



Warrenpoint Harbour Sediments

Produced by

AQUAFAC International Services Ltd

On behalf of

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1. Introduction

AQUAFAC International Services Ltd was commissioned by Warrenpoint Harbour Authority to carry out a sediment survey at Warrenpoint Harbour, Co Down. The survey was conducted on 10th December 2018. Samples were analysed for the following parameters in accordance with the OSPAR Guidelines for the Management of Dredged Material, Sintra, 22-23 July 1998, Technical Annex 1.

Tier 1: Physical Properties

- Average Particle Size (% sand, silt, clay) (See Table 1.1 Below)
- Total Solids (%)
- Percentage Solids (dry matter)
- Density/specific gravity
- Organic matter (as total organic carbon)

Table 1.1: Average particle size, based on the Wentworth scale.

Description	Lower Range	Upper Range
Boulders	256mm+	
Cobbles	64mm	256mm
Pebbles	4mm	64mm
Granules	2mm	4mm
Sand	62 microns	2mm
Silt and Clay		62 microns

Tier 2: Chemical Properties

- Cadmium
- Copper
- Mercury
- Zinc
- Chromium
- Lead
- Nickel
- Arsenic

-
- Polychlorinated biphenyls (PCB) congeners – IUPCA nos 28, 52, 101, 118, 138, 153, 180.
 - Polycyclic aromatic hydrocarbons
 - Tributyl tin and Dibutyl tin

The Limits of Detection for the chemical analysis can be seen in Table 1.2.

Table 1.2: Limits of detection.

Parameter	Limit of Detection
Cadmium	0.1 mg/Kg
Copper	2 mg/Kg
Mercury	0.01 mg/Kg
Zinc	3 mg/Kg
Chromium	0.5 mg/Kg
Lead	2 mg/Kg
Nickel	0.5 mg/Kg
Arsenic	1 mg/Kg
PCBs	0.08 µg/Kg
PAH	1 µg/Kg
TBT and DBT	1 µg/Kg

2. Materials & Methods

Sediment samples were taken at the 21 locations shown in Figure 2.1 and Table 2.1.

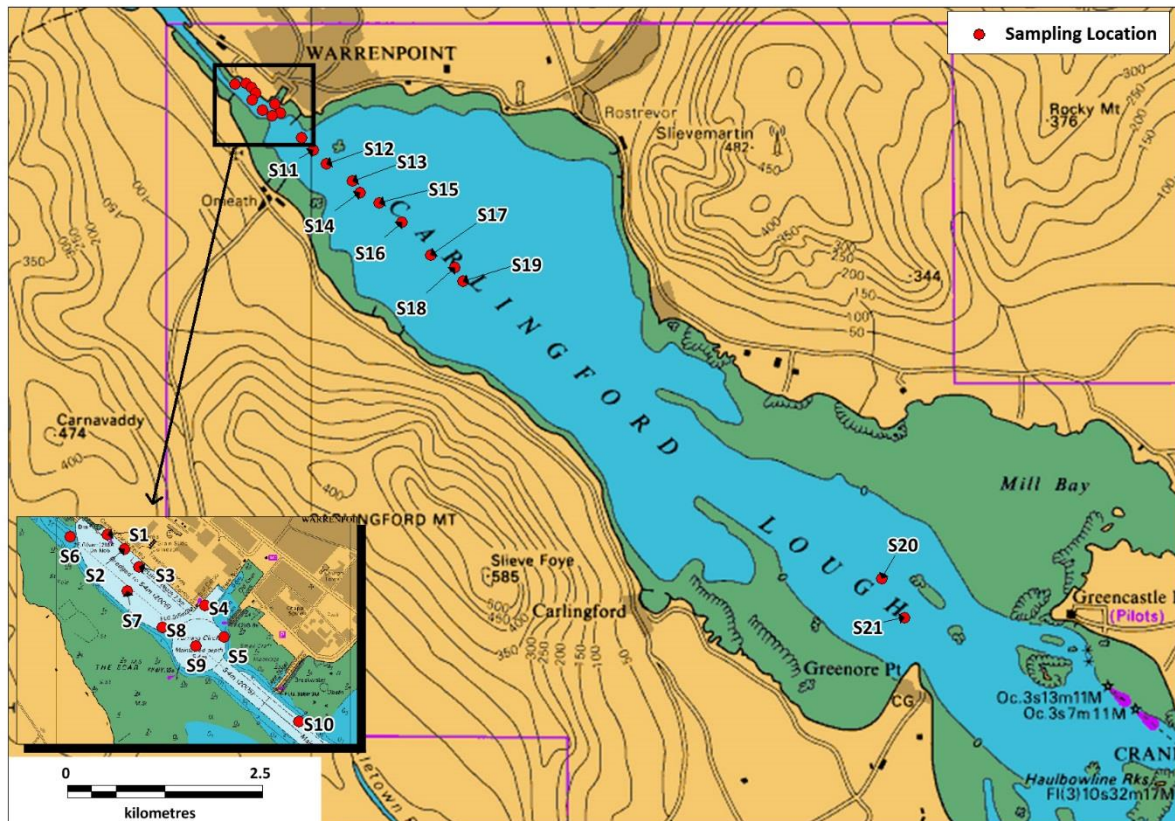


Figure 2.1: Warrenpoint sediment sampling sites.

At each station one sample was taken at the surface of the sediment by means of a 0.025m² van Veen grab. Two samples were taken subsequently using a gravity corer at respective depths of 0.5m and 1m below the sediment surface at a selection of sites (See Table 2.1 for sampling depths for each station). Where coarse hard ground was encountered, five attempts were made to retrieve a sample. This occurred at stations S20, S21 and S2. A composite sample was made by combining the different depth samples for seven of these sites (Table 2.1). These seven composite sample sites are located in the channel where sampling over multiple years has shown consistent levels with a low risk of variance. CEFAS regularly undertake composite sampling when the site has shown consistent levels over multiple years of testing and there is low risk of variance and this is believed to be the case here. The individual samples from the composite sites were retained for potential testing should the composite sample results show any elevated levels.

Sediment was taken at each station for contaminant analysis, organic carbon content, particle size

analysis, sediment density, and moisture content. All sampling jars were marked externally with date, station number, sample number and survey reference number and placed in a cooler box.

Table 2.1: Warrenpoint sediments site coordinates

Site	Latitude	Longitude	Sampling depths (m)	Composite sample
1	54.10163333	-6.263833333	0.0, 0.5, 1.0	No
2	54.10116667	-6.26285	0.0, 0.5, 1.0	No
3	54.10056667	-6.262016667	0.0	No
4	54.09928333	-6.258283333	0.0, 1.0	No
5	54.09823333	-6.257216667	0.0, 0.5	No
6	54.10156667	-6.26595	0.0, 0.5	No
7	54.09976667	-6.2627	0.0, 1.0	No
8	54.09855	-6.2607	0.0, 1.0	Yes
9	54.09793333	-6.258783333	0.0	No
10	54.09541667	-6.25295	0.0, 0.5, 1.0	Yes
11	54.09403333	-6.250683333	0.0	No
12	54.09238333	-6.24815	0.0, 0.5, 1.0	Yes
13	54.09045	-6.24305	0.0, 0.5, 1.0	Yes
14	54.08908333	-6.241633333	0.0, 0.5	Yes
15	54.0879	-6.237816667	0.0, 0.5	Yes
16	54.08573333	-6.233466667	0.0	No
17	54.0819	-6.227816667	0.0, 0.5	Yes
18	54.08055	-6.223116667	0.0	No
19	54.07893333	-6.22145	0.0	No
20	54.0448	-6.139716667	0.0	No
21	54.04033333	-6.135316667	0.0	No

2.1. Particle Size Analysis (PSA)

AQUAFAC carried out the PSA analysis in-house using the following methodology:

1. Approximately 100g of dried sediment (previously washed in distilled water and dried) was weighed out and placed in a labelled 1L glass beaker to which 100ml of a 6 percent hydrogen peroxide solution was added. This was allowed to stand overnight in a fume hood.
2. The beaker was placed on a hot plate and heated gently. Small quantities of hydrogen

peroxide were added to the beaker until there was no further reaction. This peroxide treatment removed any organic material from the sediment which can interfere with grain size determination.

3. The beaker was then emptied of sediment and rinsed into a 63 μ m sieve. This was then washed with distilled water to remove any residual hydrogen peroxide. The sample retained on the sieve was then carefully washed back into the glass beaker up to a volume of approximately 250ml of distilled water.
4. 10ml of sodium hexametaphosphate solution was added to the beaker and this solution was stirred for ten minutes and then allowed to stand overnight. This treatment helped to dissociate the clay particles from one another.
5. The beaker with the sediment and sodium hexametaphosphate solution was washed and rinsed into a 63 μ m sieve. The retained sample was carefully washed from the sieve into a labelled aluminium tray and placed in an oven for drying at 100°C for 24 hours.
6. The dried sediment was then passed through a Wentworth series of analytical sieves (>8,000 to 63 μ m; single phi units). The weight of material retained in each sieve was weighed and recorded. The material which passed through the 63 μ m sieve was also weighed and the value added to the value measured in Point 5 (above).
7. The total silt/clay fraction was determined by subtracting all weighed fractions from the initial starting weight of sediment as the less than 63 μ m fraction was lost during the various washing stages.
8. The following range of particle sizes: <63 μ m, 63<125 μ m, 125<250 μ m, 250<500 μ m, 500<1000 μ m, 1000<2000 μ m, 2000<4000 μ m and 4000<8000 μ m were reported.

2.2. Moisture Content & Density

Moisture content was taken as the percentage weight difference between the wet and dried sediment. Sediment density was calculated by placing a fixed volume (100 ml) of sediment in a volumetric cylinder and weighing the contents.

2.3. Chemical Analysis

The following methodologies were employed by SOCOTEC Burton-upon-Trent:

- Total Organic Carbon analysis: carbonate removal and sulphurous acid/combustion at 800°C/NDIR.

- Total Hydrocarbons: (GCFID) TNRCC method using gas chromatography with flame ionisation detection.
- Organotins: Solvent extraction and derivatisation followed by GC-MS analysis.
- Metal analysis: HF extraction followed by ICP analysis.
- PCB analysis: Solvent extraction and clean up followed by GC-MS-MS analysis.
- PAH analysis: Solvent extraction and clean up followed by GC-MS analysis.

All testes were carried out on the <2mm fraction.

3. Results

A description of the sediment at each station can be seen in Appendix 1. The substrate at stations S21 and S2 1.0 was too coarse to obtain a sample for chemical or physical analyses despite repeated attempts. The substrate at station S20 was also coarse and a sample for chemical analysis could not be recovered, a sample for physical analysis was recovered.

3.1. Particle Size Analysis (PSA)

The results of the granulometric analysis carried out on all 29 sediment samples are included in Table 3.1. In general, the sediments were dominated by fine sand, with the remainder mostly belonging to the silt-clay fraction, with the exception of stations S9 0.0 and S20 0.0 which were predominately pebbles.

Table 3.1: Granulometry results.

Station	Boulders (>256mm)	Cobbles (64-256mm)	Pebbles (4-64mm)	Granules (2-4mm)	Sand (62µm-2mm)	Silt-Clay (<62 µm)
S1 0.0	0	0	0	0.1	86.7	13.2
S1 0.5	0	0	0.2	0.2	75.4	24.3
S1 1.0	0	0	0	0	87.2	12.8
S2 0.0	0	0	0	0.5	97.4	2
S2 0.5	0	0	4.1	1.5	70.0	24.3
S2 1.0	N/A	N/A	N/A	N/A	N/A	N/A
S3 0.0	0	0	0	0.4	77.0	22.6
S4 0.0	0	0	0.1	0.2	68.2	31.5
S4 1.0	0	0	0	0	92.2	7.8
S5 0.0	0	0	0.2	0.3	97.5	2
S5 0.5	0	0	0	0	87.8	12.1
S6 0.0	0	0	0	0	35.4	64.6
S6 0.5	0	0	0	0	42.0	58.1
S7 0.0	0	0	0.3	0.2	58.6	40.9

Station	Boulders (>256mm)	Cobbles (64-256mm)	Pebbles (4-64mm)	Granules (2-4mm)	Sand (62µm-2mm)	Silt-Clay (<62 µm)
S7 1.0	0	0	0	0	67.5	32.5
S8 Composite	0	0	0	0	56.0	44
S9 0.0	0	0	64.5	3.5	22.7	9.3
S10 Composite	0	0	0	0	50.8	49.2
S11 0.0	0	0	0	0	59.2	40.8
S12 Composite	0	0	0	0	51.9	48
S13 Composite	0	0	0	0	59.1	41
S14 Composite	0	0	0	0	47.4	52.6
S15 Composite	0	0	0	0	51.0	49
S16 0.0	0	0	0	0	63.6	36.4
S17 Composite	0	0	0	0	51.2	48.8
S18 0.0	0	0	0	0.1	59.7	40.2
S19 0.0	0	0	0	0	62.8	37.2
S20 0.0	0	0	87.9	6.5	5.6	0.1
S21 0.0	N/A	N/A	N/A	N/A	N/A	N/A

3.2. Moisture content, density and organic carbon

The water content and density results can be seen in Table 3.2. Values ranged from 1.23 (Station S20 0.0) to 1.83g/ml (Station S9 0.0) for density and from 4.4 (Station S20 0.0) to 66.5% (Station S3 0.0) for moisture content. Organic carbon ranged from 0.30 (Station S5 0.5) to 2.6% (Station S11 0.0).

Table 3.2: Moisture content and density

Station	Density (g/ml)	Moisture Content (%)	Total Organic Carbon (% M/M)
S1 0.0	1.27	60.4	1.72
S1 0.5	1.26	57.9	2.14
S1 1.0	1.32	59.9	2.09
S2 0.0	1.3	63.0	1.69
S2 0.5	1.35	50.1	1.44
S2 1.0	N/A	N/A	N/A
S3 0.0	1.35	66.5	2.43
S4 0.0	1.25	49.5	1.73
S4 1.0	1.31	52.9	2.18
S5 0.0	1.34	55.2	1.43
S5 0.5	1.36	56.9	0.30
S6 0.0	1.32	56.5	2.50
S6 0.5	1.39	54.2	2.11
S7 0.0	1.25	61.0	1.97
S7 1.0	1.3	54.1	2.57
S8 Composite	1.32	51.5	2.52

Station	Density (g/ml)	Moisture Content (%)	Total Organic Carbon (% M/M)
S9 0.0	1.83	22.5	1.67
S10 Composite	1.29	46.3	2.12
S11 0.0	1.46	51.3	2.60
S12 Composite	1.35	48.5	2.14
S13 Composite	1.39	50.5	2.09
S14 Composite	1.42	46.2	2.15
S15 Composite	1.38	44.4	1.96
S16 0.0	1.41	48.4	1.50
S17 Composite	1.56	43.3	1.13
S18 0.0	1.48	41.1	1.54
S19 0.0	1.42	42.8	1.41
S20 0.0	1.23	4.4	N/A
S21 0.0	N/A	N/A	N/A

3.3. Contaminant Analysis

The results of the contaminant analysis carried out on the sediment samples are presented below in Tables 3.3 and 3.4. Appendix 2 contains the analytical report from SOCOTEC.

Table 3.3: Chemical contaminant results from sediments from Warrenpoint Harbour, December 2018 (S1 0.0 – S7 1.0)

Analyte	Units	S1 0.0	S1 0.5	S1 1.0	S2 0.0	S2 0.5	S2 1.0	S3 0.0	S4 0.0	S4 1.0	S5 0.0	S5 0.5	S6 0.0	S6 0.5	S7 0.0	S7 1.0
Mercury	mg/kg	0.7	0.07	0.07	0.07	0.05	N/A	0.08	0.04	0.07	0.04	0.03	0.05	0.07	0.06	0.07
Aluminium	mg/kg	43200	41900	50100	56700	44000	N/A	51900	58500	49000	59800	64800	46700	47500	50500	52500
Arsenic	mg/kg	9.6	12.3	10.9	8.8	9.8	N/A	12.5	9	13.3	7.8	3	9.6	11.9	10.6	15.2
Cadmium	mg/kg	0.4	0.5	0.5	0.6	0.3	N/A	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4
Chromium	mg/kg	97.1	88.2	81	105	70.4	N/A	87.6	65.1	69.5	58	43.7	77.8	86.4	72.5	92
Copper	mg/kg	25.1	162	24.6	34	30.9	N/A	30.4	26.1	27	24.1	22.6	31.1	31.9	27	48.7
Lead	mg/kg	39.9	35.8	39.9	31.1	34.5	N/A	53.7	30	44.5	30.3	17.2	37	38.6	36.2	53.5
Nickel	mg/kg	42.4	40.3	33.7	43.9	36.6	N/A	37.2	34.1	33.4	28.2	25.3	36.9	39.4	35.9	40.3
Zinc	mg/kg	154	215	169	190	158	N/A	177	152	167	143	99.7	179	168	155	220
Acenaphthene	µg/kg	21.5	15.9	19.4	15.1	10.6	N/A	8.43	8.10	10.8	14.1	11.8	12.1	10.2	10.5	8.98
Acenaphthylene	µg/kg	10.1	7.44	8.27	8.69	7.43	N/A	7.41	7.67	10.4	12.2	9.85	12.9	9.21	11.6	8.29
Anthracene	µg/kg	45.7	28.2	30.2	31.4	26.5	N/A	22.2	20.9	28.8	33.2	26.4	37.9	30.8	27.8	26.3
Benzo(a)anthracene	µg/kg	155	114	134	122	111	N/A	91.8	85.5	94.4	110	86.4	164	118	121	101
Benzo(a)pyrene	µg/kg	180	135	159	158	151	N/A	113	111	121	135	110	200	145	149	130
Benzo(b)fluoranthene	µg/kg	237	201	220	209	197	N/A	177	167	171	194	162	247	197	201	163
Benzo(ghi)perylene	µg/kg	171	144	156	160	148	N/A	128	120	125	138	113	177	146	151	132
Benzo(k)fluoranthene	µg/kg	114	80.7	92.1	98.0	87.7	N/A	82.5	67.4	75.0	70.3	86.7	127	91.1	109	77.3
Chrysene + Triphenylene	µg/kg	188	141	156	152	128	N/A	121	106	122	135	104	189	146	154	120
Dibenzo(ah)anthracene	µg/kg	36.9	26.8	30.6	28.8	31.4	N/A	24.1	22.5	27.3	30.8	20.6	39.3	32.2	33.8	25.8
Fluoranthene	µg/kg	300	219	220	244	196	N/A	154	145	161	190	148	268	187	223	167
Fluorene	µg/kg	37.6	35.0	29.4	32.1	21.9	N/A	24.5	23.5	32.3	38.2	33.5	27.7	25.9	28.6	22.9
Indeno(1,2,3-c,d)pyrene	µg/kg	189	160	172	179	167	N/A	141	134	143	155	130	201	159	166	145
Naphthalene	µg/kg	45.6	42.5	40.5	45.6	34.6	N/A	40.3	38.1	50.9	60.9	49.0	43.4	41.4	43.7	36.7
Phenanthrene	µg/kg	164	106	114	110	83.0	N/A	90.8	86.6	111	133	105	110	89.9	136	83.2
Pyrene	µg/kg	270	194	207	223	189	N/A	142	135	144	172	137	251	178	199	158
PCB - 028	µg/kg	1.28	0.93	0.85	0.74	1.38	N/A	0.60	0.63	0.59	0.64	0.42	0.69	0.46	0.61	0.54
PCB - 052	µg/kg	0.95	0.63	0.63	0.48	0.69	N/A	0.42	0.45	0.46	0.47	0.33	0.51	0.31	0.46	0.41
PCB - 101	µg/kg	0.46	0.29	0.45	0.29	0.36	N/A	0.22	0.22	0.35	0.27	0.18	0.28	0.20	0.24	0.28

Analyte	Units	S1 0.0	S1 0.5	S1 1.0	S2 0.0	S2 0.5	S2 1.0	S3 0.0	S4 0.0	S4 1.0	S5 0.0	S5 0.5	S6 0.0	S6 0.5	S7 0.0	S7 1.0
PCB - 118	µg/kg	0.38	0.38	0.49	0.33	0.45	N/A	0.28	0.27	0.28	0.26	0.21	0.34	0.26	0.32	0.37
PCB - 138	µg/kg	0.34	0.37	0.49	0.31	0.50	N/A	0.37	0.26	0.64	0.33	0.25	0.32	0.33	0.34	0.36
PCB - 153	µg/kg	0.46	0.36	0.52	0.39	0.48	N/A	0.32	0.30	0.62	0.33	0.25	0.35	0.36	0.30	0.33
PCB - 180	µg/kg	0.15	0.12	0.16	0.15	0.35	N/A	0.10	0.12	0.43	0.16	0.12	0.12	0.12	0.13	0.15
Dibutyl Tin	µg/kg	<5	<5	<5	<5	<5	N/A	<5	<5	<5	<5	<5	<5	<5	<5	<5
Tributyl Tin	µg/kg	<5	<5	<5	<5	<5	N/A	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dry Solids @ 105°C	%	31.7	33.9	40.6	35.3	53.0	N/A	32.8	36.2	43.2	34.0	37.0	35.0	42.0	33.8	44.3

Table 3.4: Chemical contaminant results from sediments from Warrenpoint Harbour, December 2018 (S8 comp – S7 1.0)

Analyte	Units	S8 Comp.	S9 0.0	S10 Comp.	S11 0.0	S12 Comp.	S13 Comp.	S14 Comp.	S15 Comp.	S16 0.0	S17 Comp.	S18 0.0	S19 0.0	S20 0.0	S21 0.0
Mercury	mg/kg	0.07	0.05	0.07	0.08	0.08	0.08	0.09	0.16	0.06	<0.1	0.05	0.06	N/A	N/A
Aluminium	mg/kg	54800	47800	50900	50000	49100	46700	51000	48400	47200	41800	44700	42500	N/A	N/A
Arsenic	mg/kg	12.5	9.8	11.2	19.2	13.3	11.9	13	11.8	10.4	5.9	8.8	8.6	N/A	N/A
Cadmium	mg/kg	0.5	0.3	0.3	0.7	0.5	0.2	0.3	1	0.3	<0.1	0.1	0.1	N/A	N/A
Chromium	mg/kg	85.6	69.8	75.6	105	84.9	79.5	83.5	78	66.8	60.2	64.3	62.6	N/A	N/A
Copper	mg/kg	29.7	21.6	26.7	113	32.4	22.9	31.6	60.1	44.7	15.2	17.3	18.4	N/A	N/A
Lead	mg/kg	44.6	30	39.8	123	54	40.2	43.5	53.9	36.3	20.9	31.3	29.9	N/A	N/A
Nickel	mg/kg	38.8	34.3	33.8	45.5	38.8	34.4	36.7	34.1	31.6	25.8	29.5	28.5	N/A	N/A
Zinc	mg/kg	184	133	166	464	184	160	180	264	2473*	112	120	114	N/A	N/A
Acenaphthene	µg/kg	11.6	6.20	6.74	6.56	8.03	9.42	8.68	11.1	11.5	2.20	3.95	3.58	N/A	N/A
Acenaphthylene	µg/kg	10.5	6.12	8.11	6.97	8.82	6.67	7.60	6.71	4.46	1.57	4.83	3.12	N/A	N/A
Anthracene	µg/kg	28.5	18.7	22.1	20.1	24.4	27.9	29.6	35.9	19.5	5.91	18.1	10.7	N/A	N/A
Benzo(a)anthracene	µg/kg	133	79.7	81.4	88.1	115	111	112	99.1	76.7	22.1	64.2	43.9	N/A	N/A
Benzo(a)pyrene	µg/kg	168	92.5	99.2	107	130	127	133	118	95.6	26.8	79.9	51.7	N/A	N/A
Benzo(b)fluoranthene	µg/kg	213	126	137	182	182	178	174	157	136	41.7	104	73.1	N/A	N/A
Benzo(ghi)perylene	µg/kg	160	104	96.9	122	128	122	130	114	104	31.0	78.7	55.0	N/A	N/A
Benzo(k)fluoranthene	µg/kg	97.5	66.1	60.2	78.9	98.5	71.8	91.4	74.0	66.0	16.5	56.3	33.5	N/A	N/A
Chrysene + Triphenylene	µg/kg	153	99.0	100	108	140	126	134	123	99.9	28.3	81.9	56.6	N/A	N/A
Dibenzo(ah)anthracene	µg/kg	33.2	19.9	19.7	24.3	26.9	26.3	28.0	24.5	23.4	6.28	16.6	11.3	N/A	N/A
Fluoranthene	µg/kg	207	127	140	139	183	173	184	182	144	36.6	101	68.8	N/A	N/A
Fluorene	µg/kg	26.8	19.5	18.8	20.4	24.5	22.7	21.4	21.6	22.1	5.73	10.7	9.44	N/A	N/A
Indeno(1,2,3-c,d)pyrene	µg/kg	180	115	111	137	144	134	143	126	112	31.2	88.8	61.2	N/A	N/A
Naphthalene	µg/kg	38.3	32.7	30.3	35.1	37.0	32.2	37.0	30.1	33.7	7.83	22.2	16.4	N/A	N/A
Phenanthrene	µg/kg	109	67.2	76.9	74.7	87.0	96.1	91.6	90.6	94.2	24.2	51.0	40.8	N/A	N/A
Pyrene	µg/kg	185	114	128	125	164	170	178	164	119	35.2	104	62.6	N/A	N/A
PCB - 028	µg/kg	0.61	0.40	0.45	0.48	0.44	0.39	0.42	1.05	0.57	0.15	0.33	0.23	N/A	N/A

Analyte	Units	S8 Comp.	S9 0.0	S10 Comp.	S11 0.0	S12 Comp.	S13 Comp.	S14 Comp.	S15 Comp.	S16 0.0	S17 Comp.	S18 0.0	S19 0.0	S20 0.0	S21 0.0
PCB - 052	µg/kg	0.50	0.30	0.37	0.36	0.33	0.26	0.32	1.45	0.40	0.11	0.27	0.17	N/A	N/A
PCB - 101	µg/kg	0.27	0.17	0.20	0.22	0.18	0.16	0.22	2.38	0.22	<0.08	0.12	0.09	N/A	N/A
PCB - 118	µg/kg	0.33	0.20	0.31	0.27	0.23	0.27	0.25	1.96	0.28	<0.08	0.14	0.13	N/A	N/A
PCB - 138	µg/kg	0.35	0.22	0.23	0.26	0.28	0.24	0.27	3.58	0.22	<0.08	0.11	0.13	N/A	N/A
PCB - 153	µg/kg	0.37	0.26	0.25	0.30	0.31	0.29	0.37	4.49	0.24	<0.08	0.16	0.10	N/A	N/A
PCB - 180	µg/kg	0.13	0.08	0.12	0.12	0.12	0.09	0.16	3.21	0.09	<0.08	<0.08	<0.08	N/A	N/A
Dibutyl Tin	µg/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	N/A	N/A
Tributyl Tin	µg/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	N/A	N/A
Dry Solids @ 105°C	%	37.3	38.5	46.4	35.0	40.7	45.6	48.4	42.3	39.2	60.9	49.4	49.6	N/A	N/A

4. Notes

Contaminant analysis could not be carried out on stations S20 and S21 as the sediment was too coarse. The sediment at station 2 changed from fine sand/silt to gravel preventing the corer from reaching a depth of 1m. Elevated Zinc levels were recorded at station S16 (2473mg/kg). Initial retests were carried out to confirm the result. Following this, additional samples were collected on the 24th January 2019 and sent for analysis. Five samples were taken which included the original station S16 and four new stations 25m to the north, south, east and west of S16 (see Figure 4.1). The results ranged from 104 – 126 mg/kg. The repeat results can be seen in Appendix 3 and confirm that the initial elevated result was an anomaly.

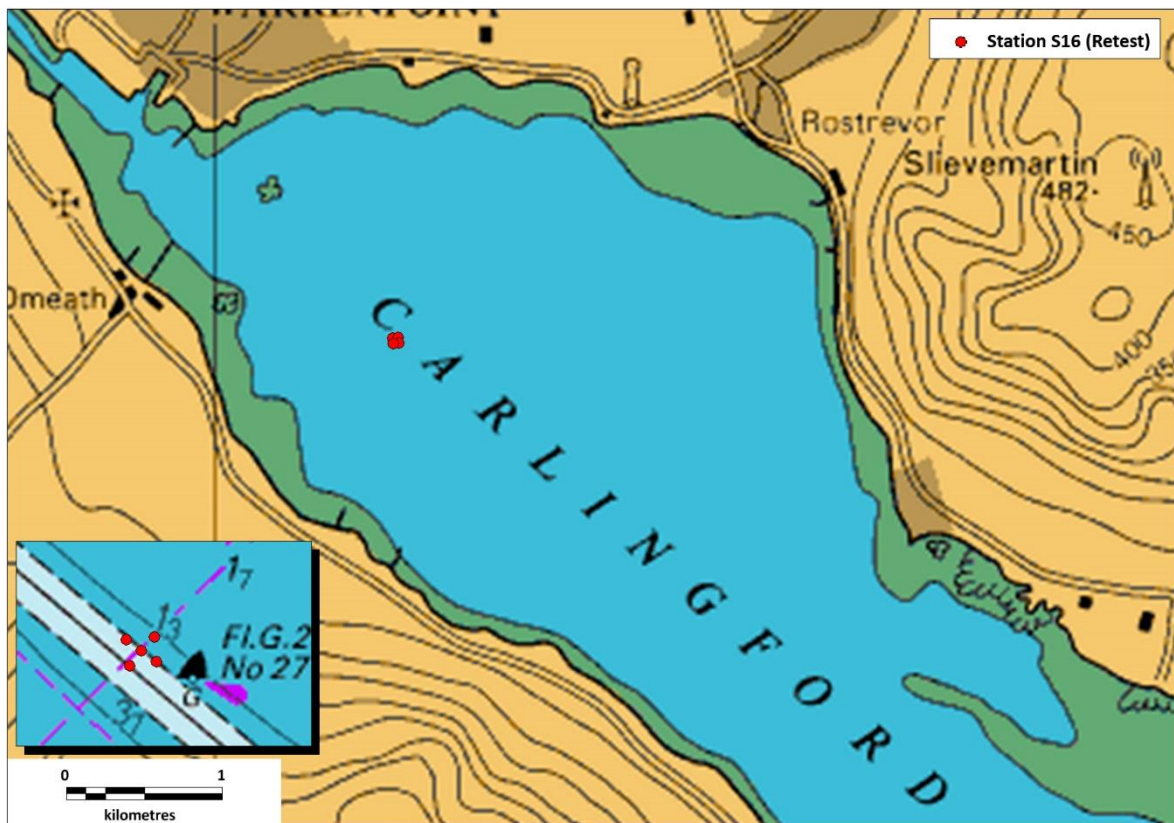


















Figure 4.1: Location of 5 resampled sites at station S16.





APPENDIX 1
Station Descriptions


Station	Sample Photograph
<p>Station: S1</p> <p>Water Depth: 7.8m @ 15:15</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell.</p>	
<p>Station: S2</p> <p>Water Depth: 9.1m @ 15:30</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. Gravel at 6 cm. No H₂S smell.</p>	
<p>Station : S3</p> <p>Water Depth: 11.2m @ 15:45</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell.</p>	
<p>Station: S4</p> <p>Water Depth: 7.6m @ 16:05</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. Plant material at 1m depth. No H₂S smell</p>	

Station	Sample Photograph
<p>Station: S5</p> <p>Water Depth: 7.8m @ 16:15</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. Gravel at 0.5m depth. No H₂S smell</p>	
<p>Station: S6</p> <p>Water Depth: 9.0m @ 15:00</p> <p>Description: Muddy sand mud. Light olive silt clay layer on surface. No H₂S smell.</p>	
<p>Station: S7</p> <p>Water Depth: 9.2m @ 14:48</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	
<p>Station: S8</p> <p>Water Depth: 7.6m @ 14:28</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. Plant material at 0.5m depth. No H₂S smell</p>	

Station	Sample Photograph
<p>Station: S9</p> <p>Water Depth: 10.9m @ 14:20</p> <p>Description: Soft black/grey mud with sand, gravel and shell at depth. No H₂S smell</p>	
<p>Station: S10</p> <p>Water Depth: 9.8m @ 14:00</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	
<p>Station: S11</p> <p>Water Depth: 10.7m @ 13:45</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	
<p>Station: S12</p> <p>Water Depth: 9.6m @ 13:30</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	

Station	Sample Photograph
<p>Station: S13</p> <p>Water Depth: 10.2m @ 13:00</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	
<p>Station: S14</p> <p>Water Depth: 9.6m @ 12:37</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	
<p>Station: S15</p> <p>Water Depth: 9.2m @ 12:20</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	
<p>Station: S16</p> <p>Water Depth: 9.6m @ 12:00</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	

Station	Sample Photograph
<p>Station: S17</p> <p>Water Depth: 7.5m @ 11:45</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	
<p>Station: S18</p> <p>Water Depth: 9.6m @ 11:32</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	
<p>Station: S19</p> <p>Water Depth: 9.2m @ 11:20</p> <p>Description: Soft black/grey mud. Light olive silt clay layer on surface. No H₂S smell</p>	
<p>Station: S20</p> <p>Water Depth: 10.2m @ 11:00</p> <p>Broken shell and stones. No H₂S smell</p>	

Station	Sample Photograph
<p data-bbox="316 241 459 271">Station: S21</p> <p data-bbox="316 315 671 344">Water Depth: 12.1m @ 10:40</p> <p data-bbox="316 389 571 418">Stones. No H₂S smell</p>	 A photograph showing a white rectangular container filled with a light-colored, granular sediment. Two dark, irregular stones are visible in the sediment. A white label is placed on the left side of the container. The label contains the following text: "Location: Warrupate", "Date: 10/11/11", "Station: S21_00". A black boot is partially visible in the upper left corner of the photo.

APPENDIX 2
SOCOTEC Analytical Report

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	MAR00175
Issue Version	1
Customer	Anthony D Bates Partnership, Axbridge, BS26 2LE
Customer Reference	Warrenpoint Sediments
Date Sampled	10-Dec-19
Date Received	14-Dec-19
Date Reported	14-Jan-19
Condition of samples	Cold Satisfactory

A handwritten signature in black ink, appearing to read 'M. Hubbard'.

Authorised by: Marya Hubbard

Position: Laboratory Manager

Any additional opinions or interpretations found in this report, are outside the scope of UKAS accreditation.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

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 MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

Units	%	%
Method No	ASC/SOP/303	ASC/SOP/303
Limit of Detection	0.2	0.2
Accreditation	UKAS	UKAS

Client Reference:	SOCOTEC Ref:	Matrix	Total Moisture	Total Solids
S1_0.0	MAR00175.001	Sediment	68.3	31.7
S1_0.5	MAR00175.002	Sediment	66.1	33.9
S1_1.0	MAR00175.003	Sediment	59.4	40.6
S2_0.0	MAR00175.004	Sediment	64.7	35.3
S2_0.5	MAR00175.005	Sediment	47.0	53.0
S3_0.0	MAR00175.007	Sediment	67.2	32.8
S4_0.0	MAR00175.008	Sediment	63.8	36.2
S4_1.0	MAR00175.009	Sediment	56.8	43.2
S5_0.0	MAR00175.010	Sediment	66.0	34.0
S5_0.5	MAR00175.011	Sediment	63.0	37.0
S6_0.0	MAR00175.012	Sediment	65.0	35.0
S6_0.5	MAR00175.013	Sediment	58.0	42.0
S7_0.0	MAR00175.014	Sediment	66.2	33.8
S7_1.0	MAR00175.015	Sediment	55.7	44.3
S8_Composite	MAR00175.016	Sediment	62.7	37.3
S9_0.0	MAR00175.017	Sediment	61.5	38.5
S10_Composite	MAR00175.018	Sediment	53.6	46.4
S11_0.0	MAR00175.019	Sediment	65.0	35.0
S12_Composite	MAR00175.020	Sediment	59.3	40.7
S13_Composite	MAR00175.021	Sediment	54.4	45.6
S14_Composite	MAR00175.022	Sediment	51.6	48.4
S15_Composite	MAR00175.023	Sediment	57.7	42.3
S16_0.0	MAR00175.024	Sediment	60.8	39.2
S17_Composite	MAR00175.025	Sediment	39.1	60.9
S18_0.0	MAR00175.026	Sediment	50.6	49.4
S19_0.0	MAR00175.027	Sediment	50.4	49.6
Reference Material (% Recovery)			N/A	N/A
QC Blank			N/A	N/A

* See Report Notes

Certificate of Analysis



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Test Report ID MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

		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	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	1	0.1	0.5	2	2	0.01	0.5
		Accreditation	UKAS	N	N	UKAS	UKAS	N	N
Client Reference:	SOCOTEC Ref:	Matrix	Arsenic (HF-MS)	Cadmium (HF-MS)	Chromium (HF-MS)	Copper (HF-MS)	Lead (HF-MS)	Mercury (Tot.MS)	Nickel (HF-MS)
S1_0.0	MAR00175.001	Sediment	9.6	0.4	97.1	25.1	39.9	0.07	42.4
S1_0.5	MAR00175.002	Sediment	12.3	0.5	88.2	162	35.8	0.07	40.3
S1_1.0	MAR00175.003	Sediment	10.9	0.5	81	24.6	39.9	0.07	33.7
S2_0.0	MAR00175.004	Sediment	8.8	0.6	105	34	31.1	0.07	43.9
S2_0.5	MAR00175.005	Sediment	9.8	0.3	70.4	30.9	34.5	0.05	36.6
S3_0.0	MAR00175.007	Sediment	12.5	0.4	87.6	30.4	53.7	0.08	37.2
S4_0.0	MAR00175.008	Sediment	9	0.3	65.1	26.1	30	0.04	34.1
S4_1.0	MAR00175.009	Sediment	13.3	0.3	69.5	27	44.5	0.07	33.4
S5_0.0	MAR00175.010	Sediment	7.8	0.3	58	24.1	30.3	0.04	28.2
S5_0.5	MAR00175.011	Sediment	3	0.3	43.7	22.6	17.2	0.03	25.3
S6_0.0	MAR00175.012	Sediment	9.6	0.3	77.8	31.1	37	0.05	36.9
S6_0.5	MAR00175.013	Sediment	11.9	0.4	86.4	31.9	38.6	0.07	39.4
S7_0.0	MAR00175.014	Sediment	10.6	0.4	72.5	27	36.2	0.06	35.9
S7_1.0	MAR00175.015	Sediment	15.2	0.4	92	48.7	53.5	0.07	40.3
S8_Composite	MAR00175.016	Sediment	12.5	0.5	85.6	29.7	44.6	0.07	38.8
S9_0.0	MAR00175.017	Sediment	9.8	0.3	69.8	21.6	30	0.05	34.3
S10_Composite	MAR00175.018	Sediment	11.2	0.3	75.6	26.7	39.8	0.07	33.8
S11_0.0	MAR00175.019	Sediment	19.2	0.7	105	113	123	0.08	45.5
S12_Composite	MAR00175.020	Sediment	13.3	0.5	84.9	32.4	54	0.08	38.8
Certified Reference Material 2702 (% Recovery)			100	94	99	92	98	101	102
QC Blank			<1	<0.1	<0.5	<2	<2	<0.01	<0.5

* See Report Notes

Certificate of Analysis



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Test Report ID MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	% M/M
Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
Limit of Detection	3	10	0.02
Accreditation	N	UKAS	UKAS

Client Reference:	SOCOTEC Ref:	Matrix	Zinc (HF-MS)	Aluminium(HF-OES)	Total Organic Carbon
S1_0.0	MAR00175.001	Sediment	154	43200	1.72
S1_0.5	MAR00175.002	Sediment	215	41900	2.14
S1_1.0	MAR00175.003	Sediment	169	50100	2.09
S2_0.0	MAR00175.004	Sediment	190	56700	1.69
S2_0.5	MAR00175.005	Sediment	158	44000	1.44
S3_0.0	MAR00175.007	Sediment	177	51900	2.43
S4_0.0	MAR00175.008	Sediment	152	58500	1.73
S4_1.0	MAR00175.009	Sediment	167	49000	2.18
S5_0.0	MAR00175.010	Sediment	143	59800	1.43
S5_0.5	MAR00175.011	Sediment	99.7	64800	0.30
S6_0.0	MAR00175.012	Sediment	179	46700	2.50
S6_0.5	MAR00175.013	Sediment	168	47500	2.11
S7_0.0	MAR00175.014	Sediment	155	50500	1.97
S7_1.0	MAR00175.015	Sediment	220	52500	2.57
S8_Composite	MAR00175.016	Sediment	184	54800	2.52
S9_0.0	MAR00175.017	Sediment	133	47800	1.67
S10_Composite	MAR00175.018	Sediment	166	50900	2.12
S11_0.0	MAR00175.019	Sediment	464	50000	2.60
S12_Composite	MAR00175.020	Sediment	184	49100	2.14
Certified Reference Material 2702 (% Recovery)			101	103	107
QC Blank			<3	<10	<0.02

* See Report Notes

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Test Report ID MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

		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	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	1	0.1	0.5	2	2	0.01	0.5
		Accreditation	UKAS	N	N	UKAS	UKAS	N	N
Client Reference:	SOCOTEC Ref:	Matrix	Arsenic (HF-MS)	Cadmium (HF-MS)	Chromium (HF-MS)	Copper (HF-MS)	Lead (HF-MS)	Mercury (Tot.MS)	Nickel (HF-MS)
S13_Composite	MAR00175.021	Sediment	11.9	0.2	79.5	22.9	40.2	0.08	34.4
S14_Composite	MAR00175.022	Sediment	13	0.3	83.5	31.6	43.5	0.09	36.7
S15_Composite	MAR00175.023	Sediment	11.8	1	78	60.1	53.9	0.16	34.1
S16_0.0	MAR00175.024	Sediment	10.4	0.3	66.8	44.7	36.3	0.06	31.6
S17_Composite	MAR00175.025	Sediment	5.9	<0.1	60.2	15.2	20.9	<0.1	25.8
S18_0.0	MAR00175.026	Sediment	8.8	0.1	64.3	17.3	31.3	0.05	29.5
S19_0.0	MAR00175.027	Sediment	8.6	0.1	62.6	18.4	29.9	0.06	28.5
Certified Reference Material 2702 (% Recovery)			99	83	99	98	97	97	101
QC Blank			<1	<0.1	<0.5	<2	<2	<0.01	<0.5

* 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 MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	% M/M
Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
Limit of Detection	3	10	0.02
Accreditation	N	UKAS	UKAS

Client Reference:	SOCOTEC Ref:	Matrix	Zinc (HF-MS)	Aluminium(HF-OES)	Total Organic Carbon
S13_Composite	MAR00175.021	Sediment	160	46700	2.09
S14_Composite	MAR00175.022	Sediment	180	51000	2.15
S15_Composite	MAR00175.023	Sediment	264	48400	1.96
S16_0.0	MAR00175.024	Sediment	2473*	47200	1.50
S17_Composite	MAR00175.025	Sediment	112	41800	1.13
S18_0.0	MAR00175.026	Sediment	120	44700	1.54
S19_0.0	MAR00175.027	Sediment	114	42500	1.41
Certified Reference Material 2702 (% Recovery)			101	99	102
QC Blank			<3	<10	<0.02

* See Report Notes

Certificate of Analysis



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Test Report ID MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

Units	µg/Kg (Dry Weight)	
Method No	ASC/SOP/301	
Limit of Detection	1	1
Accreditation	N	N

Client Reference:	SOCOTEC Ref:	Matrix	Dibutyltin (DBT)	Tributyltin (TBT)
S1_0.0	MAR00175.001	Sediment	<5	<5
S1_0.5	MAR00175.002	Sediment	<5	<5
S1_1.0	MAR00175.003	Sediment	<5	<5
S2_0.0	MAR00175.004	Sediment	<5	<5
S2_0.5	MAR00175.005	Sediment	<5	<5
S3_0.0	MAR00175.007	Sediment	<5	<5
S4_0.0	MAR00175.008	Sediment	<5	<5
S4_1.0	MAR00175.009	Sediment	<5	<5
S5_0.0	MAR00175.010	Sediment	<5	<5
S5_0.5	MAR00175.011	Sediment	<5	<5
S6_0.0	MAR00175.012	Sediment	<5	<5
S6_0.5	MAR00175.013	Sediment	<5	<5
S7_0.0	MAR00175.014	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			106	87
QC Blank			<1	<1

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 MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	N	N
Client Reference:	SOCOTEC Ref:	Matrix	Dibutyltin (DBT)	Tributyltin (TBT)
S7_1.0	MAR00175.015	Sediment	<5	<5
S8_Composite	MAR00175.016	Sediment	<5	<5
S9_0.0	MAR00175.017	Sediment	<5	<5
S10_Composite	MAR00175.018	Sediment	<5	<5
S11_0.0	MAR00175.019	Sediment	<5	<5
S12_Composite	MAR00175.020	Sediment	<5	<5
S13_Composite	MAR00175.021	Sediment	<5	<5
S14_Composite	MAR00175.022	Sediment	<5	<5
S15_Composite	MAR00175.023	Sediment	<5	<5
S16_0.0	MAR00175.024	Sediment	<5	<5
S17_Composite	MAR00175.025	Sediment	<5	<5
S18_0.0	MAR00175.026	Sediment	<5	<5
S19_0.0	MAR00175.027	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			118	97
QC Blank			<1	<1

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 MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	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	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	ACENAPTH	ACENAPHY	ANTHRACN	BAA	BAP
S1_0.0	MAR00175.001	Sediment	21.5	10.1	45.7	155	180
S1_0.5	MAR00175.002	Sediment	15.9	7.44	28.2	114	135
S1_1.0	MAR00175.003	Sediment	19.4	8.27	30.2	134	159
S2_0.0	MAR00175.004	Sediment	15.1	8.69	31.4	122	158
S2_0.5	MAR00175.005	Sediment	10.6	7.43	26.5	111	151
S3_0.0	MAR00175.007	Sediment	8.43	7.41	22.2	91.8	113
S4_0.0	MAR00175.008	Sediment	8.10	7.67	20.9	85.5	111
S4_1.0	MAR00175.009	Sediment	10.8	10.4	28.8	94.4	121
S5_0.0	MAR00175.010	Sediment	14.1	12.2	33.2	110	135
S5_0.5	MAR00175.011	Sediment	11.8	9.85	26.4	86.4	110
Certified Reference Material CRM180013 1941b (% Recovery)			99	103	75	79	70
QC Blank			<1	<1	<1	<1	<1

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 MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	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	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	BBF	BENZGHIP	BKF	CHRYSENE	DBENZA
S1_0.0	MAR00175.001	Sediment	237	171	114	188	36.9
S1_0.5	MAR00175.002	Sediment	201	144	80.7	141	26.8
S1_1.0	MAR00175.003	Sediment	220	156	92.1	156	30.6
S2_0.0	MAR00175.004	Sediment	209	160	98.0	152	28.8
S2_0.5	MAR00175.005	Sediment	197	148	87.7	128	31.4
S3_0.0	MAR00175.007	Sediment	177	128	82.5	121	24.1
S4_0.0	MAR00175.008	Sediment	167	120	67.4	106	22.5
S4_1.0	MAR00175.009	Sediment	171	125	75.0	122	27.3
S5_0.0	MAR00175.010	Sediment	194	138	70.3	135	30.8
S5_0.5	MAR00175.011	Sediment	162	113	86.7	104	20.6
Certified Reference Material CRM180013 1941b (% Recovery)			97	74	100	105	112
QC Blank			<1	<1	<1	<1	<1

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 MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	FLUORANT	FLUORENE	INDPYR	NAPTH
S1_0.0	MAR00175.001	Sediment	300	37.6	189	45.6
S1_0.5	MAR00175.002	Sediment	219	35.0	160	42.5
S1_1.0	MAR00175.003	Sediment	220	29.4	172	40.5
S2_0.0	MAR00175.004	Sediment	244	32.1	179	45.6
S2_0.5	MAR00175.005	Sediment	196	21.9	167	34.6
S3_0.0	MAR00175.007	Sediment	154	24.5	141	40.3
S4_0.0	MAR00175.008	Sediment	145	23.5	134	38.1
S4_1.0	MAR00175.009	Sediment	161	32.3	143	50.9
S5_0.0	MAR00175.010	Sediment	190	38.2	155	60.9
S5_0.5	MAR00175.011	Sediment	148	33.5	130	49.0
Certified Reference Material CRM180013 1941b (% Recovery)			93	63	80	64
QC Blank			<1	<1	<1	<1

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 MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	PHENANT	PYRENE
S1_0.0	MAR00175.001	Sediment	164	270
S1_0.5	MAR00175.002	Sediment	106	194
S1_1.0	MAR00175.003	Sediment	114	207
S2_0.0	MAR00175.004	Sediment	110	223
S2_0.5	MAR00175.005	Sediment	83.0	189
S3_0.0	MAR00175.007	Sediment	90.8	142
S4_0.0	MAR00175.008	Sediment	86.6	135
S4_1.0	MAR00175.009	Sediment	111	144
S5_0.0	MAR00175.010	Sediment	133	172
S5_0.5	MAR00175.011	Sediment	105	137
Certified Reference Material CRM180013 1941b (% Recovery)			88	85
QC Blank			<1	<1

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 MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	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	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	ACENAPTH	ACENAPHY	ANTHRACN	BAA	BAP
S6_0.0	MAR00175.012	Sediment	12.1	12.9	37.9	164	200
S6_0.5	MAR00175.013	Sediment	10.2	9.21	30.8	118	145
S7_0.0	MAR00175.014	Sediment	10.5	11.6	27.8	121	149
S7_1.0	MAR00175.015	Sediment	8.98	8.29	26.3	101	130
S8_Composite	MAR00175.016	Sediment	11.6	10.5	28.5	133	168
S9_0.0	MAR00175.017	Sediment	6.20	6.12	18.7	79.7	92.5
S10_Composite	MAR00175.018	Sediment	6.74	8.11	22.1	81.4	99.2
S11_0.0	MAR00175.019	Sediment	6.56	6.97	20.1	88.1	107
S12_Composite	MAR00175.020	Sediment	8.03	8.82	24.4	115	130
S13_Composite	MAR00175.021	Sediment	9.42	6.67	27.9	111	127
Certified Reference Material CRM180013 1941b (% Recovery)			82	109	74	76	68
QC Blank			<1	<1	<1	<1	<1

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 MAR00175
 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	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	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	BBF	BENZGHIP	BKF	CHRYSENE	DBENZA
S6_0.0	MAR00175.012	Sediment	247	177	127	189	39.3
S6_0.5	MAR00175.013	Sediment	197	146	91.1	146	32.2
S7_0.0	MAR00175.014	Sediment	201	151	109	154	33.8
S7_1.0	MAR00175.015	Sediment	163	132	77.3	120	25.8
S8_Composite	MAR00175.016	Sediment	213	160	97.5	153	33.2
S9_0.0	MAR00175.017	Sediment	126	104	66.1	99.0	19.9
S10_Composite	MAR00175.018	Sediment	137	96.9	60.2	100	19.7
S11_0.0	MAR00175.019	Sediment	182	122	78.9	108	24.3
S12_Composite	MAR00175.020	Sediment	182	128	98.5	140	26.9
S13_Composite	MAR00175.021	Sediment	178	122	71.8	126	26.3
Certified Reference Material CRM180013 1941b (% Recovery)			91	69	101	101	111
QC Blank			<1	<1	<1	<1	<1

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

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 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	FLUORANT	FLUORENE	INDPYR	NAPTH
S6_0.0	MAR00175.012	Sediment	268	27.7	201	43.4
S6_0.5	MAR00175.013	Sediment	187	25.9	159	41.4
S7_0.0	MAR00175.014	Sediment	223	28.6	166	43.7
S7_1.0	MAR00175.015	Sediment	167	22.9	145	36.7
S8_Composite	MAR00175.016	Sediment	207	26.8	180	38.3
S9_0.0	MAR00175.017	Sediment	127	19.5	115	32.7
S10_Composite	MAR00175.018	Sediment	140	18.8	111	30.3
S11_0.0	MAR00175.019	Sediment	139	20.4	137	35.1
S12_Composite	MAR00175.020	Sediment	183	24.5	144	37.0
S13_Composite	MAR00175.021	Sediment	173	22.7	134	32.2
Certified Reference Material CRM180013 1941b (% Recovery)			92	58	77	65
QC Blank			<1	<1	<1	<1

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

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 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	PHENANT	PYRENE
S6_0.0	MAR00175.012	Sediment	110	251
S6_0.5	MAR00175.013	Sediment	89.9	178
S7_0.0	MAR00175.014	Sediment	136	199
S7_1.0	MAR00175.015	Sediment	83.2	158
S8_Composite	MAR00175.016	Sediment	109	185
S9_0.0	MAR00175.017	Sediment	67.2	114
S10_Composite	MAR00175.018	Sediment	76.9	128
S11_0.0	MAR00175.019	Sediment	74.7	125
S12_Composite	MAR00175.020	Sediment	87.0	164
S13_Composite	MAR00175.021	Sediment	96.1	170
Certified Reference Material CRM180013 1941b (% Recovery)			85	85
QC Blank			<1	<1

For full analyte name see method summaries

Certificate of Analysis



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 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	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	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	ACENAPTH	ACENAPHY	ANTHRACN	BAA	BAP
S14_Composite	MAR00175.022	Sediment	8.68	7.60	29.6	112	133
S15_Composite	MAR00175.023	Sediment	11.1	6.71	35.9	99.1	118
S16_0.0	MAR00175.024	Sediment	11.5	4.46	19.5	76.7	95.6
S17_Composite	MAR00175.025	Sediment	2.20	1.57	5.91	22.1	26.8
S18_0.0	MAR00175.026	Sediment	3.95	4.83	18.1	64.2	79.9
S19_0.0	MAR00175.027	Sediment	3.58	3.12	10.7	43.9	51.7
Certified Reference Material CRM180013 1941b (% Recovery)			82	109	74	76	68
QC Blank			<1	<1	<1	<1	<1

For full analyte name see method summaries

Certificate of Analysis



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 Issue Version 1
 Customer Reference Warrenpoint Sediments

		Units	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	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	BBF	BENZGHIP	BKF	CHRYSENE	DBENZA
S14_Composite	MAR00175.022	Sediment	174	130	91.4	134	28.0
S15_Composite	MAR00175.023	Sediment	157	114	74.0	123	24.5
S16_0.0	MAR00175.024	Sediment	136	104	66.0	99.9	23.4
S17_Composite	MAR00175.025	Sediment	41.7	31.0	16.5	28.3	6.28
S18_0.0	MAR00175.026	Sediment	104	78.7	56.3	81.9	16.6
S19_0.0	MAR00175.027	Sediment	73.1	55.0	33.5	56.6	11.3
Certified Reference Material CRM180013 1941b (% Recovery)			91	69	101	101	111
QC Blank			<1	<1	<1	<1	<1

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

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 Customer Reference Warrenpoint Sediments

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	FLUORANT	FLUORENE	INDPYR	NAPTH
S14_Composite	MAR00175.022	Sediment	184	21.4	143	37.0
S15_Composite	MAR00175.023	Sediment	182	21.6	126	30.1
S16_0.0	MAR00175.024	Sediment	144	22.1	112	33.7
S17_Composite	MAR00175.025	Sediment	36.6	5.73	31.2	7.83
S18_0.0	MAR00175.026	Sediment	101	10.7	88.8	22.2
S19_0.0	MAR00175.027	Sediment	68.8	9.44	61.2	16.4
Certified Reference Material CRM180013 1941b (% Recovery)			92	58	77	65
QC Blank			<1	<1	<1	<1

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

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 Customer Reference Warrenpoint Sediments

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303	ASC/SOP/303
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	PHENANT	PYRENE
S14_Composite	MAR00175.022	Sediment	91.6	178
S15_Composite	MAR00175.023	Sediment	90.6	164
S16_0.0	MAR00175.024	Sediment	94.2	119
S17_Composite	MAR00175.025	Sediment	24.2	35.2
S18_0.0	MAR00175.026	Sediment	51.0	104
S19_0.0	MAR00175.027	Sediment	40.8	62.6
Certified Reference Material CRM180013 1941b (% Recovery)			85	85
QC Blank			<1	<1

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 MAR00175
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		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)	µg/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	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	N	N	N	N	N	N	N
Client Reference:	SOCOTEC Ref:	Matrix	PCB28	PCB52	PCB101	PCB118	PCB138	PCB153	PCB180
S1_0.0	MAR00175.001	Sediment	1.28	0.95	0.46	0.38	0.34	0.46	0.15
S1_0.5	MAR00175.002	Sediment	0.93	0.63	0.29	0.38	0.37	0.36	0.12
S1_1.0	MAR00175.003	Sediment	0.85	0.63	0.45	0.49	0.49	0.52	0.16
S2_0.0	MAR00175.004	Sediment	0.74	0.48	0.29	0.33	0.31	0.39	0.15
S2_0.5	MAR00175.005	Sediment	1.38	0.69	0.36	0.45	0.50	0.48	0.35
S3_0.0	MAR00175.007	Sediment	0.60	0.42	0.22	0.28	0.37	0.32	0.10
S4_0.0	MAR00175.008	Sediment	0.63	0.45	0.22	0.27	0.26	0.30	0.12
S4_1.0	MAR00175.009	Sediment	0.59	0.46	0.35	0.28	0.64	0.62	0.43
S5_0.0	MAR00175.010	Sediment	0.64	0.47	0.27	0.26	0.33	0.33	0.16
S5_0.5	MAR00175.011	Sediment	0.42	0.33	0.18	0.21	0.25	0.25	0.12
S6_0.0	MAR00175.012	Sediment	0.69	0.51	0.28	0.34	0.32	0.35	0.12
S6_0.5	MAR00175.013	Sediment	0.46	0.31	0.20	0.26	0.33	0.36	0.12
S7_0.0	MAR00175.014	Sediment	0.61	0.46	0.24	0.32	0.34	0.30	0.13
Certified Reference Material SRM 1941b (% Recovery)			75	102	96	100	118	107	102
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

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 MAR00175
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 Customer Reference Warrenpoint Sediments

		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)	µg/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	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	N	N	N	N	N	N	N
Client Reference:	SOCOTEC Ref:	Matrix	PCB28	PCB52	PCB101	PCB118	PCB138	PCB153	PCB180
S7_1.0	MAR00175.015	Sediment	0.54	0.41	0.28	0.37	0.36	0.33	0.15
S8_Composite	MAR00175.016	Sediment	0.61	0.50	0.27	0.33	0.35	0.37	0.13
S9_0.0	MAR00175.017	Sediment	0.40	0.30	0.17	0.20	0.22	0.26	0.08
S10_Composite	MAR00175.018	Sediment	0.45	0.37	0.20	0.31	0.23	0.25	0.12
S11_0.0	MAR00175.019	Sediment	0.48	0.36	0.22	0.27	0.26	0.30	0.12
S12_Composite	MAR00175.020	Sediment	0.44	0.33	0.18	0.23	0.28	0.31	0.12
S13_Composite	MAR00175.021	Sediment	0.39	0.26	0.16	0.27	0.24	0.29	0.09
S14_Composite	MAR00175.022	Sediment	0.42	0.32	0.22	0.25	0.27	0.37	0.16
S15_Composite	MAR00175.023	Sediment	1.05	1.45	2.38	1.96	3.58	4.49	3.21
S16_0.0	MAR00175.024	Sediment	0.57	0.40	0.22	0.28	0.22	0.24	0.09
S17_Composite	MAR00175.025	Sediment	0.15	0.11	<0.08	<0.08	<0.08	<0.08	<0.08
S18_0.0	MAR00175.026	Sediment	0.33	0.27	0.12	0.14	0.11	0.16	<0.08
S19_0.0	MAR00175.027	Sediment	0.23	0.17	0.09	0.13	0.13	0.10	<0.08
Certified Reference Material SRM 1941b (% Recovery)			78	104	99	102	123	105	108
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

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 MAR00175

Issue Version 1

Customer Reference Warrenpoint Sediments

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
SOCOTEC Env Chem*	MAR00175.001-027	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SOCOTEC Env Chem*	MAR00175.024	Please note that the Zinc result of 2473 mg/kg has been noted as significantly elevated compared to other values and is being repeated by the laboratory.
ASC/SOP/301	MAR00175.001-027	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/301	MAR00175.001-027	Due to matrix interference, the Surrogate recovery for this Test is below the required QMS specification. This has been confirmed by repeating the analysis. All other Laboratory Process Controls meet the requirements of the QMS unless otherwise stated. These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303	MAR00175.001-027	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. It is believed Triphenylene is present in these samples therefore it is suggested that the Chrysene results should be taken as a Chrysene (inc. Triphenylene). This should be taken into consideration when utilising the data.

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	MAR00175.006, 028, 029	Sample submitted was not suitable for testing
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

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 MAR00175
 Issue Version 1
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Method	Sample and Fraction Size	Method Summary
Total Solids	Wet Sediment	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 105°C to constant weight.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 800°C/NDIR.
Metals	Air dried and ground	HF extraction followed by ICP analysis.
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS 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	Solvent extraction and clean up followed by GC-FID analysis.

Analyte Definitions			
Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	FLUORENE	Fluorene
ACENAPHY	Acenaphthylene	INDPYR	Indeno[1,2,3-cd]pyrene
ANTHRACN	Anthracene	NAPTH	Naphthalene
BAA	Benzo[a]anthracene	PHENANT	Phenanthrene
BAP	Benzo[a]pyrene	PYRENE	Pyrene
BBF	Benzo[b]fluoranthene		
BENZGHIP	Benzo[ghi]perylene		
BKF	Benzo[k]fluoranthene		
CHRYSENE	Chrysene		
DBENZA	Diben[ah]anthracene		
FLUORANT	Fluoranthene		

APPENDIX 3
SOCOTEC Analytical Report
Repeat Zinc Results

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 **MAR00195**

Issue Version 1

Customer Anthony D Bates Partnership, Axbridge, BS26 2LE

Customer Reference Warrenpoint Sediments

Date Sampled 24-Jan-19

Date Received 28-Jan-19

Date Reported 18-Feb-19

Condition of samples Cold Satisfactory

A handwritten signature in black ink, appearing to read 'M. Hubbard'.

Authorised by: Marya Hubbard

Position: Laboratory Manager

Any additional opinions or interpretations found in this report, are outside the scope of UKAS accreditation.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

Certificate of Analysis



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Test Report ID MAR00195

Issue Version 1

Customer Reference Warrenpoint Sediments

Analyte	Accreditation	Method No	Limit of Detection	Client Reference:	S16_0.0	S16a_0.0	S16b_0.0	S16c_0.0	S16d_0.0	CRM 2702 (% Recovery)	QC Blank
				SOCOTEC Ref:	MAR00195.001	MAR00195.002	MAR00195.003	MAR00195.004	MAR00195.005		
				Units	Sediment	Sediment	Sediment	Sediment	Sediment		
Zinc (HF-MS)	N	SOCOTEC Env Chem*	3	mg/Kg (Dry Weight)	122	113	126	104	110	99	<3

* See Report Notes

Certificate of Analysis



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Test Report ID MAR00195
Issue Version 1
Customer Reference Warrenpoint Sediments

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
SOCOTEC Env Chem*	MAR00195.001-005	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.

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



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Test Report ID MAR00195
Issue Version 1
Customer Reference Warrenpoint Sediments

Method	Sample and Fraction Size	Method Summary
Metals	Air dried and sieved <2mm	HF/Boric acid extraction followed by ICP analysis.