (% Recovery)	82	71
		QC Blank	<0.001	<0.001

* See report notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
Site B	MAR00881.001	Sediment	226	368	344	1230	1180	775
Site G	MAR00881.002	Sediment	48.5	43.3	122	261	341	309
Site J	MAR00881.003	Sediment	39.0	28.1	91.4	167	238	234
Site M	MAR00881.004	Sediment	11.7	5.13	28.0	47.0	52.7	47.2
Site Q	MAR00881.005	Sediment	79.3	41.9	157	316	416	362
Site R	MAR00881.006	Sediment	46.2	32.6	102	194	266	258
Site T	MAR00881.007	Sediment	74.9	41.5	165	331	425	371
Site W	MAR00881.008	Sediment	87.4	42.5	202	418	535	406
CCS X	MAR00881.009	Sediment	40.0	34.9	96.0	197	257	248
CCS Y	MAR00881.010	Sediment	39.6	28.1	87.2	212	282	273
		Certified Reference Material CRM QPH098MS (% Recovery)	100	105	112	62	72	70
		QC Blank	<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.
For full analyte name see method summaries

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO	MMO	MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BEP**	**BKF**	**C1N**	**C1PHEN**	**C2N**
Site B	MAR00881.001	Sediment	452	696	539	466	360	453
Site G	MAR00881.002	Sediment	289	311	169	624	438	477
Site J	MAR00881.003	Sediment	235	240	107	566	365	428
Site M	MAR00881.004	Sediment	49.5	58.2	20.4	173	196	159
Site Q	MAR00881.005	Sediment	355	381	177	1030	655	801
Site R	MAR00881.006	Sediment	272	275	106	663	430	509
Site T	MAR00881.007	Sediment	337	374	179	962	625	733
Site W	MAR00881.008	Sediment	370	418	209	860	543	653
CCS X	MAR00881.009	Sediment	244	252	118	677	433	514
CCS Y	MAR00881.010	Sediment	273	286	141	604	399	471
Certified Reference Material CRM QPH098MS (% Recovery)			76	72	95	107	83	111
QC Blank			<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.
For full analyte name see method summaries

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	MMO	MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**C3N~**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**	**INDPYR**
Site B	MAR00881.001	Sediment	268	1100	114	808	153	509
Site G	MAR00881.002	Sediment	387	244	51.5	504	71.0	243
Site J	MAR00881.003	Sediment	388	181	40.7	351	60.5	190
Site M	MAR00881.004	Sediment	168	56.6	8.41	108	17.6	34.9
Site Q	MAR00881.005	Sediment	693	335	62.6	666	118	307
Site R	MAR00881.006	Sediment	405	221	45.6	388	68.1	221
Site T	MAR00881.007	Sediment	633	363	60.6	668	114	302
Site W	MAR00881.008	Sediment	549	428	72.8	766	123	363
CCS X	MAR00881.009	Sediment	431	198	41.5	373	67.2	193
CCS Y	MAR00881.010	Sediment	33.8	239	47.6	415	61.0	232
Certified Reference Material CRM QPH098MS (% Recovery)			89	83	94	84	94	62
QC Blank			<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.
For full analyte name see method summaries

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	mg/Kg
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/305
		Limit of Detection	1	1	1	1	1
		Accreditation	UKAS/MMO	MMO	UKAS/MMO	UKAS/MMO	MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**NAPTH**	**PERYLENE**	**PHENANT**	**PYRENE**	**THC**
Site B	MAR00881.001	Sediment	233	298	196	858	21.1
Site G	MAR00881.002	Sediment	218	135	425	504	113
Site J	MAR00881.003	Sediment	197	108	342	365	91.5
Site M	MAR00881.004	Sediment	59.7	29.1	157	133	92.2
Site Q	MAR00881.005	Sediment	356	164	616	666	47.4
Site R	MAR00881.006	Sediment	232	131	385	405	60.9
Site T	MAR00881.007	Sediment	355	185	626	668	32.6
Site W	MAR00881.008	Sediment	342	198	617	742	76.0
CCS X	MAR00881.009	Sediment	235	111	384	378	12.0
CCS Y	MAR00881.010	Sediment	213	122	369	413	37.8
		Certified Reference Material CRM QPH098MS (% Recovery)	88	81	96	86	88~
		QC Blank	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.
For full analyte name see method summaries

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
CCS Z	MAR00881.011	Sediment	43.0	24.5	92.0	189	253	242
Certified Reference Material CRM QPH098MS (% Recovery)			91	115	100	64	68	66
QC Blank			<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.
For full analyte name see method summaries

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO	MMO	MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BEP**	**BKF**	**C1N**	**C1PHEN**	**C2N**
CCS Z	MAR00881.011	Sediment	237	247	119	679	438	536
Certified Reference Material CRM QPH098MS (% Recovery)			70	67	87	107	81	103
QC Blank			<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.
For full analyte name see method summaries

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	MMO	MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**C3N~**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**	**INDPYR**
CCS Z	MAR00881.011	Sediment	444	229	37.7	389	67.7	187
Certified Reference Material CRM QPH098MS (% Recovery)			90	80	84	81	101	51
QC Blank			<1	<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.
For full analyte name see method summaries

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	mg/Kg
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/305
		Limit of Detection	1	1	1	1	1
		Accreditation	UKAS/MMO	MMO	UKAS/MMO	UKAS/MMO	MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**NAPTH**	**PERYLENE**	**PHENANT**	**PYRENE**	**THC**
CCS Z	MAR00881.011	Sediment	248	107	404	391	79.6
Certified Reference Material CRM QPH098MS (% Recovery)			97	70	91	84	89~
QC Blank			<1	<1	<1	<1	<1

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.
For full analyte name see method summaries

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 101**	**PCB 105**	**PCB 110**	**PCB 118**	**PCB 128**	**PCB 138**	**PCB 141**	**PCB 149**
Site B	MAR00881.001	Sediment	0.00013	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008
Site G	MAR00881.002	Sediment	0.00064	0.00019	0.00087	0.00031	0.00012	0.00105	0.00022	0.00067
Site J	MAR00881.003	Sediment	0.00054	0.00019	0.00068	0.00043	0.00013	0.00086	0.00010	0.00051
Site M	MAR00881.004	Sediment	0.02085	0.00819	0.02113	0.02450	0.01305	0.05398	0.00963	0.03129
Site Q	MAR00881.005	Sediment	0.00075	0.00024	0.00090	0.00050	0.00021	0.00127	<0.00008	0.00073
Site R	MAR00881.006	Sediment	0.00069	0.00021	0.00072	0.00053	0.00008	0.00106	0.00016	0.00052
		Certified Reference Material CRM QOR136 (% Recovery)	103	101	115~	98	108~	102	111~	115~
		QC Blank	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 151**	**PCB 153**	**PCB 156**	**PCB 158**	**PCB 170**	**PCB 18**	**PCB 180**
Site B	MAR00881.001	Sediment	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	0.00025	<0.00008
Site G	MAR00881.002	Sediment	0.00021	0.00096	<0.00008	0.00011	0.00019	0.00043	0.00057
Site J	MAR00881.003	Sediment	0.00014	0.00084	<0.00008	<0.00008	0.00011	0.00035	0.00056
Site M	MAR00881.004	Sediment	0.00940	0.05890	0.00656	0.00211	0.02792	0.00025	0.06172
Site Q	MAR00881.005	Sediment	0.00028	0.00108	<0.00008	0.00010	0.00021	0.00076	0.00070
Site R	MAR00881.006	Sediment	0.00016	0.00082	<0.00008	0.00015	0.00021	0.00039	0.00056
		Certified Reference Material CRM QOR136 (% Recovery)	121~	94	96	111~	102~	114~	90
		QC Blank	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 183**	**PCB 187**	**PCB 194**	**PCB 28**	**PCB 31**	**PCB 44**	**PCB 47**
Site B	MAR00881.001	Sediment	<0.00008	<0.00008	<0.00008	0.00015	0.00024	0.00020	<0.00008
Site G	MAR00881.002	Sediment	0.00014	0.00036	0.00015	0.00063	0.00084	0.00057	0.00019
Site J	MAR00881.003	Sediment	0.00011	0.00029	0.00011	0.00053	0.00076	0.00054	0.00018
Site M	MAR00881.004	Sediment	0.01069	0.03748	0.04183	0.00027	0.00032	0.00154	0.00068
Site Q	MAR00881.005	Sediment	0.00017	0.00047	0.00014	0.00081	0.00129	0.00064	0.00042
Site R	MAR00881.006	Sediment	0.00014	0.00031	0.00010	0.00058	0.00071	0.00049	0.00274
		Certified Reference Material CRM QOR136 (% Recovery)	96~	101~	94~	86	116	116~	111~
		QC Blank	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 49**	**PCB 52**	**PCB 66**
Site B	MAR00881.001	Sediment	0.00015	0.00024	<0.00008
Site G	MAR00881.002	Sediment	0.00042	0.00073	0.00071
Site J	MAR00881.003	Sediment	0.00040	0.00069	0.00071
Site M	MAR00881.004	Sediment	0.00180	0.00512	0.00374
Site Q	MAR00881.005	Sediment	0.00059	0.00104	0.00089
Site R	MAR00881.006	Sediment	0.00049	0.00074	0.00078
		Certified Reference Material CRM QOR136 (% Recovery)	110~	106	128~
		QC Blank	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 101**	**PCB 105**	**PCB 110**	**PCB 118**	**PCB 128**	**PCB 138**	**PCB 141**	**PCB 149**
Site T	MAR00881.007	Sediment	0.00077	0.00020	0.00090	0.00054	0.00018	0.00081	0.00012	0.00070
Site W	MAR00881.008	Sediment	0.00069	0.00019	0.00079	0.00039	0.00016	0.00085	<0.00008	0.00055
CCS X	MAR00881.009	Sediment	0.00058	0.00019	0.00067	0.00041	0.00009	0.00082	<0.00008	0.00054
CCS Y	MAR00881.010	Sediment	0.00064	0.00017	0.00074	0.00056	0.00015	0.00098	0.00020	0.00066
CCS Z	MAR00881.011	Sediment	0.00058	0.00014	0.00060	0.00040	0.00011	0.00053	0.00009	0.00050
		Certified Reference Material CRM QOR136 (% Recovery)	93	89	105~	94	109~	102	106~	105~
		QC Blank	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 151**	**PCB 153**	**PCB 156**	**PCB 158**	**PCB 170**	**PCB 18**	**PCB 180**
Site T	MAR00881.007	Sediment	0.00015	0.00095	0.00009	0.00015	0.00025	0.00061	0.00054
Site W	MAR00881.008	Sediment	0.00017	0.00094	<0.00008	<0.00008	0.00013	0.00065	0.00047
CCS X	MAR00881.009	Sediment	0.00015	0.00066	<0.00008	0.00009	0.00016	0.00099	0.00048
CCS Y	MAR00881.010	Sediment	0.00018	0.00099	<0.00008	<0.00008	0.00021	0.00052	0.00068
CCS Z	MAR00881.011	Sediment	0.00012	0.00068	<0.00008	<0.00008	0.00013	0.00071	0.00044
Certified Reference Material CRM QOR136 (% Recovery)			99~	110	87	106~	107~	105~	69
QC Blank			<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 183**	**PCB 187**	**PCB 194**	**PCB 28**	**PCB 31**	**PCB 44**	**PCB 47**
Site T	MAR00881.007	Sediment	0.00012	0.00033	0.00015	0.00076	0.00199	0.00062	0.00019
Site W	MAR00881.008	Sediment	0.00010	0.00034	0.00011	0.00077	0.00108	0.00058	0.00019
CCS X	MAR00881.009	Sediment	0.00011	0.00025	0.00009	0.00080	0.00144	0.00064	0.00022
CCS Y	MAR00881.010	Sediment	0.00019	0.00047	0.00016	0.00067	0.00094	0.00046	0.00017
CCS Z	MAR00881.011	Sediment	<0.00008	0.00028	<0.00008	0.00069	0.00099	0.00054	0.00018
		Certified Reference Material CRM QOR136 (% Recovery)	100~	108~	108~	79	102	106~	103~
		QC Blank	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.00008	0.00008	0.00008
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB 49**	**PCB 52**	**PCB 66**
Site T	MAR00881.007	Sediment	0.00055	0.00088	0.00076
Site W	MAR00881.008	Sediment	0.00051	0.00087	0.00068
CCS X	MAR00881.009	Sediment	0.00061	0.00096	0.00070
CCS Y	MAR00881.010	Sediment	0.00041	0.00073	0.00066
CCS Z	MAR00881.011	Sediment	0.00049	0.00085	0.00068
Certified Reference Material CRM QOR136 (% Recovery)			105~	111	127~
QC Blank			<0.00008	<0.00008	<0.00008

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)							
		Method No	ASC/SOP/302							
		Limit of Detection	0.0001							
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**PPTDE**	**PPDDE**	**PPDDT**
Site B	MAR00881.001	Sediment	<0.0001	<0.0001	<0.0001	0.0001	0.0002	0.0009	0.0002	<0.0001
Site G	MAR00881.002	Sediment	<0.0001	0.0001	<0.0001	0.0009	0.0005	0.0068	0.0014	0.0035
Site J	MAR00881.003	Sediment	<0.0001	<0.0001	<0.0001	0.0003	0.0006	0.0055	0.0011	0.0034
Site M	MAR00881.004	Sediment	<0.0001	<0.0001	<0.0001	0.0003	0.0002	0.0018	0.0003	0.0002
Site Q	MAR00881.005	Sediment	<0.0001	<0.0001	<0.0001	0.0008	0.0008	0.0079	0.0015	0.0021
Site R	MAR00881.006	Sediment	<0.0001	0.0002	<0.0001	0.0008	0.0006	0.0066	0.0014	0.0016
	Certified Reference Material CRM QOR136 (% Recovery)		94~	110~	115~	106~	116	60	91	67~
	QC Blank		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.
For full analyte name see method summaries

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)							
		Method No	ASC/SOP/302							
		Limit of Detection	0.0001							
		Accreditation	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	UKAS/MMO	MMO
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**PPTDE**	**PPDDE**	**PPDDT**
Site T	MAR00881.007	Sediment	<0.0001	0.0001	<0.0001	0.0010	0.0007	0.0074	0.0015	0.0016
Site W	MAR00881.008	Sediment	<0.0001	<0.0001	<0.0001	0.0008	0.0006	0.0067	0.0011	0.0037
CCS X	MAR00881.009	Sediment	<0.0001	<0.0001	0.0001	0.0005	0.0006	0.0050	0.0013	0.0016
CCS Y	MAR00881.010	Sediment	<0.0001	<0.0001	<0.0001	0.0008	0.0007	0.0060	0.0012	0.0052
CCS Z	MAR00881.011	Sediment	<0.0001	<0.0001	<0.0001	0.0005	0.0006	0.0047	0.0010	<0.0001
Certified Reference Material CRM QOR136 (% Recovery)			110~	95~	132~	117~	111~	77	94	57
QC Blank			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

~ Indicates result is for an In-house Reference Material as
no Certified Reference Materials are avaliable.
For full analyte name see method summaries

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00881
Issue Version 1
Customer Reference MMO Marine Sediment Analysis

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
*SUB_01	MAR00881.001-011	Analysis was conducted by an approved subcontracted laboratory.
SOCOTEC Env Chem*	MAR00881.001-011	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ASC/SOP/301	MAR00881.001-011	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/302	MAR00881.001-011	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with DDT falling outside acceptable limits. DDT is a known problem compound that can breakdown into DDD and DDE .These circumstances should be taken into consideration when utilising the data and in line with our QMS policy we have removed accreditation, where applicable.
ASC/SOP/303/304	MAR00881.001-011	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved in the PAHSED UKAS accredited method. Chrysene and Triphenylene are resolved for MMO but this is currently not UKAS accredited therefore Chrysene is reported without this acccreditation.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Handling Time Exceeded	N/A	N/A
D3	Sample Contaminated through Damaged Packaging	N/A	N/A
D4	Sample Contaminated through Sampling	N/A	N/A
D5	Inappropriate Container/Packaging	N/A	N/A
D6	Damaged in Transit	N/A	N/A
D7	Insufficient Quantity of Sample	N/A	N/A
D8	Inappropriate Headspace	N/A	N/A
D9	Retained at Incorrect Temperature	N/A	N/A
D10	Lack of Date & Time of Sampling	N/A	N/A
D11	Insufficient Sample Details	N/A	N/A
D12	Sample integrity compromised or not suitable for analysis	N/A	N/A

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00881
Issue Version	1
Customer Reference	MMO Marine Sediment Analysis

Method	Sample and Fraction Size	Method Summary
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Metals	Air dried	Aqua-regia extraction followed by ICP analysis.
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Ultra-violet fluorescence spectroscopy
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Organochlorine Pesticides (OCPs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions

Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	C2N	C2-naphthalenes	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	C3N	C3-naphthalenes	AHCH	alpha-Hexachlorocyclohexane
ANTHRACN	Anthracene	CHRYSENE	Chrysene	BHCH	beta-Hexachlorocyclohexane
BAA	Benzo[a]anthracene	DBENZAH	Dibenzo[ah]anthracene	GHCH	gamma-Hexachlorocyclohexane
BAP	Benzo[a]pyrene	FLUORANT	Fluoranthene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene
BEP	Benzo[e]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	PPDDE	p,p'-Dichorodiphenyldichloroethylene
BENZGHIP	Benzo[ghi]perylene	NAPTH	Naphthalene	PPDDT	p,p'-Dichorodiphenyltrichloroethane
BKF	Benzo[k]fluoranthene	PERYLENE	Perylene	PPTDE	p,p'-Dichorodiphenyldichloroethane
C1N	C1-naphthalenes	PHENANT	Phenanthrene		
C1PHEN	C1-phenanthrene	PYRENE	Pyrene		