Dublin Port Company

Alexandra Basin Redevelopment (ABR)

Project Capital Dredging

Dumping at Sea Permit No S0024-01

Sediment Monitoring Results (Summer 2020)

12th June 2020

Introduction

Dublin Port Company (DPC) was granted a Dumping at Sea Permit (S0024-01) by the EPA on 13th September 2016 for the loading and dumping at sea of dredged material arising from capital dredging as part of the Alexandra Basin Redevelopment (ABR) Project.

The permit sets out in detail the conditions under which DPC will carry out loading and dumping at sea.

This document sets out Sediment Monitoring Results (summer 2020) in compliance with Condition 4.7 and Schedule B.1.4 of the permit.

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Condition 4.7 Sediment Chemistry and Grain Size

Condition 4.7.1 The permit holder shall carry out chemical and granulometric analysis of sediments in accordance with Schedule B.1.4 of this permit. A report on this analysis shall be submitted to the Agency within 1 month of completion of the analysis.

Condition 4.7.2 Following submission of the results of the monitoring specified in Condition 4.7.1, loading and dumping may not proceed without the written agreement of the Agency.

Sediment Chemistry and Grain Size Sampling and Analysis Programme

DPC commissioned Hydromaster Ltd to undertake the sediment chemistry and grain size sampling and analysis programme. The analysis was undertaken by the appropriately accredited Socotec Laboratory based in the UK.

The survey to collect the samples was undertaken on 15th and 16th April 2020. DPC received the Hydromaster Report on the sampling and analysis programme on 28th May 2020.

The Hydromaster Report is attached (Appendix 1). The sampling required as part of Schedule B.1.4 of Permit S0024-01 concerns sampling stations DC03, DC04, DC05, DC06 and DC07 shown in Figure 1. The results of the analysis for these sites have been transcribed into the standard Marine Institute format and are also attached (Appendix 2).

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Please note that the Hydromaster Report makes reference to further sampling and analysis undertaken under the same survey programme. These samples were taken within Dublin Harbour to support future capital and maintenance dredging consent applications and will be sent directly to the Marine Institute for review. They do not form part of this compliance monitoring report.

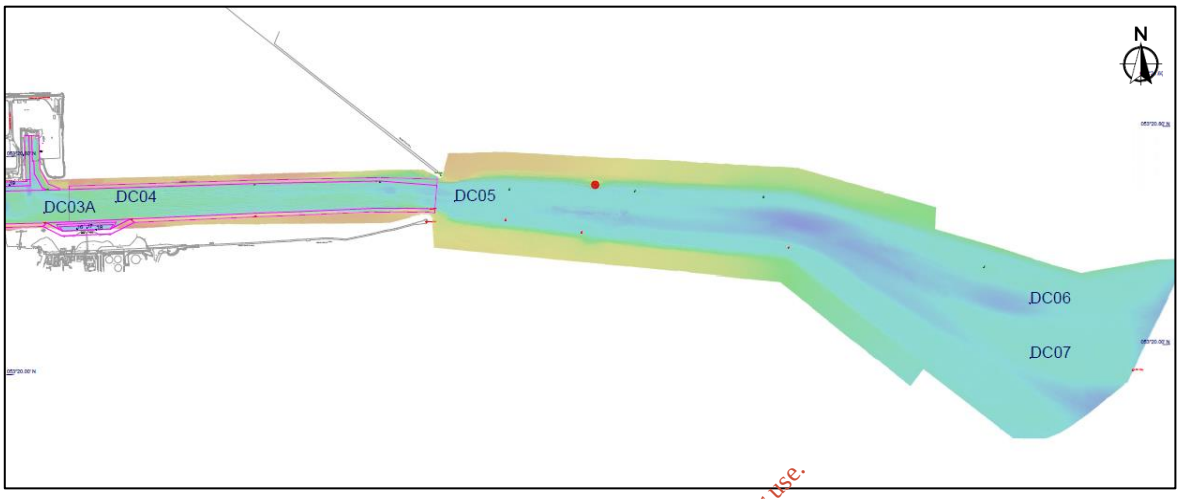

Figure 1 Sample Locations

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Interpretation of Results

Table 1 shows a comparison of the 2020 sediment chemistry results with Marine Institute Guidelines for the Assessment of Dredge Material for Disposal in Irish Waters.

The following observations of the results are made:

- Sample Locations DC05, DC06 and DC07 within Dublin Bay all lie below the lower Marine Institute guideline limit for all parameters.

- Sample Location DC03A within the inner Liffey channel exhibits a Cadmium level at the lower guideline limit and Σ (16 PAH) level marginally above the lower guideline limit. All other parameters are below the lower guideline limit.

- Sample DC04 within the inner Liffey channel exhibits Cadmium, Lead, PCBs and PAH levels marginally above the lower guideline limit. All other parameters are below the lower guideline limit.

- A comparison of the sediment chemistry results taken at locations DC03A and DC04 within the inner Liffey channel between 2013 and 2020 are presented in Table 2. The results taken in 2013 were used to support the Dumping at Sea Permit application for the ABR Project which was granted in September 2016. The results demonstrate that there has been no significant change in sediment chemistry within the inner Liffey channel since the commencement of the ABR Project capital dredging programme.

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Table 1 Results of sediment chemistry results 2020 against Marine Institute Guidelines

Parameter	Units (Dry Wt)	Results - 2020					Guideline Values	
		DC03A	DC04	CD05	DC06	DC07	Lower Level	Upper Level
		surface	*surface*	*surface*	*surface*	*surface*		
Arsenic	*mg kg^{-1}*	9.7	10.8	6.1	9	10.8	20	70
Cadmium	*mg kg^{-1}*	0.7	1	0.2	0.3	0.3	0.7	4.2
Chromium	*mg kg^{-1}*	78.9	76.5	82.9	105	106	120	370
Copper	*mg kg^{-1}*	24.4	28	6.8	6.4	6.1	40	110
Lead	*mg kg^{-1}*	31.4	65.6	11.7	9.7	9.9	60	218
Mercury	*mg kg^{-1}*	0.04	0.18	<0.01	<0.01	<0.01	0.2	0.7
Nickel	*mg kg^{-1}*	24.3	26.4	10.3	9.7	8.5	40	60
Zinc	*mg kg^{-1}*	105	139	36	37	30	160	410
(TBT + DBT)	*mg kg^{-1}*	<0.01	<0.01	<0.01	<0.01	<0.01	0.1	0.5
g-HCH (Lindane)	*ug kg^{-1}*	<0.1	0.21	<0.1	<0.1	<0.1	0.3	1
PCB 028	*ug kg^{-1}*	0.3400	5.3900	0.0800	0.0800	0.1000	1	180
PCB 052	*ug kg^{-1}*	0.2800	4.3100	0.0800	0.0800	0.1800	1	180
PCB 101	*ug kg^{-1}*	0.1600	2.0800	0.0800	0.0800	0.1500	1	180
PCB 118	*ug kg^{-1}*	0.2200	2.5400	0.0800	0.0800	0.1100	1	180
PCB 138	*ug kg^{-1}*	0.1700	2.0200	0.0800	0.0800	0.0800	1	180
PCB 153	*ug kg^{-1}*	0.22	2.42	0.08	0.08	0.09	1	180
PCB 180	*ug kg^{-1}*	0.08	1.33	0.08	0.08	0.08	1	180
Σ (7 PCBs)	*ug kg^{-1}*	1.4700	20.0900	0.5600	0.5600	0.7900	7	1260
Hexachlorobenzine	*ug kg^{-1}*	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	1
Acenaphthene	*ug kg^{-1}*	28.3	46.8	7.83	1.63	1.22	-	-
Acenaphthylene	*ug kg^{-1}*	146	83.9	7.44	2.86	1.84	-	-
Anthracene	*ug kg^{-1}*	133	167	19.1	6.11	4.05	-	-
Benzo (a) anthracene	*ug kg^{-1}*	383	395	38.7	9.36	5.5	-	-
Benzo (a) pyrene	*ug kg^{-1}*	522	472	49.9	17	7.75	-	-
Benzo (b) fluoranthene	*ug kg^{-1}*	383	449	54.7	18.6	10.8	-	-
Benzo (ghi) perylene	*ug kg^{-1}*	322	370	36.6	15.3	7.67	-	-
Benzo (k) fluoranthene	*ug kg^{-1}*	180	260	20	10.1	6.45	-	-
Chrysene	*ug kg^{-1}*	395	459	49.9	13.2	6.87	-	-
Dibenz (a,h) anthracene	*ug kg^{-1}*	76.6	75.1	8.7	3.67	1.78	-	-
Flourene	*ug kg^{-1}*	86.1	94	11.5	4.42	2.95	-	-
Fluoranthene	*ug kg^{-1}*	398	669	67	13.3	8.37	-	-
Indeno (1,2,3–cd)	*ug kg^{-1}*	336	383	38.1	16.2	8.33	-	-
Naphthalene	*ug kg^{-1}*	61.2	133	14.4	8.89	3.76	-	-
Phenanthrene	*ug kg^{-1}*	199	247	43.8	13	6.92	-	-
Pyrene	*ug kg^{-1}*	660	787	104	16.5	11.1	-	-
Σ (16 PAH)	*ug kg^{-1}*	4309.2	5090.8	571.67	170.14	95.36	4000	-
Total Extractable Hydrocarbons	*g kg^{-1}*	0.517	0.961	0.124	0.0353	0.0189	1	

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Table 2 Sediment Chemistry in Inner Liffey Channel from 2013 to 2020

Parameter	Units (Dry Wt)	2013		2017		2020		Guideline Values	
		DC03A	DC04	DC03A	DC04	DC03A	DC04	Lower Level	Upper Level
		surface	surface	surface	surface	surface	surface		
Arsenic	mg kg^{-1}	7.93	8.73	6.99	5.31	9.7	10.8	20	70
Cadmium	mg kg^{-1}	0.462	0.427	0.27	0.17	0.7	1	0.7	4.2
Chromium	mg kg^{-1}	139	136	41.5	38.2	78.9	76.5	120	370
Copper	mg kg^{-1}	64.6	57.1	15.9	9.12	24.4	28	40	110
Lead	mg kg^{-1}	46.2	44.5	27	18.5	31.4	65.6	60	218
Mercury	mg kg^{-1}	0.048	0.091	0.08	lab error*	0.04	0.18	0.2	0.7
Nickel	mg kg^{-1}	65.4	63.8	15.9	13.5	24.3	26.4	40	110
Zinc	mg kg^{-1}	136	119	66.2	44.5	105	139	160	410
(TBT + DBT)	mg kg^{-1}	0.008	0.008	<0.007	<0.007	<0.01	<0.01	0.1	0.5
g-HCH (Lindane)	ug kg^{-1}	Results below laboratory limit of detection					0.21	0.3	1
PCB 028	ug kg^{-1}	0.1	0.2	<0.1	1.15	0.3400	5.3900	1	180
PCB 052	ug kg^{-1}	0.1	0.1	<0.1	5.67	0.2800	4.3100	1	180
PCB 101	ug kg^{-1}	0.1	0.1	<0.1	2.88	0.1600	2.0800	1	180
PCB 118	ug kg^{-1}	0.1	0.1	0.21	1.49	0.2200	2.5400	1	180
PCB 138	ug kg^{-1}	0.1	0.1	<0.1	0.87	0.1700	2.0200	1	180
PCB 153	ug kg^{-1}	0.1	0.1	0.32	0.64	0.22	2.42	1	180
PCB 180	ug kg^{-1}	0.1	0.1	<0.1	<0.1	0.08	1.33	1	180
Σ (7 PCBs)	ug kg^{-1}	0.7	0.8	1.03	12.8	1.4700	20.0900	7	1260
Hexachlorobenzine	ug kg^{-1}	<1	<1	<1.0	<1.0	<0.1	<0.1	0.3	1
Acenaphthene	ug kg^{-1}	16.4	16.9	12.9	9.86	28.3	46.8	-	-
Acenaphthylene	ug kg^{-1}	83.8	37.9	11.5	8.54	146	83.9	-	-
Anthracene	ug kg^{-1}	91.3	55.3	31	23.3	133	167	-	-
Benzo (a) anthracene	ug kg^{-1}	210	142	104	76.4	383	395	-	-
Benzo (a) pyrene	ug kg^{-1}	259	146	147	92.1	522	472	-	-
Benzo (b) fluoranthene	ug kg^{-1}	219	126	104	80	383	449	-	-
Benzo (ghi) perylene	ug kg^{-1}	134	71.1	94.7	60.2	322	370	-	-
Benzo (k) fluoranthene	ug kg^{-1}	111	53.6	43.5	31.4	180	260	-	-
Chrysene	ug kg^{-1}	175	121	64.3	59.4	395	459	-	-
Dibenz (a,h) anthracene	ug kg^{-1}	34.1	18.7	<0.1	<0.1	76.6	75.1	-	-
Flourene	ug kg^{-1}	42.7	25.6	19.6	17.6	86.1	94	-	-
Fluoranthene	ug kg^{-1}	210	184	162	147	398	669	-	-
Indeno (1,2,3–cd)	ug kg^{-1}	117	62.7	82.7	51	336	383	-	-
Naphthalene	ug kg^{-1}	59.7	46.7	42.2	22	61.2	133	-	-
Phenanthrene	ug kg^{-1}	129	123	109	95.3	199	247	-	-
Pyrene	ug kg^{-1}	273	219	159	163	660	787	-	-
Σ (16 PAH)	ug kg^{-1}	2165	1449.5	1187.5	937.2	4309.2	5090.8	4000	-
Total Extractable Hydrocarbons	g kg^{-1}	0.0388	0.0513	<0.00001	<0.00001	0.517	0.961	1	

Note: An investigation of the 2017 Mercury results for sample location DC04 was submitted to the EPA via EDEN on 9th September 2019 (EDEN Reference No. LR043978). The issue was closed by the EPA on 8th November 2019.

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Conclusion

The summer 2020 sediment chemistry sampling and analysis results demonstrate that there has been no significant change in sediment chemistry within the inner Liffey channel or Dublin Bay since the commencement of the ABR Project capital dredging programme. It can therefore be concluded that the sediments remain suitable for disposal at sea, subject to compliance with the conditions of Dumping at Sea Permit S0024-01.

DPC has ably demonstrated its commitment to comply with the conditions of Dumping at Sea Permit S0024-01 during the three winter dredging campaigns 2017-18, 2018-19 and 2019-20. Annual Environmental Reports for 2017, 2018 and 2019 are available on the EPA Website.

DPC confirms its commitment to continue to comply with the conditions of Dumping at Sea Permit S0024-01 during the fourth (final) winter dredging campaign (October 2020 – March 2021).

DPC requests that the EPA provide written consent in accordance with Condition 4.7.2 of the permit to allow DPC to proceed with the fourth winter dredging season October 2020 to March 2021.

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Appendix 1

Hydromaster Report

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Dublin Port
Sediment sampling (contamination) Report
April 2020

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NOTES

Survey date	The 15th and 16th of April
Report date	15/05/2020
Location	Dublin Port
Coordinate system	Geographic WGS84 and ITM
Report Revision	Draft
Prepared by	DL
Check by	CM/BS

Document control

Date	Prepared by	Comment
15/05/2020	DL	Draft
17/05/2020	CM and BS	Final review and edits

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1. Introduction

Dublin Port Company (DPC) are conducting a comprehensive sampling and analysis plan of marine sediment designed to cover the planned maintenance dredging of the berths and navigation channel as well as covering locations for the capital works (berth widening and a turning circle).

The primary area of concern highlighted by the Environmental Protection Agency (EPA) is the possibility of contaminants found within the sediment. Therefore a total of thirty-one sampling locations were chosen as well as five historically sampled locations for the collection and analysis of sediment samples for contamination.

Hydromaster were contracted to collect these sediment samples and conduct the required analysis.

Hydromaster undertook sediment collection across two days in April (the 15th and 16th), within the Dublin port area. The survey was carried out over two days due to restrictions of access to berths and tidal height.

The sampling locations are spread out across Dublin Port and the channel. The sample locations are shown below in Figure 1 and Figure 2.

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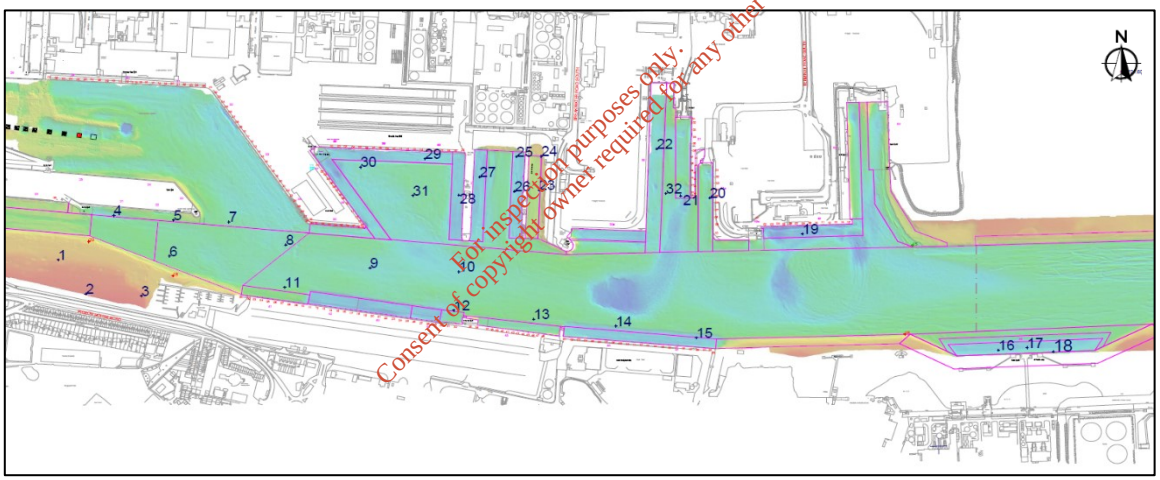

Figure 1: Dublin port sediment sampling locations (2020 licenced area).

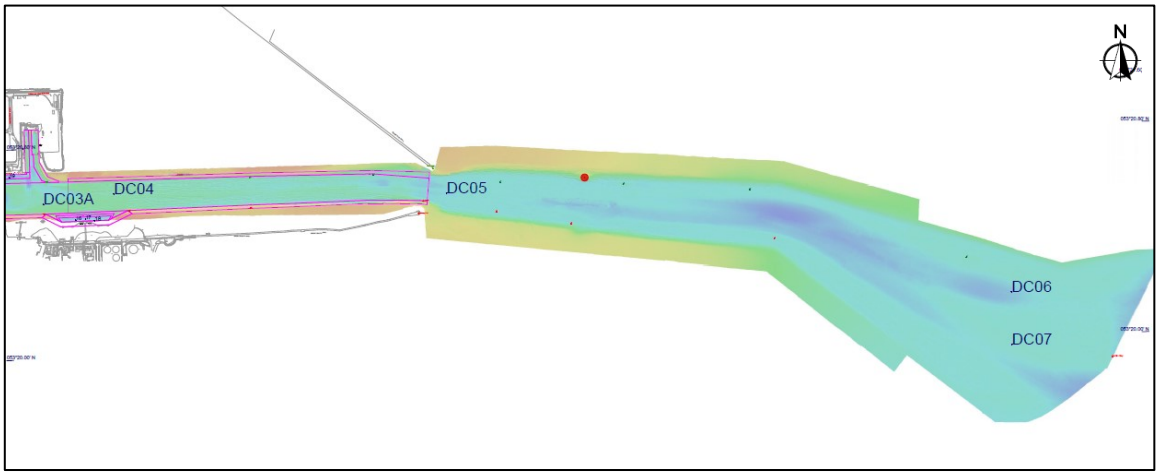

Figure 2: Dublin port sediment sampling locations (2016 licenced area).

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The locations of the samples at some locations had to be moved slightly due to either access restrictions, or the inability for the grab to collect a valid sample (large rocks or hard bottom). In these instances, the sample was collected from within a 10m radius of the original location.

Details of the sample locations are provided in Table 1 in appendix A.

Detailed location charts (PDF format) are provided in appendix C.

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2. Sediment sampling methodology

The sampling vessel is equipped with a highly accurate Hemisphere mounted GPS VS330, allowing a location fix of up to 10 mm. This was used when approaching the sampling location to ensure that the sample was collected from the designated position.

At each location, all of the equipment was cleaned thoroughly prior to deployment. Additionally a new set of disposable gloves were used by the individual collecting the sample to remove the possibility of contamination from the sampler and between samples.

Once in position, sediment samples were collected by Hydromaster scientists utilising a Van Veen benthic grab of 0.1m^2 (Figure 3).

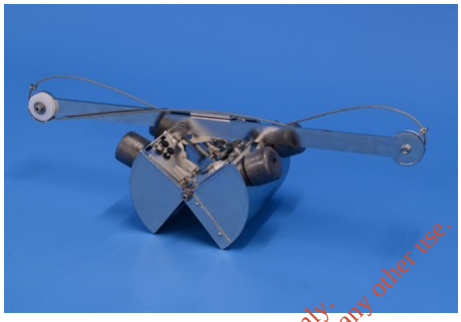

Figure 3: Van veen grab utilised for sediment sample collection

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Once the grab was brought back onto the sampling vessel, the sample was deposited into the stainless-steel collection bucket. Samples found to be less than 2l were rejected.

If any samples were rejected or unusable all of the equipment was cleaned thoroughly before the equipment was redeployed and a new sample was collected. This ensured no cross contamination between samples

Successful grab samples were placed into the collection bucket and a visual inspection was carried out. Once the sample had been documented, laboratory sub samples were collected from the surface layer and placed into the laboratory provided sample containers. These processes are detailed in the following sections.

Once the documentation and sampling had been carried out, all the sampling equipment was cleaned thoroughly with seawater to minimise sample cross contamination.

2.1. Visual sediment characteristics

Once the sediment sample was placed into the stainless-steel collection bucket, photographs were taken, and a descriptive log of sediment characteristics was recorded. The sediment characteristics log included the following details:

- Sediment classification (very coarse, fine silt, muddy etc.);
- Layering (if present, including colour of surface/subsurface layers and presence of anoxic layer);

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- Odour (presence of H_2S);
- Visible fauna;
- Bioturbation (presence/absence); and
- Anthropogenic debris (e.g. pollution, plastic waste etc.).

This qualitative sediment analysis was performed on sediment obtained from the first successful grab taken at each location. The photographs and characteristics collected from this process can be viewed in Appendix A.

2.2. Analytical laboratory sampling

Once the sediment sample had been photographed and documented, sub samples were collected from the surface layer using a stainless-steel scoop and placed into the laboratory provided containers. The details of the containers collected at each site are provided in Appendix X.

All sediment samples to be sent to the analytical laboratory were labelled with the project number, site number, date and time of sampling and placed into cold storage immediately. Samples were transported to the laboratory immediately after demobilisation along with full Chain of Custody (CoC) documentation. The laboratory used for analysis of these samples was Socotec, based in the UK.

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The sediment samples collected from all of the locations were subjected to the following laboratory analyses:

- Grain Size Analysis (<2mm and <63µm);
- Organic Carbon content;
- Total Extractable Hydrocarbons (TEH);
- Heavy Metals (Cd, Hg, As, Cr, Cu, Pb, Ni, Zn);
- ΣPAH16;
- ΣPCB7;
- HCB;
- g-HCH;
- p,p' DDT;
- p,p' DDD;
- p,p' DDE;
- TBT;
- DBT.

For QAQC purposes, the laboratory conducted a QC blank and a reference material analysis for all chemical analysis. These results are provided with the laboratory results in Appendix B.

3. Results

Samples were successfully collected, and sub sampled from all but one location (30). At this location, only large rocks were able to be obtained. These were provided to the lab for visual inspection, but no physio-chemical analysis was able to be carried out. Additionally at location 21 only one large rock was able to be collected after multiple grab attempts on location. Therefore the vessel was

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moved to location 32 and a sample was successfully collected. This may be used as a proxy for location 21.

3.1. Laboratory results

The results provided by the laboratory are provided in Appendix B.

3.2. EPA documentation

The results from the laboratory and the survey details were inputted into the EPA survey document. This completed document is provided in Appendix B.

4. Conclusion

Sediment samples were able to be collected from all but one location (30). All samples were stored and delivered successfully to the laboratory for analysis. Accurate analysis was possible on all samples provided to the laboratory.

5. Appendices

5.1. Appendix A – Sampling Details

- Appendix A1 Sample location time and date
- Appendix A2 Sediment descriptions

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5.2. Appendix B – Laboratory results

- Appendix B1 Laboratory results
- Appendix B2 EPA result sheet

5.3. Appendix C – Charts of Grab samples location

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Appendix A1 – Sampling locations and sample descriptions

Table 1: Sampling locations

Location Name	Latitude	Longitude	Date sampled	Time sample taken
new 1	53.34479	-6.22156	16/04/2020	13:30
new 2	53.34395	-6.22057	15/04/2020	19:40
new 3	53.34391	-6.2186	15/04/2020	19:30
new 4	53.34573	-6.2194	15/04/2020	17:04
new 5	53.34561	-6.21733	15/04/2020	16:47
new 6	53.34478	-6.21758	16/04/2020	13:20
new 7	53.34554	-6.21537	16/04/2020	14:04
new 8	53.34497	-6.21332	16/04/2020	14:12
new 9	53.34441	-6.21042	16/04/2020	14:47
new 10	53.34426	-6.20714	16/04/2020	15:03
new 11	53.34414	-6.21353	16/04/2020	14:32
new 12	53.34343	-6.20728	15/04/2020	16:35
new 13	53.34315	-6.20445	15/04/2020	16:24
new 14	53.34294	-6.20152	15/04/2020	16:11
new 15	53.34262	-6.19859	15/04/2020	15:58
new 16	53.34217	-6.18777	16/04/2020	15:32
new 17	53.34223	-6.18673	16/04/2020	15:43
new 18	53.34211	-6.1858	16/04/2020	15:51
new 19	53.34496	-6.19467	15/04/2020	15:03
new 20	53.34585	-6.19806	15/04/2020	13:18
new 21	53.34593	-6.19903	15/04/2020	15:46
new 22	53.34697	-6.19988	15/04/2020	18:40
new 23	53.34612	-6.20411	15/04/2020	14:15
new 24	53.34693	-6.20394	15/04/2020	14:26
new 25	53.34689	-6.20492	15/04/2020	13:47
new 26	53.34609	-6.20505	15/04/2020	13:31
new 27	53.34642	-6.20626	15/04/2020	13:57
new 28	53.34602	-6.20703	15/04/2020	18:52
new 29	53.34692	-6.20827	15/04/2020	19:03
new 30	53.34695	-6.21063	15/04/2020	19:22
new 31	53.34601	-6.20865	16/04/2020	15:16
new 32	53.34596	-6.19958	15/04/2020	14:39
DC03A	53.3432	-6.19116	16/04/2020	11:23
DC04	53.34369	-6.18346	16/04/2020	11:14
DC05	53.34332	-6.14829	16/04/2020	10:54
DC06	53.33608	-6.08881	16/04/2020	09:46
DC07	53.33274	-6.08881	16/04/2020	10:10

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Appendix A2 – Sample descriptions

Table 2: Sample descriptions

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 1		Grey sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 2		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2

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Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 3		Grey sandy SILT	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 4		Grey slightly sandy silty CLAY	No	Slight H_2S	No	No	No	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 5		Grey sandy SILT	No	No	No	No	No	3	2
new 6		Grey slightly sandy silty CLAY	No	No	No	No	No	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 7		Grey sandy clayey SILT	No	No	No	No	No	3	2
new 8		Grey slightly sandy slightly gravelly silty CLAY	No	No	No	No	No	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 9		Very large rocks with Grey sandy silty CLAY	No	No	Large velvet swimming crab	No	small pottery and brick fragments	3	2
new 10		Grey slightly sandy silty CLAY	No	No	No	No	No	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 11		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 12		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	small number of ragworms	minor	No	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 13		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 14		Grey sandy SILT	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 15		Grey sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	Plastic bottle in sediment	3	2
new 16		Grey sandy SILT	Yes, light fine sediment on top of dark	Slight H_2S	large number of ragworms	some burrows observed	Oil sheen on surface	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 17		Grey sandy SILT	Yes, light fine sediment on top of dark	Slight H_2S	small number of ragworms	some burrows observed	No	3	2
new 18		Grey slightly sandy silty CLAY	No	No	No	No	No	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 19		Grey slightly gravelly silty SAND	No	No	Shells and fragements	No	No	3	2
new 20		Large rocks Grey slightly gravelly sandy SILT	No	No	No	No	small pottery and brick fragments	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 21	No photo taken as only a single large rock was collected.	One large rock	No	No	No	No	No	-	-
new 22		Grey sandy SILT	Yes, light fine sediment on top of dark	Slight H_2S	small number of ragworms	some burrows observed	No	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 23		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 24		Grey sandy clayey SILT	Yes, light fine sediment on top of dark	Slight H_2S	Crab shell remains	No	No	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 25		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 26		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Strong H_2S	No	No	No	3	2

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EPA Export 12-08-2020:04:15:23

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 27		Grey sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 28		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2

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EPA Export 12-08-2020:04:15:24

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 29		Grey sllightly sandy slightly gravelly silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 30		Large rocks no sediment	N/A	No	Barnacles present on some rocks	No	No	-	-

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EPA Export 12-08-2020:04:15:24

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 31		Small rocks Grey sandy clayey SILT	No	Slight H_2S	No	No	No	3	2
new 32		some rocksGrey slightly sandy slightly gravelly silty CLAY	No	No	No	No	No	3	2

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Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
DC03A		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	4	2
DC04		Grey sandy SILT	No	Slight H_2S	No	No	Small piece of plastic	4	2

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EPA Export 12-08-2020:04:15:24

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
DC05		Grey silty SAND	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	4	2
DC06		Grey slightly gravelly silty SAND	No	No	No	No	No	4	2

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Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
DC07		Light brown SAND	No	No	Some shell fragments	No	No	4	2

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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	**MAR00599**	
Issue Version	3	
Customer	Hydromaster Ltd, 7 Howley Court, Dublin Road, Oranmore, Co. Galway, Ireland H91 V1KD	
Customer Reference	Dublin Port	
Date Sampled	15-Apr-20	
Date Received	17-Apr-20	
Date Reported	26-May-20	
Condition of samples	Cold	Satisfactory

This is a revised report containing the actual CRM values in addition to the % Recovery

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Authorised by: Marya Hubbard

Position: Laboratory Manager

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

Client Reference:	SOCOTEC Ref:	Matrix	Visual Description
2	MAR00599.001	Sediment	Grey slightly sandy silty CLAY
3	MAR00599.002	Sediment	Grey sandy SILT
4	MAR00599.003	Sediment	Grey slightly sandy silty CLAY
5	MAR00599.004	Sediment	Grey sandy SILT
12	MAR00599.005	Sediment	Grey slightly sandy silty CLAY
13	MAR00599.006	Sediment	Grey slightly sandy silty CLAY
14	MAR00599.007	Sediment	Grey sandy SILT
15	MAR00599.008	Sediment	Grey sandy silty CLAY
19	MAR00599.009	Sediment	Grey slightly gravelly silty SAND
20	MAR00599.010	Sediment	Grey slightly gravelly sandy SILT
22	MAR00599.011	Sediment	Grey sandy SILT
23	MAR00599.012	Sediment	Grey slightly sandy silty CLAY
24	MAR00599.013	Sediment	Grey sandy clayey SILT
25	MAR00599.014	Sediment	Grey slightly sandy silty CLAY
26	MAR00599.015	Sediment	Grey slightly sandy silty CLAY
27	MAR00599.016	Sediment	Grey sandy silty CLAY
28	MAR00599.017	Sediment	Grey slightly sandy silty CLAY
29	MAR00599.018	Sediment	Grey sllightly sandy slightly gravelly silty CLAY
32	MAR00599.019	Sediment	Grey slightly sandy slightly gravelly silty CLAY
1	MAR00599.020	Sediment	Grey sandy silty CLAY
6	MAR00599.021	Sediment	Grey slightly sandy silty CLAY
7	MAR00599.022	Sediment	Grey sandy clayey SILT
8	MAR00599.023	Sediment	Grey slightly sandy slightly gravelly silty CLAY
9	MAR00599.024	Sediment	Grey sandy silty CLAY
10	MAR00599.025	Sediment	Grey slightly sandy silty CLAY
11	MAR00599.026	Sediment	Grey slightly sandy silty CLAY
16	MAR00599.027	Sediment	Grey sandy SILT
17	MAR00599.028	Sediment	Grey sandy SILT
18	MAR00599.029	Sediment	Grey slightly sandy silty CLAY
31	MAR00599.030	Sediment	Grey sandy clayey SILT
DC03A	MAR00599.031	Sediment	Grey slightly sandy silty CLAY
DC04	MAR00599.032	Sediment	Grey sandy SILT
DC05	MAR00599.033	Sediment	Grey silty SAND
DC06	MAR00599.034	Sediment	Grey slightly gravelly silty SAND
DC07	MAR00599.035	Sediment	Light brown SAND

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	%	%	%	%	%	mg/m3
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SOCOTEC Doncaster*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Particle Density**
2	MAR00599.001	Sediment	41.8	58.2	1.8	52.4	45.8	2.66
3	MAR00599.002	Sediment	58.2	41.8	0.0	27.0	73.0	2.63
4	MAR00599.003	Sediment	49.8	50.2	1.0	25.4	73.7	2.68
5	MAR00599.004	Sediment	49.5	50.5	3.1	37.7	59.2	2.70
12	MAR00599.005	Sediment	49.1	50.9	1.2	29.9	69.0	2.69
13	MAR00599.006	Sediment	57.2	42.8	0.1	26.5	73.4	2.66
14	MAR00599.007	Sediment	52.9	47.1	5.1	31.9	63.0	2.69
15	MAR00599.008	Sediment	56.1	43.9	0.0	26.1	73.9	2.63
19	MAR00599.009	Sediment	27.3	72.7	25.3	65.4	9.3	2.70
20	MAR00599.010	Sediment	43.0	57.0	9.8	31.0	59.2	2.61
22	MAR00599.011	Sediment	48.0	52.0	8.9	43.6	47.4	2.60
23	MAR00599.012	Sediment	63.6	36.4	0.0	16.2	83.8	2.67
24	MAR00599.013	Sediment	60.5	39.5	1.1	11.8	87.1	2.67
25	MAR00599.014	Sediment	61.5	38.5	0.3	17.5	82.2	2.64
26	MAR00599.015	Sediment	61.6	38.4	0.4	21.8	77.9	2.66
27	MAR00599.016	Sediment	64.8	35.2	0.1	17.5	82.4	2.62
28	MAR00599.017	Sediment	62.0	38.0	0.2	21.3	78.5	2.66
29	MAR00599.018	Sediment	61.1	38.9	0.1	22.8	77.1	2.69
32	MAR00599.019	Sediment	45.7	54.3	43.6	24.8	31.6	2.66
1	MAR00599.020	Sediment	69.2	30.8	0.0	18.3	81.7	2.53
6	MAR00599.021	Sediment	56.6	43.4	8.1	35.6	56.3	2.69
7	MAR00599.022	Sediment	40.2	59.8	21.2	50.4	28.3	2.68
8	MAR00599.023	Sediment	47.8	52.2	7.7	32.3	60.0	2.64
9	MAR00599.024	Sediment	20.1	79.9	81.8	8.9	9.2	2.67
10	MAR00599.025	Sediment	53.2	46.8	23.2	26.2	50.7	2.70
11	MAR00599.026	Sediment	62.8	37.2	0.0	24.0	76.0	2.66
16	MAR00599.027	Sediment	62.0	38.0	0.0	20.2	79.8	2.66
17	MAR00599.028	Sediment	70.4	29.6	0.0	18.1	81.9	2.63
18	MAR00599.029	Sediment	69.9	30.1	0.0	20.5	79.5	2.54
31	MAR00599.030	Sediment	47.8	52.2	3.9	28.5	67.6	2.70

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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	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	%	% M/M
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	00/01/1900	0.02
		Accreditation	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Carbonate**	**TOC**
2	MAR00599.001	Sediment	1.68	1.08
3	MAR00599.002	Sediment	3.24	2.30
4	MAR00599.003	Sediment	3.28	2.38
5	MAR00599.004	Sediment	3.68	1.94
12	MAR00599.005	Sediment	3.96	1.46
13	MAR00599.006	Sediment	3.80	1.67
14	MAR00599.007	Sediment	4.92	1.33
15	MAR00599.008	Sediment	3.32	1.59
19	MAR00599.009	Sediment	6.76	0.81
20	MAR00599.010	Sediment	4.00	1.11
22	MAR00599.011	Sediment	4.16	1.00
23	MAR00599.012	Sediment	3.36	2.11
24	MAR00599.013	Sediment	3.96	1.97
25	MAR00599.014	Sediment	3.52	2.06
26	MAR00599.015	Sediment	3.72	1.92
27	MAR00599.016	Sediment	3.96	1.90
28	MAR00599.017	Sediment	3.36	1.85
29	MAR00599.018	Sediment	3.44	1.85
32	MAR00599.019	Sediment	6.04	0.79
1	MAR00599.020	Sediment	3.64	3.62
6	MAR00599.021	Sediment	3.84	1.49
7	MAR00599.022	Sediment	3.88	2.58
8	MAR00599.023	Sediment	4.24	1.69
9	MAR00599.024	Sediment	5.44	0.44
10	MAR00599.025	Sediment	6.08	1.11
11	MAR00599.026	Sediment	3.72	2.16
16	MAR00599.027	Sediment	3.36	1.89
17	MAR00599.028	Sediment	3.04	2.08
18	MAR00599.029	Sediment	3.36	2.06
31	MAR00599.030	Sediment	3.76	1.63

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

			Units	%	%	%	%	%	mg/m3
			Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SOCOTEC Doncaster*
			Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
			Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**		**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Particle Density**
DC03A	MAR00599.031	Sediment		62.4	37.6	0.0	32.4	67.6	2.65
DC04	MAR00599.032	Sediment		48.1	51.9	0.0	38.6	61.4	2.66
DC05	MAR00599.033	Sediment		42.3	57.7	0.5	91.9	7.6	2.63
DC06	MAR00599.034	Sediment		31.9	68.1	0.9	94.1	5.1	2.75
DC07	MAR00599.035	Sediment		27.3	72.7	0.2	97.0	2.9	2.64

* See Report Notes

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	%	% M/M
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	00/01/1900	0.02
		Accreditation	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Carbonate**	**TOC**
DC03A	MAR00599.031	Sediment	3.20	1.35
DC04	MAR00599.032	Sediment	3.24	1.74
DC05	MAR00599.033	Sediment	2.32	0.24
DC06	MAR00599.034	Sediment	2.16	0.13
DC07	MAR00599.035	Sediment	1.84	0.11

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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	0.5	3
		Accreditation	UKAS	N	N	UKAS	UKAS	Nickel	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Lead**	**Nickel**	**Zinc**
2	MAR00599.001	Sediment	23.7	0.9	95.6	39.2	50.4	17.3	118
3	MAR00599.002	Sediment	34.8	1.1	79.7	42.0	61.8	25.6	201
4	MAR00599.003	Sediment	36.3	1.3	77.2	38.1	71.2	33.1	183
5	MAR00599.004	Sediment	35.4	1.1	85.8	32.2	53.9	30.1	149
12	MAR00599.005	Sediment	32.7	1.0	81.1	34.6	35.0	34.1	124
13	MAR00599.006	Sediment	28.7	0.9	78.0	37.9	32.0	43.0	117
14	MAR00599.007	Sediment	24.9	1.3	81.8	22.3	26.4	32.3	103
15	MAR00599.008	Sediment	19.5	0.9	78.3	26.1	33.6	30.6	112
19	MAR00599.009	Sediment	14.6	0.6	91.6	19.9	15.2	24.7	95.0
20	MAR00599.010	Sediment	14.6	0.9	83.0	24.7	39.7	29.2	121
22	MAR00599.011	Sediment	13.8	1.1	86.5	42.5	24.4	27.0	99.0
23	MAR00599.012	Sediment	15.8	0.9	85.1	39.9	44.8	35.6	150
24	MAR00599.013	Sediment	12.7	1.0	78.8	47.8	57.2	36.0	176
25	MAR00599.014	Sediment	17.4	1.1	81.9	34.6	41.9	33.0	143
26	MAR00599.015	Sediment	21.4	0.9	78.8	30.0	36.8	32.8	129
27	MAR00599.016	Sediment	19.1	0.9	81.3	31.9	38.7	33.1	144
28	MAR00599.017	Sediment	19.9	0.9	77.9	32.5	40.6	32.1	141
29	MAR00599.018	Sediment	18.0	1.0	78.3	31.1	39.4	31.9	134
32	MAR00599.019	Sediment	10.7	0.8	88.9	46.3	18.6	28.4	92
		Certified Reference Material 2702 (% Recovery)	105	253	80	78	89	82	90
		Certified Reference Material 2702 (Result)	47.5	2	280	91	118	62	439
		Certified Reference Material 1646a (% Recovery)	-	-	-	-	-	-	-
		Certified Reference Material 1646a (Result)	-	-	-	-	-	-	-
		QA/QC In-House Refernece Material (% Recovery)	120	100	102	103	98	102	100
		QC Blank	<1	<0.1	<0.5	<2	<2	<0.5	<3

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	10	0.5	0.01
		Accreditation	UKAS	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Aluminium**	**Lithium**	**Mercury**
2	MAR00599.001	Sediment	23900	23.9	0.02
3	MAR00599.002	Sediment	30100	32.7	0.04
4	MAR00599.003	Sediment	35800	39.8	0.07
5	MAR00599.004	Sediment	31000	34.2	0.07
12	MAR00599.005	Sediment	34000	35.9	0.02
13	MAR00599.006	Sediment	33000	35.8	0.01
14	MAR00599.007	Sediment	30700	32.4	0.01
15	MAR00599.008	Sediment	35300	37.8	0.06
19	MAR00599.009	Sediment	11700	14.1	<0.01
20	MAR00599.010	Sediment	28100	30.5	0.02
22	MAR00599.011	Sediment	26500	29.5	0.01
23	MAR00599.012	Sediment	40700	44.3	0.05
24	MAR00599.013	Sediment	43300	46.0	0.04
25	MAR00599.014	Sediment	38000	40.4	0.05
26	MAR00599.015	Sediment	41200	42.7	0.04
27	MAR00599.016	Sediment	40100	42.2	0.03
28	MAR00599.017	Sediment	38300	40.6	0.05
29	MAR00599.018	Sediment	36900	38.8	0.02
32	MAR00599.019	Sediment	19100	21.8	<0.01
		Certified Reference Material 2702 (% Recovery)	98	93	-
		Certified Reference Material 2702 (Result)	82400	73	-
		Certified Reference Material 1646a (% Recovery)	-	-	25
		Certified Reference Material 1646a (Result)	-	-	0.01
		QA/QC In-House Refernece Material (% Recovery)	106	97	102
		QC Blank	<10	<0.5	<0.01

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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	0.5	3
		Accreditation	UKAS	N	N	UKAS	UKAS	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Lead**	**Nickel**	**Zinc**
1	MAR00599.020	Sediment	16.4	1.2	79.7	45.1	70.0	33.1	252
6	MAR00599.021	Sediment	12.8	0.9	98.0	27.5	48.9	25.4	136
7	MAR00599.022	Sediment	13.1	0.7	111	23.6	110	20.0	117
8	MAR00599.023	Sediment	17.1	1.2	101	28.9	78.0	27.0	145
9	MAR00599.024	Sediment	16.2	1.2	103	15.7	10.6	33.2	62.0
10	MAR00599.025	Sediment	14.9	0.9	82.3	22.8	29.8	24.3	116
11	MAR00599.026	Sediment	18.0	1.1	90.0	62.3	51.8	29.2	151
16	MAR00599.027	Sediment	15.6	0.8	81.4	34.1	39.5	28.0	127
17	MAR00599.028	Sediment	14.3	0.9	94.8	34.0	43.6	29.1	154
18	MAR00599.029	Sediment	11.3	0.9	80.8	29.0	41.6	28.6	133
31	MAR00599.030	Sediment	10.9	0.9	85.7	29.3	48.5	26.5	137
DC03A	MAR00599.031	Sediment	9.7	0.7	78.9	24.4	31.4	24.3	105
DC04	MAR00599.032	Sediment	10.8	1.0	76.5	28.0	65.6	26.4	139
DC05	MAR00599.033	Sediment	6.1	0.2	82.9	6.8	11.7	10.3	36.0
DC06	MAR00599.034	Sediment	9.0	0.3	105	6.4	9.7	9.7	37.0
DC07	MAR00599.035	Sediment	10.8	0.3	106	6.1	9.9	8.5	30.0
		Certified Reference Material 2702 (% Recovery)	90	218	86	80	94	87	93
		Certified Reference Material 2702 (Result)	40.9	2	303	95	125	66	450
		Certified Reference Material 1646a (% Recovery)		-	-	-	-	-	-
		Certified Reference Material 1646a (Result)	-	-	-	-	-	-	-
		QA/QC In-House Refernece Material (% Recovery)	103	100	98	107	104	98	97
		QC Blank	<1	<0.1	<0.5	<2	<2	<0.5	<3

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	10	0.5	0.01
		Accreditation	UKAS	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Aluminium**	**Lithium**	**Mercury**
1	MAR00599.020	Sediment	38900	40.8	0.17
6	MAR00599.021	Sediment	32300	34.0	0.09
7	MAR00599.022	Sediment	26600	28.5	0.07
8	MAR00599.023	Sediment	35100	36.0	0.11
9	MAR00599.024	Sediment	18800	16.1	<0.01
10	MAR00599.025	Sediment	28200	29.3	0.01
11	MAR00599.026	Sediment	40800	42.1	0.06
16	MAR00599.027	Sediment	43000	44.5	0.04
17	MAR00599.028	Sediment	44400	46.5	0.08
18	MAR00599.029	Sediment	44200	45.6	0.06
31	MAR00599.030	Sediment	36000	36.8	0.11
DC03A	MAR00599.031	Sediment	36600	36.7	0.04
DC04	MAR00599.032	Sediment	36500	37.4	0.18
DC05	MAR00599.033	Sediment	20500	16.9	<0.01
DC06	MAR00599.034	Sediment	16000	13.6	<0.01
DC07	MAR00599.035	Sediment	13700	12.5	<0.01
		Certified Reference Material 2702 (% Recovery)	100	94	-
		Certified Reference Material 2702 (Result)	84400	73	-
		Certified Reference Material 1646a (% Recovery)		-	0.01
		Certified Reference Material 1646a (Result)	-	-	25
		QA/QC In-House Refernece Material (% Recovery)	108	99	101
		QC Blank	<10	<0.5	<0.01

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
2	MAR00599.001	Sediment	16.1	16.2
3	MAR00599.002	Sediment	43.3	56.9
4	MAR00599.003	Sediment	12.4	22.4
5	MAR00599.004	Sediment	15.4	33.4
12	MAR00599.005	Sediment	11.0	10.9
13	MAR00599.006	Sediment	<5	14.4
14	MAR00599.007	Sediment	<5	<5
15	MAR00599.008	Sediment	<5	<5
19	MAR00599.009	Sediment	<5	<5
20	MAR00599.010	Sediment	20.0	13.0
22	MAR00599.011	Sediment	<5	<5
23	MAR00599.012	Sediment	<5	<5
24	MAR00599.013	Sediment	<5	<5
25	MAR00599.014	Sediment	<5	<5
26	MAR00599.015	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			97	81
Certified Reference Material BCR-646			743	389
QC Blank			<1	<1

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
27	MAR00599.016	Sediment	<5	<5
28	MAR00599.017	Sediment	<5	<5
29	MAR00599.018	Sediment	<5	<5
32	MAR00599.019	Sediment	<5	<5
1	MAR00599.020	Sediment	19.0	28.4
6	MAR00599.021	Sediment	<5	18.1
7	MAR00599.022	Sediment	<5	18.7
8	MAR00599.023	Sediment	16.4	63.6
9	MAR00599.024	Sediment	<5	<5
10	MAR00599.025	Sediment	<5	<5
11	MAR00599.026	Sediment	<5	23.4
16	MAR00599.027	Sediment	<5	<5
17	MAR00599.028	Sediment	<5	<5
18	MAR00599.029	Sediment	<5	<5
31	MAR00599.030	Sediment	12.7	34.7
DC03A	MAR00599.031	Sediment	<5	<5
DC04	MAR00599.032	Sediment	<5	<5
		Certified Reference Material BCR-646 (% Recovery)	84	72
		Certified Reference Material BCR-646	649	345
		QC Blank	<1	<1

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
DC05	MAR00599.033	Sediment	<5	<5
DC06	MAR00599.034	Sediment	<5	<5
DC07	MAR00599.035	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			103	81
Certified Reference Material BCR-646			797	390
QC Blank			<1	<1

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
2	MAR00599.001	Sediment	46.2	40.8	95.0	193	269	271
3	MAR00599.002	Sediment	43.9	91.7	123	308	432	380
4	MAR00599.003	Sediment	45.2	104	135	329	427	409
5	MAR00599.004	Sediment	89.3	432	531	1340	1580	1070
12	MAR00599.005	Sediment	30.6	51.9	70.5	176	226	222
13	MAR00599.006	Sediment	15.2	47.9	37.6	101	145	153
14	MAR00599.007	Sediment	20.3	59.4	45.2	116	167	148
15	MAR00599.008	Sediment	20.2	94.2	82.4	235	319	256
19	MAR00599.009	Sediment	2.69	3.01	6.21	17.2	22.6	24.9
20	MAR00599.010	Sediment	38.4	72.3	111	283	361	349
Certified Reference Material CRM180013 1941b (% Recovery)			70	100	68	64	56	90
Certified Reference Material CRM180013 1941b			27	53	125	214	200	408
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

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Test Report ID MAR00599
Issue Version 3
Customer Reference Dublin Port

		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	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
2	MAR00599.001	Sediment	184	103	217	42.3	353	65.0
3	MAR00599.002	Sediment	302	178	250	69.6	468	86.9
4	MAR00599.003	Sediment	294	207	265	68.0	533	99.7
5	MAR00599.004	Sediment	818	620	1240	203	1700	285
12	MAR00599.005	Sediment	163	93.3	183	32.8	275	59.6
13	MAR00599.006	Sediment	117	65.4	124	27.4	145	49.0
14	MAR00599.007	Sediment	123	75.3	139	26.5	160	50.4
15	MAR00599.008	Sediment	207	120	248	52.5	261	64.6
19	MAR00599.009	Sediment	15.6	10.8	22.0	3.73	23.5	4.40
20	MAR00599.010	Sediment	264	126	308	55.3	412	78.3
Certified Reference Material CRM180013 1941b (% Recovery)			69	90	88	110	79	52
Certified Reference Material CRM180013 1941b			212	203	256	58	514	44
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
2	MAR00599.001	Sediment	184	44.5	248	436	277000
3	MAR00599.002	Sediment	302	80.8	222	698	1070000
4	MAR00599.003	Sediment	299	91.2	247	642	644000
5	MAR00599.004	Sediment	823	179	378	2800	1170000
12	MAR00599.005	Sediment	171	53.0	150	309	489000
13	MAR00599.006	Sediment	120	54.9	95.5	181	357000
14	MAR00599.007	Sediment	121	53.5	104	220	387000
15	MAR00599.008	Sediment	202	57.2	141	385	433000
19	MAR00599.009	Sediment	14.9	5.02	10.4	33.1	81800
20	MAR00599.010	Sediment	257	77.4	230	460	819000
Certified Reference Material CRM180013 1941b (% Recovery)			67	60	75	69	94~
Certified Reference Material CRM180013 1941b			228	509	305	401	
QC Blank			<1	<1	<1	<1	<100

For full analyte name see method summaries

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
22	MAR00599.011	Sediment	45.2	36.7	100	298	292	269
23	MAR00599.012	Sediment	18.0	35.6	53.7	145	202	189
24	MAR00599.013	Sediment	16.0	49.2	66.9	162	266	243
25	MAR00599.014	Sediment	9.36	28.2	35.0	94.4	137	122
26	MAR00599.015	Sediment	15.0	31.9	43.9	112	155	146
27	MAR00599.016	Sediment	12.2	29.9	44.0	126	162	158
28	MAR00599.017	Sediment	12.4	32.7	48.5	123	175	170
29	MAR00599.018	Sediment	13.5	49.0	66.8	141	205	205
32	MAR00599.019	Sediment	9.23	14.2	21.7	115	229	253
1	MAR00599.020	Sediment	32.4	77.7	120	334	448	403
6	MAR00599.021	Sediment	15.2	51.9	76.7	198	278	241
7	MAR00599.022	Sediment	19.6	40.7	81.3	173	252	212
8	MAR00599.023	Sediment	17.1	86.4	107	265	404	317
9	MAR00599.024	Sediment	9.11	41.3	60.4	103	213	174
10	MAR00599.025	Sediment	14.0	38.5	52.2	115	183	168
11	MAR00599.026	Sediment	24.0	63.8	88.3	215	288	252
16	MAR00599.027	Sediment	12.4	39.6	45.6	139	197	167
17	MAR00599.028	Sediment	18.4	121	100	276	387	304
18	MAR00599.029	Sediment	20.9	41.9	48.7	137	215	196
Certified Reference Material CRM180013 1941b (% Recovery)			70	100	65	66	60	90
Certified Reference Material CRM180013 1941b			27	53	120	221	215	408
QC Blank			<1	<1	<1	<1	<1	<1

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For full analyte name see method summaries

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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	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
22	MAR00599.011	Sediment	174	138	314	45.3	593	51.7
23	MAR00599.012	Sediment	159	94.8	170	34.1	229	36.7
24	MAR00599.013	Sediment	197	134	181	44.5	219	45.6
25	MAR00599.014	Sediment	115	70.5	115	23.2	153	25.9
26	MAR00599.015	Sediment	128	71.9	133	27.9	165	30.9
27	MAR00599.016	Sediment	129	82.2	143	25.7	179	32.0
28	MAR00599.017	Sediment	144	84.4	145	27.9	180	35.7
29	MAR00599.018	Sediment	163	91.7	164	35.1	190	39.9
32	MAR00599.019	Sediment	212	108	186	50.4	185	17.9
1	MAR00599.020	Sediment	333	201	368	70.6	519	69.1
6	MAR00599.021	Sediment	196	127	207	44.8	301	43.0
7	MAR00599.022	Sediment	166	126	185	33.1	259	40.8
8	MAR00599.023	Sediment	271	160	245	56.8	283	57.7
9	MAR00599.024	Sediment	138	72.0	113	28.1	118	30.5
10	MAR00599.025	Sediment	136	76.9	123	31.6	146	40.1
11	MAR00599.026	Sediment	212	113	232	48.7	327	63.3
16	MAR00599.027	Sediment	150	102	195	34.0	211	35.9
17	MAR00599.028	Sediment	261	176	291	63.9	296	68.7
18	MAR00599.029	Sediment	158	108	168	37.0	195	41.0
Certified Reference Material CRM180013 1941b (% Recovery)			67	85	87	99	79	54
Certified Reference Material CRM180013 1941b			206	191	253	52	514	46
QC Blank			<1	<1	<1	<1	<1	<1

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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	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
22	MAR00599.011	Sediment	182	86.5	355	546	366000
23	MAR00599.012	Sediment	148	47.3	139	295	292000
24	MAR00599.013	Sediment	197	55.5	135	333	498000
25	MAR00599.014	Sediment	110	36.6	82.4	175	520000
26	MAR00599.015	Sediment	128	45.7	107	199	337000
27	MAR00599.016	Sediment	132	50.7	110	222	385000
28	MAR00599.017	Sediment	144	58.6	117	215	351000
29	MAR00599.018	Sediment	160	58.5	123	240	403000
32	MAR00599.019	Sediment	218	22.3	71.2	193	281000
1	MAR00599.020	Sediment	323	71.6	270	603	385000
6	MAR00599.021	Sediment	203	40.7	155	354	598000
7	MAR00599.022	Sediment	169	36.1	131	378	312000
8	MAR00599.023	Sediment	283	59.2	139	510	372000
9	MAR00599.024	Sediment	141	28.0	74.5	255	267000
10	MAR00599.025	Sediment	132	36.5	88.4	232	342000
11	MAR00599.026	Sediment	215	63.9	160	421	367000
16	MAR00599.027	Sediment	158	43.2	118	258	437000
17	MAR00599.028	Sediment	271	67.6	154	459	443000
18	MAR00599.029	Sediment	171	62.7	154	249	526000
Certified Reference Material CRM180013 1941b (% Recovery)			69	62	76	72	102~
Certified Reference Material CRM180013 1941b			235	526	309	418	
QC Blank			<1	<1	<1	<1	<100

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
31	MAR00599.030	Sediment	21.4	78.3	100	230	352	302
DC03A	MAR00599.031	Sediment	28.3	146	133	383	522	383
DC04	MAR00599.032	Sediment	46.8	83.9	167	395	472	449
DC05	MAR00599.033	Sediment	7.83	7.44	19.1	38.7	49.9	54.7
DC06	MAR00599.034	Sediment	1.63	2.86	6.11	9.36	17.0	18.6
DC07	MAR00599.035	Sediment	1.22	1.84	4.05	5.50	7.75	10.8
Certified Reference Material CRM180013 1941b (% Recovery)			70	96	68	65	60	90
Certified Reference Material CRM180013 1941b			27	51	125	218	215	408
QC Blank			<1	<1	<1	<1	<1	<1

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
31	MAR00599.030	Sediment	251	159	236	56.8	294	57.9
DC03A	MAR00599.031	Sediment	322	180	395	76.6	398	86.1
DC04	MAR00599.032	Sediment	370	260	459	75.1	669	94.0
DC05	MAR00599.033	Sediment	36.6	20.0	49.9	8.70	67.0	11.5
DC06	MAR00599.034	Sediment	15.3	10.1	13.2	3.67	13.3	4.42
DC07	MAR00599.035	Sediment	7.67	6.45	6.87	1.78	8.37	2.95
		Certified Reference Material CRM180013 1941b (% Recovery)	73	94	90	100	84	49
		Certified Reference Material CRM180013 1941b	224	212	262	53	547	42
		QC Blank	<1	<1	<1	<1	<1	<1

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Test Report ID	MAR00599
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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)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
31	MAR00599.030	Sediment	259	56.6	164	425	615000
DC03A	MAR00599.031	Sediment	336	61.2	199	660	517000
DC04	MAR00599.032	Sediment	383	133	247	787	961000
DC05	MAR00599.033	Sediment	38.1	14.4	43.8	104	124000
DC06	MAR00599.034	Sediment	16.2	8.89	13.0	16.5	35300
DC07	MAR00599.035	Sediment	8.33	3.76	6.92	11.1	18900
Certified Reference Material CRM180013 1941b (% Recovery)			72	58	73	75	95~
Certified Reference Material CRM180013 1941b			246	492	296	436	
QC Blank			<1	<1	<1	<1	<100

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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	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
2	MAR00599.001	Sediment	0.93	0.53	0.40	0.50	0.47	0.47	0.22
3	MAR00599.002	Sediment	1.44	0.95	1.00	1.14	1.27	1.24	0.53
4	MAR00599.003	Sediment	2.53	2.03	1.23	1.30	1.29	1.47	0.64
5	MAR00599.004	Sediment	1.89	1.39	1.19	1.40	1.64	1.79	0.81
12	MAR00599.005	Sediment	0.87	0.55	0.37	0.44	0.47	0.48	0.25
13	MAR00599.006	Sediment	0.60	0.39	0.26	0.34	0.34	0.38	0.19
14	MAR00599.007	Sediment	0.22	0.16	0.10	0.13	0.14	0.14	<0.08
15	MAR00599.008	Sediment	0.57	0.40	0.28	0.38	0.36	0.41	0.21
19	MAR00599.009	Sediment	0.17	0.11	<0.08	<0.08	<0.08	<0.08	<0.08
20	MAR00599.010	Sediment	1.55	1.10	0.99	1.17	0.93	1.08	0.47
22	MAR00599.011	Sediment	0.41	0.30	0.19	0.20	0.24	0.26	0.10
23	MAR00599.012	Sediment	1.21	0.80	0.52	0.73	0.66	0.71	0.41
24	MAR00599.013	Sediment	1.34	0.76	0.72	0.91	1.17	1.21	0.68
25	MAR00599.014	Sediment	1.08	0.66	0.48	0.69	0.60	0.74	0.38
26	MAR00599.015	Sediment	0.71	0.46	0.34	0.45	0.51	0.55	0.29
27	MAR00599.016	Sediment	0.73	0.44	0.36	0.46	0.47	0.51	0.24
28	MAR00599.017	Sediment	0.99	0.68	0.46	0.67	0.61	0.69	0.37
29	MAR00599.018	Sediment	0.94	0.59	0.39	0.49	0.52	0.58	0.31
32	MAR00599.019	Sediment	0.31	0.23	0.13	0.19	0.19	0.17	<0.08
		Certified Reference Material SRM 1941b (% Recovery)	66	90	85	96	120	90	83
		Certified Reference Material SRM 1941b (Result)	2.98	4.75	4.43	4.04	4.33	4.95	2.70
		QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

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Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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)	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	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	UKAS	UKAS	N	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
2	MAR00599.001	Sediment	<0.1	<0.1	0.14	<0.1	0.12	0.31	0.12	0.67
3	MAR00599.002	Sediment	<0.1	<0.1	<0.1	0.48	0.26	0.62	0.25	1.73
4	MAR00599.003	Sediment	<0.1	<0.1	<0.1	0.84	<0.1	1.12	0.19	3.95
5	MAR00599.004	Sediment	<0.1	<0.1	0.11	0.46	0.19	0.80	0.15	2.68
12	MAR00599.005	Sediment	<0.1	<0.1	<0.1	0.32	0.10	0.38	<0.1	1.15
13	MAR00599.006	Sediment	<0.1	<0.1	<0.1	0.29	0.10	0.53	0.11	1.55
14	MAR00599.007	Sediment	<0.1	<0.1	<0.1	0.12	<0.1	0.17	<0.1	0.69
15	MAR00599.008	Sediment	<0.1	<0.1	<0.1	0.36	0.10	0.55	<0.1	2.18
19	MAR00599.009	Sediment	<0.1	<0.1	<0.1	0.10	<0.1	0.08	<0.1	0.35
20	MAR00599.010	Sediment	<0.1	<0.1	<0.1	1.27	<0.1	1.03	0.12	3.21
22	MAR00599.011	Sediment	<0.1	<0.1	<0.1	0.29	<0.1	0.27	<0.1	0.96
23	MAR00599.012	Sediment	<0.1	<0.1	<0.1	0.71	0.15	0.65	0.38	2.73
24	MAR00599.013	Sediment	<0.1	<0.1	<0.1	0.47	0.10	0.72	0.20	2.64
25	MAR00599.014	Sediment	<0.1	<0.1	<0.1	0.71	0.11	0.62	0.31	3.00
26	MAR00599.015	Sediment	<0.1	<0.1	<0.1	0.41	0.11	0.49	<0.1	2.03
27	MAR00599.016	Sediment	<0.1	<0.1	<0.1	0.35	0.12	0.51	<0.1	2.02
28	MAR00599.017	Sediment	<0.1	<0.1	<0.1	0.42	0.14	0.53	0.15	3.07
29	MAR00599.018	Sediment	<0.1	<0.1	<0.1	0.52	0.14	0.50	<0.1	2.01
32	MAR00599.019	Sediment	<0.1	<0.1	<0.1	0.11	<0.1	0.20	<0.1	0.56
Certified Reference Material SRM 1941b (% Recovery)			83~	110~	83~	45~	99	74	101~	74
Certified Reference Material SRM 1941b (Result)							5.78	2.37		3.45
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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		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	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
1	MAR00599.020	Sediment	1.89	1.46	0.95	1.10	1.18	1.37	0.65
6	MAR00599.021	Sediment	1.69	1.12	0.79	0.93	0.84	1.01	0.45
7	MAR00599.022	Sediment	1.57	1.58	1.56	1.80	1.42	1.33	0.45
8	MAR00599.023	Sediment	2.59	1.80	1.65	1.58	3.19	3.80	2.44
9	MAR00599.024	Sediment	1.44	0.81	0.56	0.53	0.86	1.14	1.46
10	MAR00599.025	Sediment	1.09	0.62	0.42	0.52	0.48	0.55	0.26
11	MAR00599.026	Sediment	1.25	0.85	0.59	0.65	0.69	0.79	0.38
16	MAR00599.027	Sediment	0.76	0.58	0.36	0.43	0.37	0.51	0.28
17	MAR00599.028	Sediment	0.67	0.55	0.35	0.43	0.45	0.49	0.26
18	MAR00599.029	Sediment	0.67	0.55	0.31	0.43	0.41	0.41	0.19
31	MAR00599.030	Sediment	3.73	2.24	1.53	1.69	1.74	1.93	0.95
DC03A	MAR00599.031	Sediment	0.34	0.28	0.16	0.22	0.17	0.22	0.08
DC04	MAR00599.032	Sediment	5.39	4.31	2.08	2.54	2.02	2.42	1.33
DC05	MAR00599.033	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
DC06	MAR00599.034	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
DC07	MAR00599.035	Sediment	0.10	0.18	0.15	0.11	<0.08	0.09	<0.08
Certified Reference Material SRM 1941b (% Recovery)			71	87	88	103	109	96	83
Certified Reference Material SRM 1941b			3.23	4.56	4.50	4.36	3.93	5.28	2.71
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

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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	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		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)	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	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	N	UKAS	N	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
1	MAR00599.020	Sediment	<0.1	<0.1	0.18	1.74	0.28	0.93	0.21	5.04
6	MAR00599.021	Sediment	0.11	0.14	0.21	0.72	0.13	0.79	0.23	4.17
7	MAR00599.022	Sediment	<0.1	<0.1	<0.1	0.62	<0.1	0.52	<0.1	2.85
8	MAR00599.023	Sediment	<0.1	<0.1	<0.1	1.18	<0.1	1.30	0.11	7.16
9	MAR00599.024	Sediment	<0.1	<0.1	<0.1	0.51	<0.1	0.35	0.13	2.67
10	MAR00599.025	Sediment	<0.1	<0.1	<0.1	0.45	<0.1	0.47	<0.1	2.15
11	MAR00599.026	Sediment	<0.1	<0.1	<0.1	0.54	0.17	0.66	0.11	2.83
16	MAR00599.027	Sediment	<0.1	<0.1	<0.1	0.52	<0.1	0.87	0.31	5.47
17	MAR00599.028	Sediment	<0.1	<0.1	<0.1	0.87	0.10	0.77	0.25	4.42
18	MAR00599.029	Sediment	<0.1	<0.1	<0.1	0.66	0.13	0.51	0.29	2.13
31	MAR00599.030	Sediment	<0.1	<0.1	<0.1	1.31	<0.1	1.29	0.14	5.77
DC03A	MAR00599.031	Sediment	<0.1	<0.1	<0.1	0.29	<0.1	0.24	<0.1	1.06
DC04	MAR00599.032	Sediment	<0.1	<0.1	0.21	3.29	<0.1	3.16	0.15	10.2
DC05	MAR00599.033	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DC06	MAR00599.034	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DC07	MAR00599.035	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Certified Reference Material SRM 1941b (% Recovery)			125~	160~	145~	170~	114	90	76~	185
Certified Reference Material SRM 1941b							6.65	2.89		8.63
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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For full analyte name see method summaries

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

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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 MAR00599
Issue Version 3
Customer Reference Dublin Port

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*	MAR00599.001-035	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SOCOTEC Doncaster*	MAR00599.001-035	Analysis was conducted by an internal SOCOTEC laboratory.
SUB_01*	MAR00599.001-035	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR00599.005-009, .011-019, .021, .022, .024-.029, .031, .032-.035	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	MAR00599.001-035	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with Dieldrin and p,p'-Dichorodiphenyldichloroethane falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/302	MAR00599.020-035	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with beta-Hexachlorocyclohexane falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR00599.001-035	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	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

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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	MAR00599
Issue Version	3
Customer Reference	Dublin Port

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 120°C to constant weight.
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Carbonate	Air dried and ground	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Metals	Air dried and ground	Hydrofluoric Acid extraction followed by ICP analysis.
Mercury	Air dried and ground	Nitric/Peroxide digest followed by ICPMS 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.
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	CHRYSENE	Chrysene	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	DBENZAH	Dibenzo[ah]anthracene	AHCH	alpha-Hexachlorocyclohexane
ANTHRACN	Anthracene	FLUORANT	Fluoranthene	BHCH	beta-Hexachlorocyclohexane
BAA	Benzo[a]anthracene	FLUORENE	Fluorene	GHCH	gamma-Hexachlorocyclohexane
BAP	Benzo[a]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	NAPTH	Naphthalene	HCB	Hexachlorobenzene
BENZGHIP	Benzo[ghi]perylene	PHENANT	Phenanthrene	DDD	p,p'-Dichorodiphenyldichloroethane
BKF	Benzo[k]fluoranthene	PYRENE	Pyrene	DDE	p,p'-Dichorodiphenyldichloroethylene
				DDT	p,p'-Dichorodiphenyltrichloroethane

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Instructions

As part of an application for a Dumping at Sea (DAS) Permit, sediment chemistry results must be submitted using this form. When completing this form, please ensure that you:

* Complete all worksheets in full - i.e. sheets "2. Project Info", "3. Results" and "4. QA".
* Report all results in the units specified (e.g. mg kg^{-1} versus μg kg^{-1}).
* Do not alter the format of this spreadsheet by changing units, by moving columns or by inserting new columns amongst the existing used columns.
* Insert additional rows as necessary at the end of the existing rows in sheet. "3 Results"
* Insert other determinants as necessary in the empty columns to the right in sheet. "3 Results".
* Any additional information should be included as inserted comments or in the Notes column in sheet. "3 Results".
* Provide a brief description of methodology used in sheet "2. Project Info".
* Enter the measured value (as well as the certified value) for Certified Reference material in sheet "4. QA"
* If in-house reference material is used, insert the measured value and the range normally achieved.
* Refer to the Dumping at Sea Application Form Guidance Note for further relevant information: http://www.epa.ie/downloads/forms/lic/das/name,30267,en.html

Key	
Location	Name of area e.g. Cork Harbour, Dublin Bay
CRMs	Certified reference materials used in analyses for metals, organics & TBT
Fraction analysed	Specify which fraction of sediment was analysed. < 2mm is requested, but some labs use < 63um
Analysing laboratory	Main laboratory where samples were sent to for analysis
Sub-contract lab	Sub-contracted laboratory where samples were sent by main laboratory
Sample ID code	Sample number assigned by sampler
Lab Report ID	Code assigned by analysing laboratory
Position (dd.ddd)	Give lat/long coordinates in decimal degrees (dd.dddd) of the position from where the sample was taken. List also the datum & projection.
Sampling depth (m)	The depth below the seabed surface at which the sample was collected.
<2mm	Grain size % < 2mm
<63um	Grain size % < 63mm
OC	Organic carbon (NOT organic matter)
Cd	Cadmium mg/kg
Hg	Mercury mg/kg
As	Arsenic **mg/kg**
Cr	Chromium mg/kg
Cu	Copper mg/kg
Pb	Lead mg/kg
Ni	Nickel mg/kg
Zn	Zinc mg/kg
TEH	Total extractable hydrocarbons g/kg
ΣPAH16	Sum of USEPA 16 PAH - acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]flouranthene, benzo[a]pyrene, benzo[ghi]perylene, chrysene, dibenz(ah)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene,
ΣPCB7	Sum of the seven ICES polychlorinated biphenyls: PCB 028, PCB 052, PCB 101, PCB 138, BCB 153, PCB 180, PCB 118.
HCB	Hexachlorobenzene
γ-HCH	γ-Hexachlorocyclohexane (Lindane)
p,p' DDT	pp DDT ug/kg
p,p' DDD	pp DDD ug/kg
p,p' DDE	pp DDE ug/kg
TBT	TBT (mg/kg)
DBT	DBT (mg/kg)

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1. General Information	Applicant (company name)	
	Location (port/harbour)	
	Dredge Quantity (tonnes)	
	Permit Application Reg. No. (to be assigned by EPA)	
2. Survey Information	Survey Company	Hydromaster
	Sampling Date	15th and 16th of April 2020
	Analysing Laboratory	Socotec
	Sub Contract Lab	
	Analysis Date	11th May 2020
3. Methods Information	Fraction analysed	
	Water content of sample (reported as %)	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
	Are results reported as wet weight or dry weight?	Dry Weight
	Granulometry method	Wet and dry sieving followed by laser diffraction analysis.
	TEH method	Solvent extraction and clean up followed by GC-FID analysis.
	Organic carbon (OC) method	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
	Metals (incl. mercury & arsenic) extraction type	Hydrofluoric Acid extraction.
	Methods of detection (metals, incl. mercury & arsenic)	ICP analysis.
	Organics extraction types	Solvent extraction and derivatisation followed by GC-MS analysis.

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Methods of detection (PCBs / PAHs / TBT / DBT)	Solvent extraction and clean up followed by GC-MS-MS analysis.

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EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed m	Lab Report ID	Sample appearance (e.g. colour, texture, signs of life)
new 1	Hydromaster	Dublin Port	16/04/2020	new 1	53.34479	-6.22156	Surface	MAR00599.020	Grey sandy silty CLAY
new 2	Hydromaster	Dublin Port	15/04/2020	new 2	53.34395	-6.22057	Surface	MAR00599.001	Grey slightly sandy silty CLAY
new 3	Hydromaster	Dublin Port	15/04/2020	new 3	53.34391	-6.2186	Surface	MAR00599.002	Grey sandy SILT
new 4	Hydromaster	Dublin Port	15/04/2020	new 4	53.34573	-6.2194	Surface	MAR00599.003	Grey slightly sandy silty CLAY
new 5	Hydromaster	Dublin Port	15/04/2020	new 5	53.34561	-6.21733	Surface	MAR00599.004	Grey sandy SILT
new 6	Hydromaster	Dublin Port	16/04/2020	new 6	53.34478	-6.21758	Surface	MAR00599.021	Grey slightly sandy silty CLAY
new 7	Hydromaster	Dublin Port	16/04/2020	new 7	53.34554	-6.21537	Surface	MAR00599.022	Grey sandy clayey SILT
new 8	Hydromaster	Dublin Port	16/04/2020	new 8	53.34497	-6.21332	Surface	MAR00599.023	Grey slightly sandy slightly gravelly silty CLAY
new 9	Hydromaster	Dublin Port	16/04/2020	new 9	53.34441	-6.21042	Surface	MAR00599.024	Grey sandy silty CLAY
new 10	Hydromaster	Dublin Port	16/04/2020	new 10	53.34426	-6.20714	Surface	MAR00599.025	Grey slightly sandy silty CLAY
new 11	Hydromaster	Dublin Port	16/04/2020	new 11	53.34414	-6.21353	Surface	MAR00599.026	Grey slightly sandy silty CLAY
new 12	Hydromaster	Dublin Port	15/04/2020	new 12	53.34343	-6.20728	Surface	MAR00599.005	Grey slightly sandy silty CLAY
new 13	Hydromaster	Dublin Port	15/04/2020	new 13	53.34315	-6.20445	Surface	MAR00599.006	Grey slightly sandy silty CLAY

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EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed m	Lab Report ID	Sample appearance (e.g. colour, texture, signs of life)
new 14	Hydromaster	Dublin Port	15/04/2020	new 14	53.34294	-6.20152	Surface	MAR00599.007	Grey sandy SILT
new 15	Hydromaster	Dublin Port	15/04/2020	new 15	53.34262	-6.19859	Surface	MAR00599.008	Grey sandy silty CLAY
new 16	Hydromaster	Dublin Port	16/04/2020	new 16	53.34217	-6.18777	Surface	MAR00599.027	Grey sandy SILT
new 17	Hydromaster	Dublin Port	16/04/2020	new 17	53.34223	-6.18673	Surface	MAR00599.028	Grey sandy SILT
new 18	Hydromaster	Dublin Port	16/04/2020	new 18	53.34211	-6.1858	Surface	MAR00599.029	Grey slightly sandy silty CLAY, small ragworms and oil sheen observed on surface
new 19	Hydromaster	Dublin Port	15/04/2020	new 19	53.34496	-6.19467	Surface	MAR00599.009	Grey slightly gravelly silty SAND
new 20	Hydromaster	Dublin Port	15/04/2020	new 20	53.34585	-6.19806	Surface	MAR00599.010	Grey slightly gravelly sandy SILT
new 21	Hydromaster	Dublin Port	15/04/2020	new 21	53.34593	-6.19903	Surface	N/A	Very large rocks only in the localised area. No suitable sample was able to be
new 22	Hydromaster	Dublin Port	15/04/2020	new 22	53.34697	-6.19988	Surface	MAR00599.011	Grey sandy SILT
new 23	Hydromaster	Dublin Port	15/04/2020	new 23	53.34612	-6.20411	Surface	MAR00599.012	Grey slightly sandy silty CLAY
new 24	Hydromaster	Dublin Port	15/04/2020	new 24	53.34693	-6.20394	Surface	MAR00599.013	Grey sandy clayey SILT
new 25	Hydromaster	Dublin Port	15/04/2020	new 25	53.34689	-6.20492	Surface	MAR00599.014	Grey slightly sandy silty CLAY
new 26	Hydromaster	Dublin Port	15/04/2020	new 26	53.34609	-6.20505	Surface	MAR00599.015	Grey slightly sandy silty CLAY

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EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed m	Lab Report ID	Sample appearance (e.g. colour, texture, signs of life)
new 27	Hydromaster	Dublin Port	15/04/2020	new 27	53.34642	-6.20626	Surface	MAR00599.016	Grey sandy silty CLAY
new 28	Hydromaster	Dublin Port	15/04/2020	new 28	53.34602	-6.20703	Surface	MAR00599.017	Grey slightly sandy silty CLAY
new 29	Hydromaster	Dublin Port	15/04/2020	new 29	53.34692	-6.20827	Surface	MAR00599.018	Grey sllightly sandy slightly gravelly silty CLAY
new 30	Hydromaster	Dublin Port	15/04/2020	new 30	53.34695	-6.21063	Surface	N/A	Very large rocks only in the localised area. No suitable sample was able to be collected from within the 10m
new 31	Hydromaster	Dublin Port	16/04/2020	new 31	53.34601	-6.20865	Surface	MAR00599.030	Grey sandy clayey SILT
new 32	Hydromaster	Dublin Port	15/04/2020		53.34596	-6.19958	Surface	MAR00599.019	Grey sllightly sandy slightly gravelly silty CLAY
DC03A	Hydromaster	Dublin Port	16/04/2020	DC03A	53.3432	-6.19116	Surface	MAR00599.031	Grey slightly sandy silty CLAY
DC04	Hydromaster	Dublin Port	16/04/2020	DC04	53.34369	-6.18346	Surface	MAR00599.032	Grey sandy SILT
DC05	Hydromaster	Dublin Port	16/04/2020	DC05	53.34332	-6.14829	Surface	MAR00599.033	Grey silty SAND
DC06	Hydromaster	Dublin Port	16/04/2020	DC06	53.33608	-6.08881	Surface	MAR00599.034	Grey slightly gravelly silty SAND
DC07	Hydromaster	Dublin Port	16/04/2020	DC07	53.33274	-6.08881	Surface	MAR00599.035	Light brown SAND

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EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	% Moisture	Particle size >2mm %	Particle size <2mm >63um %	Partic+B:Nle size <63um %	OC %	Carbonate %	Dry solids %	Al mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Cu mg kg^{-1}	Pb mg kg^{-1}	Ni mg kg^{-1}
new 1	69.2	0	18.3	81.7	3.62	3.64	30.8	38900	1.2	0.17	16.4	79.7	45.1	70	33.1
new 2	41.8	1.8	52.4	45.8	1.08	1.68	58.2	23900	0.9	0.02	23.7	95.6	39.2	50.4	17.3
new 3	58.2	0	27	73	2.3	3.24	41.8	30100	1.1	0.04	34.8	79.7	42	61.8	25.6
new 4	49.8	1	25.4	73.7	2.38	3.28	50.2	35800	1.3	0.07	36.3	77.2	38.1	71.2	33.1
new 5	49.5	3.1	37.7	59.2	1.94	3.68	50.5	31000	1.1	0.07	35.4	85.8	32.2	53.9	30.1
new 6	56.6	8.1	35.6	56.3	1.49	3.84	43.4	32300	0.9	0.09	12.8	98	27.5	48.9	25.4
new 7	40.2	21.2	50.4	28.3	2.58	3.88	59.8	26600	0.7	0.07	13.1	111	23.6	110	20
new 8	47.8	7.7	32.3	60	1.69	4.24	52.2	35100	1.2	0.11	17.1	101	28.9	78	27
new 9	20.1	81.8	8.9	9.2	0.44	5.44	79.9	18800	1.2	<0.01	16.2	103	15.7	10.6	33.2
new 10	53.2	23.2	26.2	50.7	1.11	6.08	46.8	28200	0.9	0.01	14.9	82.3	22.8	29.8	24.3
new 11	62.8	0	24	76	2.16	3.72	37.2	40800	1.1	0.06	18	90	62.3	51.8	29.2
new 12	49.1	1.2	29.9	69	1.46	3.96	50.9	34000	1	0.02	32.7	81.1	34.6	35	34.1
new 13	57.2	0.1	26.5	73.4	1.67	3.8	42.8	33000	0.9	0.01	28.7	78	37.9	32	43

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EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	% Moisture	Particle size >2mm %	Particle size <2mm >63um %	Partic+B:Nle size <63um %	OC %	Carbonate %	Dry solids %	Al mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Cu mg kg^{-1}	Pb mg kg^{-1}	Ni mg kg^{-1}
new 14	52.9	5.1	31.9	63	1.33	4.92	47.1	30700	1.3	0.01	24.9	81.8	22.3	26.4	32.3
new 15	56.1	0	26.1	73.9	1.59	3.32	43.9	35300	0.9	0.06	19.5	78.3	26.1	33.6	30.6
new 16	62	0	20.2	79.8	1.89	3.36	38	43000	0.8	0.04	15.6	81.4	34.1	39.5	28
new 17	70.4	0	18.1	81.9	2.08	3.04	29.6	44400	0.9	0.08	14.3	94.8	34	43.6	29.1
new 18	69.9	0	20.5	79.5	2.06	3.36	30.1	44200	0.9	0.06	11.3	80.8	29	41.6	28.6
new 19	27.3	25.3	65.4	9.3	0.81	6.76	72.7	11700	0.6	<0.01	14.6	91.6	19.9	15.2	24.7
new 20	43	9.8	31	59.2	1.11	4	57	28100	0.9	0.02	14.6	83	24.7	39.7	29.2
new 21															
new 22	48	8.9	43.6	47.4	1	4.16	52	26500	1.1	0.01	13.8	86.5	42.5	24.4	27
new 23	63.6	0	16.2	83.8	2.11	3.36	36.4	40700	0.9	0.05	15.8	85.1	39.9	44.8	35.6
new 24	60.5	1.1	11.8	87.1	1.97	3.96	39.5	43300	1	0.04	12.7	78.8	47.8	57.2	36
new 25	61.5	0.3	17.5	82.2	2.06	3.52	38.5	38000	1.1	0.05	17.4	81.9	34.6	41.9	33
new 26	61.6	0.4	21.8	77.9	1.92	3.72	38.4	41200	0.9	0.04	21.4	78.8	30	36.8	32.8

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EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	% Moisture	Particle size >2mm %	Particle size <2mm >63um %	Partic+B:Nle size <63um %	OC %	Carbonate %	Dry solids %	Al mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Cu mg kg^{-1}	Pb mg kg^{-1}	Ni mg kg^{-1}
new 27	64.8	0.1	17.5	82.4	1.9	3.96	35.2	40100	0.9	0.03	19.1	81.3	31.9	38.7	33.1
new 28	62	0.2	21.3	78.5	1.85	3.36	38	38300	0.9	0.05	19.9	77.9	32.5	40.6	32.1
new 29	61.1	0.1	22.8	77.1	1.85	3.44	38.9	36900	1	0.02	18	78.3	31.1	39.4	31.9
new 30															
new 31	47.8	3.9	28.5	67.6	1.63	3.76	52.2	36000	0.9	0.11	10.9	85.7	29.3	48.5	26.5
new 32	45.7	43.6	24.8	31.6	0.79	6.04	54.3	19100	0.8	<0.01	10.7	88.9	46.3	18.6	28.4
DC03A	62.4	0	32.4	67.6	1.35	3.2	37.6	36600	0.7	0.04	9.7	78.9	24.4	31.4	24.3
DC04	48.1	0	38.6	61.4	1.74	3.24	51.9	36500	1	0.18	10.8	76.5	28	65.6	26.4
DC05	42.3	0.5	91.9	7.6	0.24	2.32	57.7	20500	0.2	<0.01	6.1	82.9	6.8	11.7	10.3
DC06	31.9	0.9	94.1	5.1	0.13	2.16	68.1	16000	0.3	<0.01	9	105	6.4	9.7	9.7
DC07	27.3	0.2	97	2.9	0.11	1.84	72.7	13700	0.3	<0.01	10.8	106	6.1	9.9	8.5

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Sample ID code	Zn mg kg^{-1}	TEH g kg^{-1}	HCB (ug kg-1)	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	TBT mg kg^{-1}	DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}
new 1	252	0.3850	0.28	0.18	0.21	5.04	0.93	1.74	0.0284	0.019	1.8900	1.4600	0.9500	1.1800
new 2	118	0.2770	0.12	0.14	0.12	0.67	0.31	<0.1	0.016228	0.016086	0.9300	0.5300	0.4000	0.4700
new 3	201	1.0700	0.26	<0.1	0.25	1.73	0.62	0.48	0.056911	0.043275	1.4400	0.9500	1.0000	1.2700
new 4	183	0.6440	<0.1	<0.1	0.19	3.95	1.12	0.84	0.022375	0.012421	2.5300	2.0300	1.2300	1.2900
new 5	149	1.1700	0.19	0.11	0.15	2.68	0.8	0.46	0.033381	0.015365	1.8900	1.3900	1.1900	1.6400
new 6	136	0.5980	0.13	0.21	0.23	4.17	0.79	0.72	0.0181	<0.005	1.6900	1.1200	0.7900	0.8400
new 7	117	0.3120	<0.1	<0.1	<0.1	2.85	0.52	0.62	0.0187	<0.005	1.5700	1.5800	1.5600	1.4200
new 8	145	0.3720	<0.1	<0.1	0.11	7.16	1.3	1.18	0.0636	0.0164	2.5900	1.8000	1.6500	3.1900
new 9	62	0.2670	<0.1	<0.1	0.13	2.67	0.35	0.51	<0.005	<0.005	1.4400	0.8100	0.5600	0.8600
new 10	116	0.3420	<0.1	<0.1	<0.1	2.15	0.47	0.45	<0.005	<0.005	1.0900	0.6200	0.4200	0.4800
new 11	151	0.3670	0.17	<0.1	0.11	2.83	0.66	0.54	0.0234	<0.005	1.2500	0.8500	0.5900	0.6900
new 12	124	0.4890	0.1	<0.1	<0.1	1.15	0.38	0.32	0.01093	0.010994	0.8700	0.5500	0.3700	0.4700
new 13	117	0.3570	0.1	<0.1	0.11	1.55	0.53	0.29	0.01439	<0.005	0.6000	0.3900	0.2600	0.3400

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Sample ID code	Zn mg kg^{-1}	TEH g kg^{-1}	HCB (ug kg-1)	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	TBT mg kg^{-1}	DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}
new 14	103	0.3870	<0.1	<0.1	<0.1	0.69	0.17	0.12	<0.005	<0.005	0.2200	0.1600	0.1000	0.1400
new 15	112	0.4330	0.1	<0.1	<0.1	2.18	0.55	0.36	<0.005	<0.005	0.5700	0.4000	0.2800	0.3600
new 16	127	0.4370	<0.1	<0.1	0.31	5.47	0.87	0.52	<0.005	<0.005	0.7600	0.5800	0.3600	0.3700
new 17	154	0.4430	0.1	<0.1	0.25	4.42	0.77	0.87	<0.005	<0.005	0.6700	0.5500	0.3500	0.4500
new 18	133	0.5260	0.13	<0.1	0.29	2.13	0.51	0.66	<0.005	<0.005	0.6700	0.5500	0.3100	0.4100
new 19	95	0.0818	<0.1	<0.1	<0.1	0.35	0.08	0.1	<0.005	<0.005	0.1700	0.1100	<0.08	<0.08
new 20	121	0.8190	<0.1	<0.1	0.12	3.21	1.03	1.27	0.012957	0.019992	1.5500	1.1000	0.9900	0.9300
new 21														
new 22	99	0.3660	<0.1	<0.1	<0.1	0.96	0.27	0.29	<0.005	<0.005	0.4100	0.3000	0.1900	0.2400
new 23	150	0.2920	0.15	<0.1	0.38	2.73	0.65	0.71	<0.005	<0.005	1.2100	0.8000	0.5200	0.6600
new 24	176	0.4980	0.1	<0.1	0.2	2.64	0.72	0.47	<0.005	<0.005	1.3400	0.7600	0.7200	1.1700
new 25	143	0.5200	0.11	<0.1	0.31	3	0.62	0.71	<0.005	<0.005	1.0800	0.6500	0.4800	0.6000
new 26	129	0.3370	0.11	<0.1	<0.1	2.03	0.49	0.41	<0.005	<0.005	0.7100	0.4600	0.3400	0.5100

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Sample ID code	Zn mg kg^{-1}	TEH g kg^{-1}	HCB (ug kg-1)	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	TBT mg kg^{-1}	DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}
new 27	144	0.3850	0.12	<0.1	<0.1	2.02	0.51	0.35	<0.005	<0.005	0.7300	0.4400	0.3600	0.4700
new 28	141	0.3510	0.14	<0.1	0.15	3.07	0.53	0.42	<0.005	<0.005	0.9900	0.6800	0.4600	0.6100
new 29	134	0.4030	0.14	<0.1	<0.1	2.01	0.5	0.52	<0.005	<0.005	0.9400	0.5900	0.3900	0.5200
new 30		0.0000												
new 31	137	0.6150	<0.1	<0.1	0.14	5.77	1.29	7.31	0.0347	0.0127	3.7300	2.2400	1.5300	1.7400
new 32	92	0.2810	<0.1	<0.1	<0.1	0.56	0.2	0.11	<0.005	<0.005	0.3100	0.2300	0.1300	0.1900
DC03A	105	0.5170	<0.1	<0.1	<0.1	1.06	0.24	0.29	<0.005	<0.005	0.3400	0.2800	0.1600	0.1700
DC04	139	0.9610	<0.1	0.21	0.15	10.2	3.16	3.29	<0.005	<0.005	5.3900	4.3100	2.0800	2.0200
DC05	36	0.1240	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	<0.08	<0.08	<0.08	<0.08
DC06	37	0.0353	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	<0.08	<0.08	<0.08	<0.08
DC07	30	0.0189	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	0.1000	0.1800	0.1500	<0.08

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Sample ID code	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}
new 1	1.3700	0.6500	1.1000	32.40	77.70	120.00	334.00	448.00	403.00	333.00	201.00	368.00	70.60	69.10	519.00	323.00
new 2	0.4700	0.2200	0.5000	46.20	40.80	95.00	193.00	269.00	271.00	184.00	103.00	217.00	42.30	65.00	353.00	184.00
new 3	1.2400	0.5300	1.1400	43.90	91.70	123.00	308.00	432.00	380.00	302.00	178.00	250.00	69.60	86.90	468.00	302.00
new 4	1.4700	0.6400	1.3000	45.20	104.00	135.00	329.00	427.00	409.00	294.00	207.00	265.00	68.00	99.70	533.00	299.00
new 5	1.7900	0.8100	1.4000	89.30	432.00	531.00	1340.00	1580.00	1070.00	818.00	620.00	1240.00	203.00	285.00	1700.00	823.00
new 6	1.0100	0.4500	0.9300	15.20	51.90	76.70	198.00	278.00	241.00	196.00	127.00	207.00	44.80	43.00	301.00	203.00
new 7	1.3300	0.4500	1.8000	19.60	40.70	81.30	173.00	252.00	212.00	166.00	126.00	185.00	33.10	40.80	259.00	169.00
new 8	3.8000	2.4400	1.5800	17.10	86.40	107.00	265.00	404.00	317.00	271.00	160.00	245.00	56.80	57.70	283.00	283.00
new 9	1.1400	1.4600	0.5300	9.11	41.30	60.40	103.00	213.00	174.00	138.00	72.00	113.00	28.10	30.50	118.00	141.00
new 10	0.5500	0.2600	0.5200	14.00	38.50	52.20	115.00	183.00	168.00	136.00	76.90	123.00	31.60	40.10	146.00	132.00
new 11	0.7900	0.3800	0.6500	24.00	63.80	88.30	215.00	288.00	252.00	212.00	113.00	232.00	48.70	63.30	327.00	215.00
new 12	0.4800	0.2500	0.4400	30.60	51.90	70.50	176.00	226.00	222.00	163.00	93.30	183.00	32.80	59.60	275.00	171.00
new 13	0.3800	0.1900	0.3400	15.20	47.90	37.60	101.00	145.00	153.00	117.00	65.40	124.00	27.40	49.00	145.00	120.00

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Sample ID code	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}
new 14	0.1400	<0.08	0.1300	20.30	59.40	45.20	116.00	167.00	148.00	123.00	75.30	139.00	26.50	50.40	160.00	121.00
new 15	0.4100	0.2100	0.3800	20.20	94.20	82.40	235.00	319.00	256.00	207.00	120.00	248.00	52.50	64.60	261.00	202.00
new 16	0.5100	0.2800	0.4300	12.40	39.60	45.60	139.00	197.00	167.00	150.00	102.00	195.00	34.00	35.90	211.00	158.00
new 17	0.4900	0.2600	0.4300	18.40	121.00	100.00	276.00	387.00	304.00	261.00	176.00	291.00	63.90	68.70	296.00	271.00
new 18	0.4100	0.1900	0.4300	20.90	41.90	48.70	137.00	215.00	196.00	158.00	108.00	168.00	37.00	41.00	195.00	171.00
new 19	<0.08	<0.08	<0.08	2.69	3.01	6.21	17.20	22.60	24.90	15.60	10.80	22.00	3.73	4.40	23.50	14.90
new 20	1.0800	0.4700	1.1700	38.40	72.30	111.00	283.00	361.00	349.00	264.00	126.00	308.00	55.30	78.30	412.00	257.00
new 21																
new 22	0.2600	0.1000	0.2000	45.20	36.70	100.00	298.00	292.00	269.00	174.00	138.00	314.00	45.30	51.70	593.00	182.00
new 23	0.7100	0.4100	0.7300	18.00	35.60	53.70	145.00	202.00	189.00	159.00	94.80	170.00	34.10	36.70	229.00	148.00
new 24	1.2100	0.6800	0.9100	16.00	49.20	66.90	162.00	266.00	243.00	197.00	134.00	181.00	44.50	45.60	219.00	197.00
new 25	0.7400	0.3800	0.6900	9.36	28.20	35.00	94.40	137.00	122.00	115.00	70.50	115.00	23.20	25.90	153.00	110.00
new 26	0.5500	0.2900	0.4500	15.00	31.90	43.90	112.00	155.00	146.00	128.00	71.90	133.00	27.90	30.90	165.00	128.00

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Sample ID code	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}
new 27	0.5100	0.2400	0.4600	12.20	29.90	44.00	126.00	162.00	158.00	129.00	82.20	143.00	25.70	32.00	179.00	132.00
new 28	0.6900	0.3700	0.6700	12.40	32.70	48.50	123.00	175.00	170.00	144.00	84.40	145.00	27.90	35.70	180.00	144.00
new 29	0.5800	0.3100	0.4900	13.50	49.00	66.80	141.00	205.00	205.00	163.00	91.70	164.00	35.10	39.90	190.00	160.00
new 30																
new 31	1.9300	0.9500	1.6900	21.40	78.30	100.00	230.00	352.00	302.00	251.00	159.00	236.00	56.80	57.90	294.00	259.00
new 32	0.1700	<0.08	0.1900	9.23	14.20	21.70	115.00	229.00	253.00	212.00	108.00	186.00	50.40	17.90	185.00	218.00
DC03A	0.2200	0.0800	0.2200	28.30	146.00	133.00	383.00	522.00	383.00	322.00	180.00	395.00	76.60	86.10	398.00	336.00
DC04	2.4200	1.3300	2.5400	46.80	83.90	169.00	395.00	472.00	449.00	370.00	260.00	459.00	75.10	94.00	669.00	383.00
DC05	<0.08	<0.08	<0.08	7.83	7.44	19.10	38.70	49.90	54.70	36.60	20.00	49.90	8.70	11.50	67.00	38.10
DC06	<0.08	<0.08	<0.08	1.63	2.86	6.11	9.36	17.00	18.60	15.30	10.10	13.20	3.67	4.42	13.30	16.20
DC07	0.0900	<0.08	0.1100	1.22	1.84	4.05	5.50	7.75	10.80	7.67	6.45	6.87	1.78	2.95	8.37	8.33

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Sample ID code	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}											
new 1	71.60	270.00	603.00											
new 2	44.50	248.00	436.00											
new 3	80.80	222.00	698.00											
new 4	91.20	247.00	642.00											
new 5	179.00	378.00	2800.00											
new 6	40.70	155.00	354.00											
new 7	36.10	131.00	378.00											
new 8	59.20	139.00	510.00											
new 9	28.00	74.50	255.00											
new 10	36.50	88.40	232.00											
new 11	63.90	160.00	421.00											
new 12	53.00	150.00	309.00											
new 13	54.90	95.50	181.00											

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Sample ID code	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}											
new 14	53.50	104.00	220.00											
new 15	57.20	141.00	385.00											
new 16	43.20	118.00	258.00											
new 17	67.60	154.00	459.00											
new 18	62.70	154.00	249.00											
new 19	5.02	10.40	33.10											
new 20	77.40	230.00	460.00											
new 21														
new 22	86.50	355.00	546.00											
new 23	47.30	139.00	295.00											
new 24	55.50	135.00	333.00											
new 25	36.60	82.40	175.00											
new 26	45.70	107.00	199.00											

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Sample ID code	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}											
new 27	50.70	110.00	222.00											
new 28	58.60	117.00	215.00											
new 29	58.50	123.00	240.00											
new 30														
new 31	56.60	164.00	425.00											
new 32	22.30	71.20	193.00											
DC03A	61.20	199.00	660.00											
DC04	133.00	247.00	787.00											
DC05	14.40	43.80	104.00											
DC06	8.89	13.00	16.50											
DC07	3.76	6.92	11.10											

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EPA Export 12-08-2020:04:15:25

Sample ID code						
new 1						
new 2						
new 3						
new 4						
new 5						
new 6						
new 7						
new 8						
new 9						
new 10						
new 11						
new 12						
new 13						

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EPA Export 12-08-2020:04:15:25

Sample ID code						
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new 15						
new 16						
new 17						
new 18						
new 19						
new 20						
new 21						
new 22						
new 23						
new 24						
new 25						
new 26						

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EPA Export 12-08-2020:04:15:25

Sample ID code						
new 27						
new 28						
new 29						
new 30						
new 31						
new 32						
DC03A						
DC04						
DC05						
DC06						
DC07						

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EPA Export 12-08-2020:04:15:25

Reference Type	Reference Material	OC %	TEH g kg^{-1}	Cu mg kg^{-1}	Zn mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	Pb mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Ni mg kg^{-1}	Li mg kg^{-1}	Al mg kg^{-1}	DBT mg kg^{-1}	TBT mg kg^{-1}
CRM (measured % recovered)		N/A	94~	78.0	90.0	253.0	25.0	89.0	105.0	80.0	82.0	93.0	98.0	97.0	81.0
CRM result				91.0	439.0	2.0	0.01	118.0	47.5	280.0	62.0	73.0	82400.0	743	389
QA/QC In-House Refernece Material (%				103.0	100.0	100.0	102.0	98.0	120.0	102.0	102.0	97.0	106.0		
QC Blank			<100	<2	<3	<0.1	<0.01	<2	<1	<0.5	<0.5	<0.5	<10	<1	<1
	~ Indicates result is for an In-house Reference Material as no Certified														
	Reference Materials are avaliable.														

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EPA Export 12-08-2020:04:15:25

Reference Type	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}
CRM (measured % recovered)	66	90	85	120	90	83	96	70	100	68	64	56	90
CRM result	2.98	4.75	4.43	4.33	4.95	2.7	4.04	27	53	125	214	200	408
QA/QC In-House Refernece Material (%													
QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1	<1	<1	<1	<1	<1

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EPA Export 12-08-2020:04:15:25

Reference Type	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}	HCB (ug kg-1)
CRM (measured % recovered)	69	90	88	110	52	79	67	60	75	69	99
CRM result	212	203	256	58	44	514	228	509	305	401	5.78
QA/QC In-House Refernece Material (%											
QC Blank	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1

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Reference Type	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	Please add columns here for additional parameters		
CRM (measured % recovered)	83~	101~	74	74	45~			
CRM result			3.45	2.37				
QA/QC In-House Refernece Material (%								
QC Blank	<0.1	<0.1	<0.1	<0.1	<0.1			

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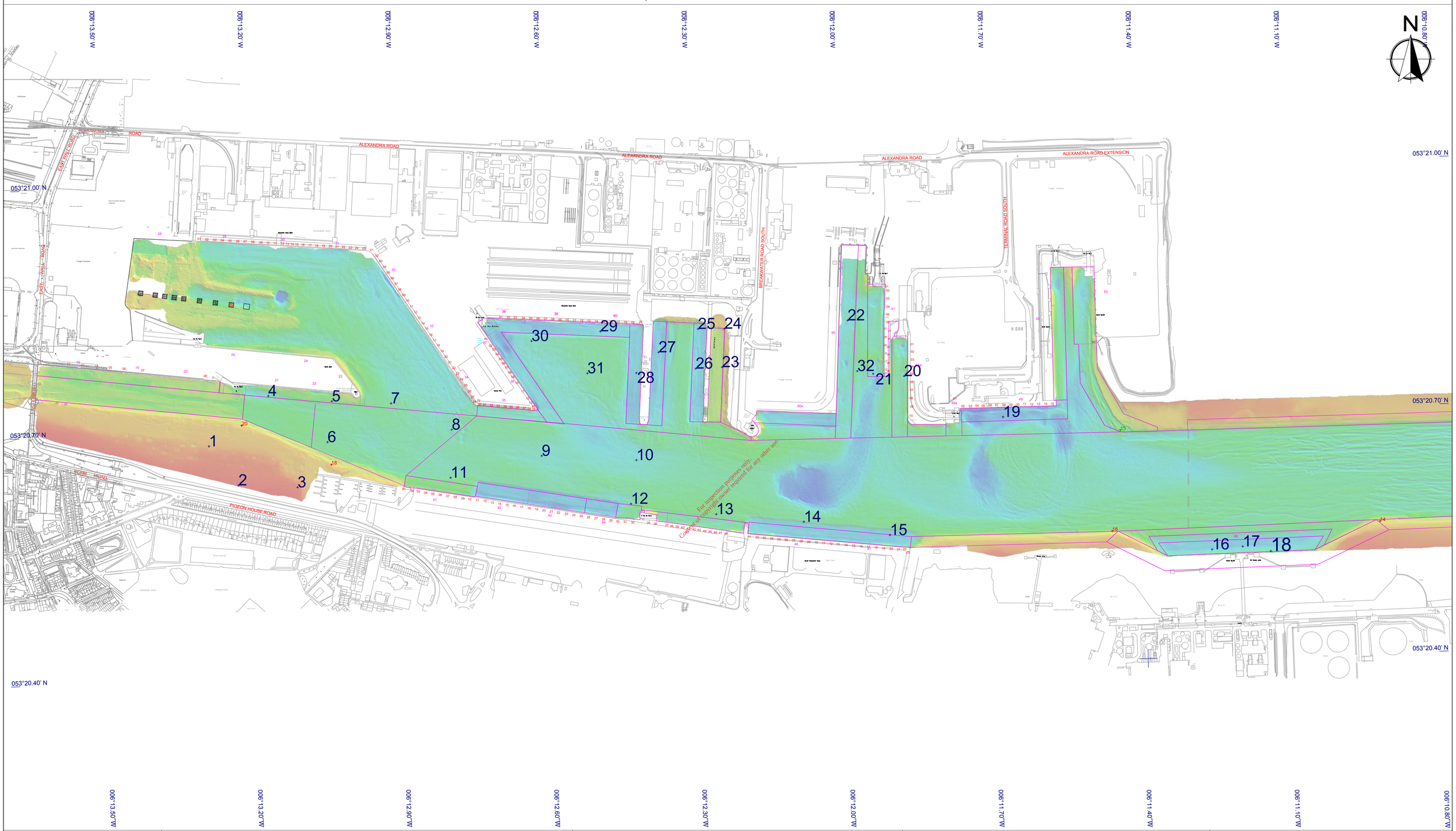
Dublin Grab samples location - chart 1 (2020 licenced)



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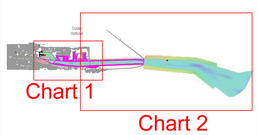
KEY PLAN



LEGEND:

-0.5 m
0.5 m
1.5 m
2.5 m
3.6 m
4.7 m
5.8 m
6.9 m
8.0 m
9.0 m
10.1 m
11.2 m
12.2 m
13.3 m

Maintenance dredge design
Navigation Buoys position
2020 licenced grab sample locations

0 40.0 160.0 320.0 m

GENRAL NOTES:

Soundings/Grid: Navigation Depths - Shoal Bias
Contours: Average Depths (every meter)

Datum: Chart Datum (OD Malin - 2.51 m)
Projection: Geographic - WGS84

Survey Location: Dublin Port
Survey method: Grab sampling
Survey Date: 15th and 16th April 2020

Contractor: Hydromaster Ltd

HYDROMASTER LTD
7 Hawley court, Dublin Road
Oranmore, Co. Galway.
Ireland
T +353 5038910 17 / E info@hydromaster.ie

DRAWING REVISION

Date:	Rev:	Description:	Drawn By:
15/05/2020	0	Draft	CM

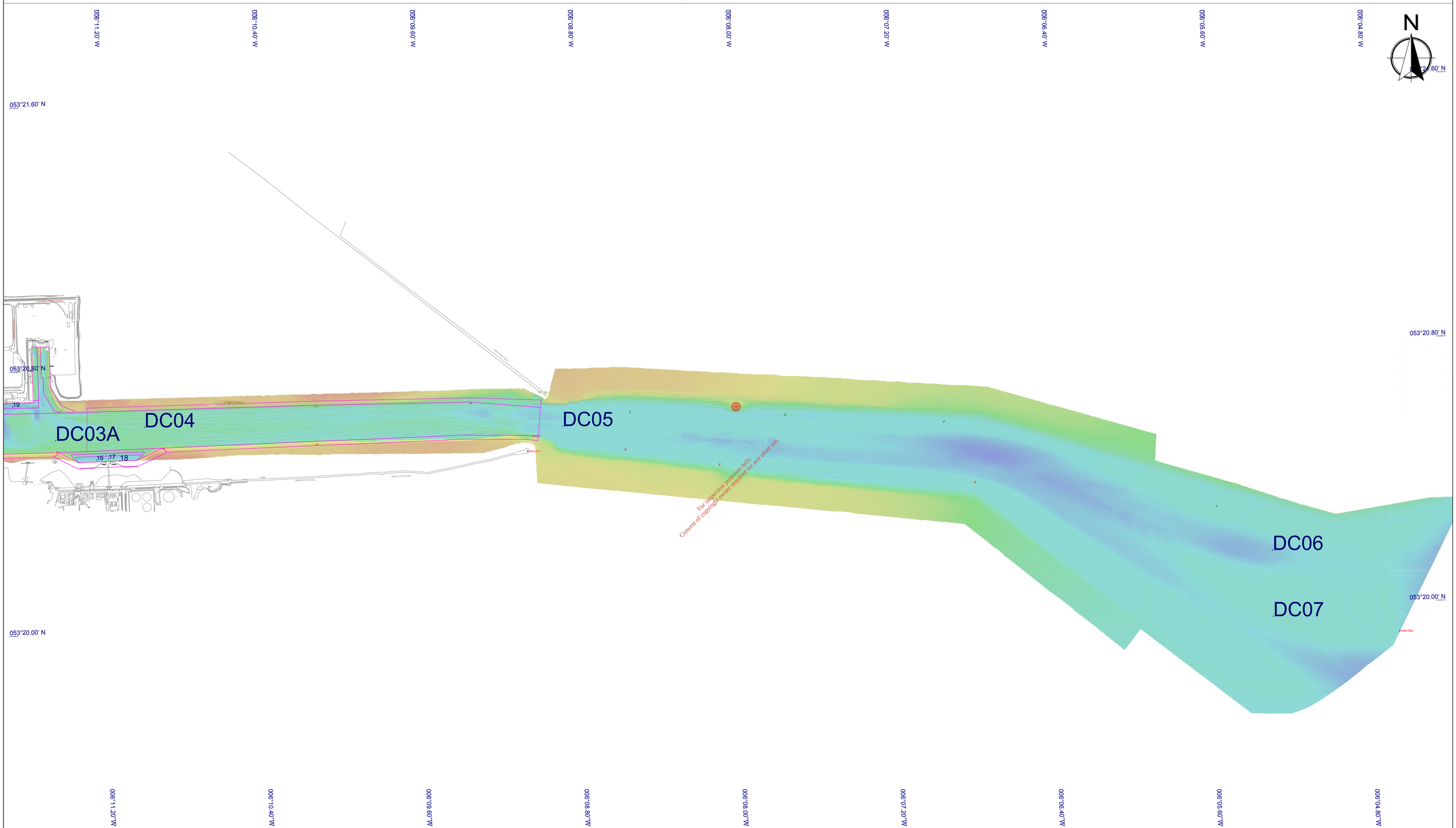
CLIENT:

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Project: Dublin Sediment sampling (contamination)
Drawing Title: Dublin Grab sample location - Chart 1 (2020 licenced)
Paper size and scale: 1:4000 @ A1
Job Number: 2004_GS
Drawn By: CM
Checked By: BS

EPA Export 12-08-2020:04:15:25

Dublin Grab samples location - chart 2 (2016 licenced)



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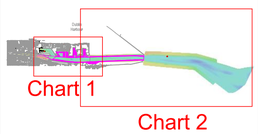
KEY PLAN



LEGEND:

-0.5 m
0.5 m
1.5 m
2.5 m
3.6 m
4.7 m
5.8 m
6.9 m
8.0 m
9.0 m
10.1 m
11.2 m
12.2 m
13.3 m

Maintenance dredge design
Navigation Buoys position
DC02 2016 licenced grab sample locations

0 100.0 400.0 800.0 m

GENRAL NOTES:

Soundings/Grid: Navigation Depths - Shoal Bias
Contours: Average Depths (every meter)

Datum: Chart Datum (OD Malin - 2.51 m)
Projection: Geographic - WGS84

Survey Location: Dublin Port
Survey method: Grab sampling
Survey Date: 15th and 16th April 2020

Contractor: Hydromaster Ltd

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7 Hawley court, Dublin Road
Oranmore, Co. Galway.
Ireland
T +353 6038910 17/ E info@hydromaster.ie

DRAWING REVISION

Date:	Rev:	Description:	Drawn By:
15/05/2020	0	Draft	CM

CLIENT:

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Project: Dublin Sediment sampling (contamination)
Drawing Title: Dublin Grab sample location - Chart 2 (2016 licenced)
Paper size and scale: 1:10000 @ A1
Job Number: 2004_GS
Drawn By: CM
Checked By: BS

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Appendix 2

Sediment Results in Marine Institute Format

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Instructions

As part of an application for a Dumping at Sea (DAS) Permit, sediment chemistry results must be submitted using this form. When completing this form, please ensure that you:

* Complete all worksheets in full - i.e. sheets "2. Project Info", "3. Results" and "4. QA".
* Report all results in the units specified (e.g. mg kg^{-1} versus μg kg^{-1}).
* Do not alter the format of this spreadsheet by changing units, by moving columns or by inserting new columns amongst the existing used columns.
* Insert additional rows as necessary at the end of the existing rows in sheet. "3 Results"
* Insert other determinants as necessary in the empty columns to the right in sheet. "3 Results".
* Any additional information should be included as inserted comments or in the Notes column in sheet. "3 Results".
* Provide a brief description of methodology used in sheet "2. Project Info".
* Enter the measured value (as well as the certified value) for Certified Reference material in sheet "4. QA"
* If in-house reference material is used, insert the measured value and the range normally achieved.
* Refer to the Dumping at Sea Application Form Guidance Note for further relevant information: http://www.epa.ie/downloads/forms/lic/das/name,30267,en.html

Key	
Location	Name of area e.g. Cork Harbour, Dublin Bay
CRMs	Certified reference materials used in analyses for metals, organics & TBT
Fraction analysed	Specify which fraction of sediment was analysed. < 2mm is requested, but some labs use < 63um
Analysing laboratory	Main laboratory where samples were sent to for analysis
Sub-contract lab	Sub-contracted laboratory where samples were sent by main laboratory
Sample ID code	Sample number assigned by sampler
Lab Report ID	Code assigned by analysing laboratory
Position (dd.ddd)	Give lat/long coordinates in decimal degrees (dd.dddd) of the position from where the sample was taken. List also the datum & projection.
Sampling depth (m)	The depth below the seabed surface at which the sample was collected.
<2mm	Grain size % < 2mm
<63um	Grain size % < 63mm
OC	Organic carbon (NOT organic matter)
Cd	Cadmium mg/kg
Hg	Mercury mg/kg
As	Arsenic **mg/kg**
Cr	Chromium mg/kg
Cu	Copper mg/kg
Pb	Lead mg/kg
Ni	Nickel mg/kg
Zn	Zinc mg/kg
TEH	Total extractable hydrocarbons g/kg
ΣPAH16	Sum of USEPA 16 PAH - acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]flouranthene, benzo[a]pyrene, benzo[ghi]perylene, chrysene, dibenz(ah)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene,
ΣPCB7	Sum of the seven ICES polychlorinated biphenyls: PCB 028, PCB 052, PCB 101, PCB 138, BCB 153, PCB 180, PCB 118.
HCB	Hexachlorobenzene
γ-HCH	γ-Hexachlorocyclohexane (Lindane)
p,p' DDT	pp DDT ug/kg
p,p' DDD	pp DDD ug/kg
p,p' DDE	pp DDE ug/kg
TBT	TBT (mg/kg)
DBT	DBT (mg/kg)

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1. General Information	Applicant (company name)	
	Location (port/harbour)	
	Dredge Quantity (tonnes)	
	Permit Application Reg. No. (to be assigned by EPA)	
2. Survey Information	Survey Company	Hydromaster
	Sampling Date	15th and 16th of April 2020
	Analysing Laboratory	Socotec
	Sub Contract Lab	
	Analysis Date	11th May 2020
3. Methods Information	Fraction analysed	
	Water content of sample (reported as %)	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
	Are results reported as wet weight or dry weight?	Dry Weight
	Granulometry method	Wet and dry sieving followed by laser diffraction analysis.
	TEH method	Solvent extraction and clean up followed by GC-FID analysis.
	Organic carbon (OC) method	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
	Metals (incl. mercury & arsenic) extraction type	Hydrofluoric Acid extraction.
	Methods of detection (metals, incl. mercury & arsenic)	ICP analysis.
	Organics extraction types	Solvent extraction and derivatisation followed by GC-MS analysis.

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Methods of detection (PCBs / PAHs / TBT / DBT)	Solvent extraction and clean up followed by GC-MS-MS analysis.

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EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed m	Lab Report ID	Sample appearance (e.g. colour, texture, signs of life)
DC03A	Hydromaster	Dublin Port	16/04/2020	DC03A	53.3432	-6.19116	Surface	MAR00599.031	Grey slightly sandy silty CLAY
DC04	Hydromaster	Dublin Port	16/04/2020	DC04	53.34369	-6.18346	Surface	MAR00599.032	Grey sandy SILT
DC05	Hydromaster	Dublin Port	16/04/2020	DC05	53.34332	-6.14829	Surface	MAR00599.033	Grey silty SAND
DC06	Hydromaster	Dublin Port	16/04/2020	DC06	53.33608	-6.08881	Surface	MAR00599.034	Grey slightly gravelly silty SAND
DC07	Hydromaster	Dublin Port	16/04/2020	DC07	53.33274	-6.08881	Surface	MAR00599.035	Light brown SAND

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EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	% Moisture	Particle size >2mm %	Particle size <2mm >63um %	Partic+B:Nle size <63um %	OC %	Carbonate %	Dry solids %	Al mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Cu mg kg^{-1}	Pb mg kg^{-1}	Ni mg kg^{-1}
DC03A	62.4	0	32.4	67.6	1.35	3.2	37.6	36600	0.7	0.04	9.7	78.9	24.4	31.4	24.3
DC04	48.1	0	38.6	61.4	1.74	3.24	51.9	36500	1	0.18	10.8	76.5	28	65.6	26.4
DC05	42.3	0.5	91.9	7.6	0.24	2.32	57.7	20500	0.2	<0.01	6.1	82.9	6.8	11.7	10.3
DC06	31.9	0.9	94.1	5.1	0.13	2.16	68.1	16000	0.3	<0.01	9	105	6.4	9.7	9.7
DC07	27.3	0.2	97	2.9	0.11	1.84	72.7	13700	0.3	<0.01	10.8	106	6.1	9.9	8.5

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EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Zn mg kg^{-1}	TEH g kg^{-1}	HCB (ug kg-1)	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	TBT mg kg^{-1}	DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}
DC03A	105	0.5170	<0.1	<0.1	<0.1	1.06	0.24	0.29	<0.005	<0.005	0.3400	0.2800	0.1600	0.1700
DC04	139	0.9610	<0.1	0.21	0.15	10.2	3.16	3.29	<0.005	<0.005	5.3900	4.3100	2.0800	2.0200
DC05	36	0.1240	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	<0.08	<0.08	<0.08	<0.08
DC06	37	0.0353	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	<0.08	<0.08	<0.08	<0.08
DC07	30	0.0189	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	0.1000	0.1800	0.1500	<0.08

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Sample ID code	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}
DC03A	0.2200	0.0800	0.2200	28.30	146.00	133.00	383.00	522.00	383.00	322.00	180.00	395.00	76.60	86.10	398.00	336.00
DC04	2.4200	1.3300	2.5400	46.80	83.90	167.00	395.00	472.00	449.00	370.00	260.00	459.00	75.10	94.00	669.00	383.00
DC05	<0.08	<0.08	<0.08	7.83	7.44	19.10	38.70	49.90	54.70	36.60	20.00	49.90	8.70	11.50	67.00	38.10
DC06	<0.08	<0.08	<0.08	1.63	2.86	6.11	9.36	17.00	18.60	15.30	10.10	13.20	3.67	4.42	13.30	16.20
DC07	0.0900	<0.08	0.1100	1.22	1.84	4.05	5.50	7.35	10.80	7.67	6.45	6.87	1.78	2.95	8.37	8.33

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Sample ID code	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}											
DC03A	61.20	199.00	660.00											
DC04	133.00	247.00	787.00											
DC05	14.40	43.80	104.00											
DC06	8.89	13.00	16.50											
DC07	3.76	6.92	11.10											

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EPA Export 12-08-2020:04:15:26

Sample ID code						
DC03A						
DC04						
DC05						
DC06						
DC07						

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EPA Export 12-08-2020:04:15:26

Reference Type	Reference Material	OC %	TEH g kg^{-1}	Cu mg kg^{-1}	Zn mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	Pb mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Ni mg kg^{-1}	Li mg kg^{-1}	Al mg kg^{-1}	DBT mg kg^{-1}	TBT mg kg^{-1}
CRM (measured % recovered)		N/A	94~	78.0	90.0	253.0	25.0	89.0	105.0	80.0	82.0	93.0	98.0	97.0	81.0
CRM result				91.0	439.0	2.0	0.01	118.0	47.5	280.0	62.0	73.0	82400.0	743	389
QA/QC In-House Refernece Material (%				103.0	100.0	100.0	102.0	98.0	120.0	102.0	102.0	97.0	106.0		
QC Blank			<100	<2	<3	<0.1	<0.01	<2	<1	<0.5	<0.5	<0.5	<10	<1	<1
	~ Indicates result is for an In-house Reference Material as no Certified														
	Reference Materials are avaliable.														

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Reference Type	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}
CRM (measured % recovered)	66	90	85	120	90	83	96	70	100	68	64	56	90
CRM result	2.98	4.75	4.43	4.33	4.95	2.7	4.04	27	53	125	214	200	408
QA/QC In-House Refernece Material (%													
QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1	<1	<1	<1	<1	<1

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Reference Type	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}	HCB (ug kg-1)
CRM (measured % recovered)	69	90	88	110	52	79	67	60	75	69	99
CRM result	212	203	256	58	44	514	228	509	305	401	5.78
QA/QC In-House Refernece Material (%											
QC Blank	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1

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Reference Type	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	Please add columns here for additional parameters		
CRM (measured % recovered)	83~	101~	74	74	45~			
CRM result			3.45	2.37				
QA/QC In-House Refernece Material (%								
QC Blank	<0.1	<0.1	<0.1	<0.1	<0.1			

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