Protected Areas	If your activity is within 2km of any WFD protected area, include each identified area in your impact assessment. • special areas of conservation (SAC) • special protection areas (SPA) • shellfish waters • bathing waters • nutrient sensitive areas	Yes	A SSSI, SPA and RAMSAR designations for the Granton Eastern Harbour and the shoreline along the coast

Source: Taken from https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

4.1 Potential Risk to Water Quality

The potential risks to water quality at both the dredge sites and disposal site are further considered below.

The coastal classification of this area of water in and around Granton Harbour and the disposal ground is good (2016 Kinghorn to Leith Docks polygon) as detailed on Scotland's Environment (http://www.environment.scotland.gov.uk/).

Although there are contaminants of concern above the Rev AL1 for sediment disposal, it is considered that these levels will not contribute to an overall degradation of water quality as the potential for dilution in the Firth of Forth is very considerable. The key contaminants for impacting water quality are considered to be metals as these have the potential to dissolve/desorb from sorption sites, whereas the organic contaminants (PAHs and PCBs) have a greater affinity for the organic materials which they are bound to, and are more likely to remain strongly bound to the sediment, or if become dissolved, quickly adsorbed onto organic matter.

Additionally, the sediment quality within the disposal ground which is also noted to contain levels of contaminants above the adopted PELs, which does not appear to have impacted on the Water Quality classification of good in this area.

The key risk is considered to be an increase in turbidity/suspended solids during the disposal activity, although this is likely to cause localised degradation in water quality, it is considered that this will be a short term event and has been factored in to the selection and location of the agreed disposal ground. On this basis, the associated risk with degradation of water quality directly associated with the proposed disposal is considered to be Low i.e. unlikely to cause a significant adverse effect on the overall water quality.

4.2 Protected Areas

The coastline immediately either side of Granton Harbour and the eastern harbour (outwith dredge area) have ecological designations as SSSI, SPA and RAMSAR sites. The designations are for a variety of birds, invertebrates, habitat and geomorphological features.

The key potential risk to the sensitive features are considered to be attributed to the transport of suspended material from the dredge site during dredging whereby contaminants associated with particulate material could be transported from the western harbour towards the protected areas.

Considering the presence of contaminants within the harbour sediments, mitigation measures will be required during the dredging works to minimise this potential risk.

To minimise the potential suspension and distribution of sediment several options are available and will need to be employed to minimise the potential impact on designated sites, and to reduce the potential for offsite distribution of material. This needs to be considered during all stages, but more so when the areas with contaminants in exceedance of REV AL2 are being dredged and moved from the water environment to land for a land based disposal option.

The key proposed mitigation measures for the dredge works are as follows:

- Dredging method to be designed to limit release of sediment during works.
- Physical Barrier – a physical silt barrier will be placed between dredging within the western harbour and Eastern harbours/Firth of Forth.
- Turbidity Monitoring – to ensure that material is not being widely displaced. A baseline would need to be established for contaminant levels within the eastern harbour sediments as well as baseline turbidity levels prior to dredging to enable direct comparisons.

4.3 Assessment Summary

Review of available information has highlighted that although several chemical contaminants exceed RAL1 within the sediments which have been identified for a sea based disposal (0-1.2m below surface), assessment of key receptors identified from the Water Framework Directive assessment for estuarine and coastal waters concluded that there is a low risk to the key receptor of Water Quality. The chemical levels in the sediment are not considered likely to have a significant impact on the sediment quality already located within the disposal grounds and it is recognised that this part of the sea floor is a sacrificial site for the disposal of dredge material. The preferred disposal site would be FO038 Narrow Deep due to its proximity to Granton Harbour.

Further assessment of the risks to Protected Areas have identified a potential risk and that mitigation measures should be adopted during dredging works. The specific details of dredging and associated mitigation measures will need to be finalised.

While the risk to migratory fish (particularly salmon) was screened out at the start of the risk assessment process, it should be considered as best practice that these are considered during the dredging works and that timing for these is considered as far as practicable to mitigate against any potential risks.

4.4 Other Considerations

The other point to consider as part of this assessment is the proposed volume total in comparison to the total volumes of sediment disposed of within the various licensed disposal site within the Firth of Forth. Data supplied by Marine Scotland indicated that just under 1.25 million tonnes (wet) of dredged material were disposed of within the licensed sites in 2017.

In comparison, the proposed material for disposal form Granton Harbour is 86,980m^3, assuming a bulk density of 1.8, would equate to 156,564 tonnes wet of material.

5 CONCLUSIONS

As previously outlined, the proposed method for disposal is a split waste stream with c. 36% of material earmarked for a sea based disposal (upper 1.2m of dredge) and the remaining 64% being disposed of on land due to the presence of contaminants in exceedance of Rev AL2.

Following the review of available disposal options and assessment of material in relation to sea based disposal, the Best Practicable Environmental Option for the disposal of dredging's from Granton Harbour has therefore been assessed as a combination of sea and land based disposal.

While it is noted that contaminants are present in the material ear marked for a sea based disposal, it is also noted that the key contaminant of concern, mercury, is also present in the disposal grounds as well as the wider estuary sediments at similar levels.

The exclusion of the more contaminated sediments in the areas previously identified for sea disposal is considered to minimise the long term impact on the marine environment as well as providing the most cost effective disposal solution.

REFERENCES

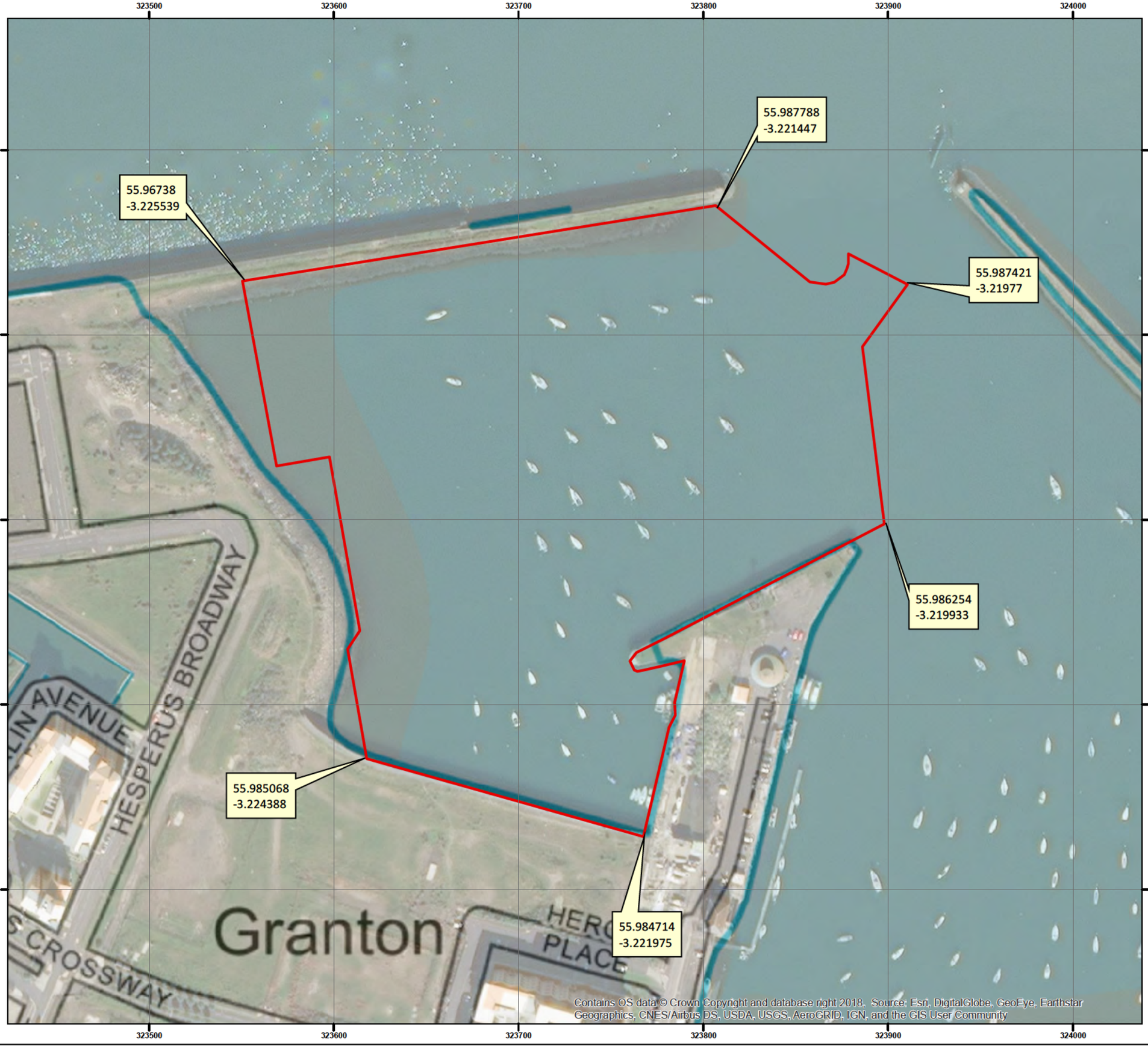
Canadian Council for Minsters of the Environment (CCME), Canadian Environmental Quality Guidelines, https://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/

Marine Scotland (2017). *Pre-DredgeSampling Guidance Version 1*: Scottish Government.

Marine Scotland (2018), National Marine Plan Interactive (NMPI), https://marinescotland.atkinsgeospatial.com/nmpi/

APPENDICES

A FIGURES



Legend

Dredge Area

Do not scale this map

Client
Granton Central Developments

Project
Granton Harbour

Title
Dredge Area

Status
Final

Drawing No.
769967-004

Revision

Scale
1:2,000

A3

Date
28 Sep 2018

Drawn	Checked	Approved
FR	CCAS	CCAS

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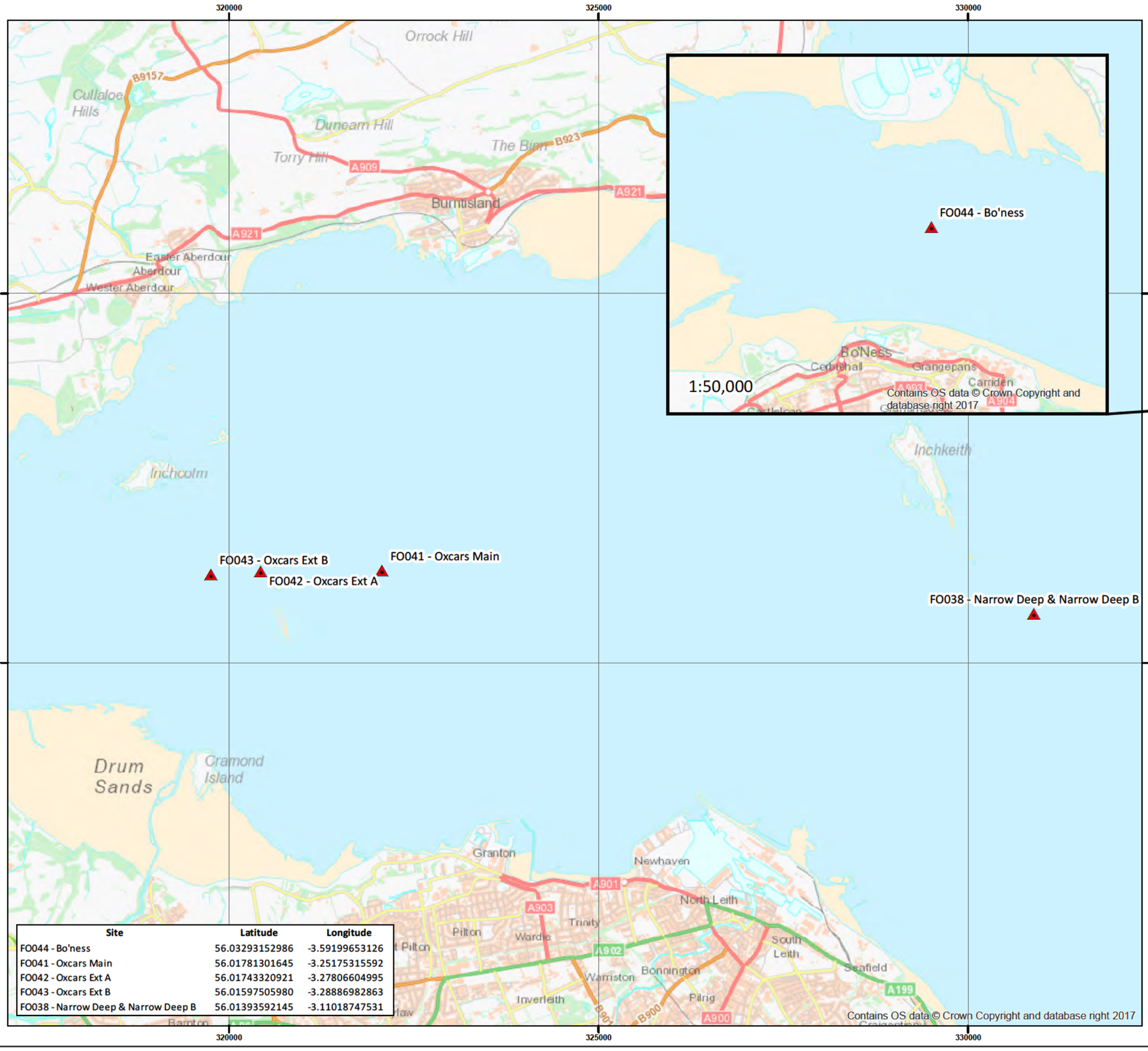

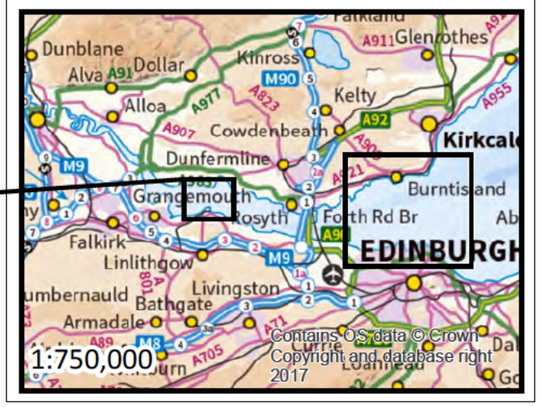

Legend

▲ Disposal Site

Do not scale this map

Site	Latitude	Longitude
FO044 - Bo'ness	56.03293152986	-3.59199653126
FO041 - Oxcars Main	56.01781301645	-3.25175315592
FO042 - Oxcars Ext A	56.01743320921	-3.27806604995
FO043 - Oxcars Ext B	56.01597505980	-3.28886982863
FO038 - Narrow Deep & Narrow Deep B	56.01393592145	-3.11018747531

Client: Granton Central Developments

Project: Granton Harbour

Title: Sea Disposal Sites

Status: Final

Drawing No.: 769967-003

Revision:

Scale: 1:50,000

A3

Date: 30 Apr 2018

Drawn: FR

Checked: CCAS

Approved: CCAS

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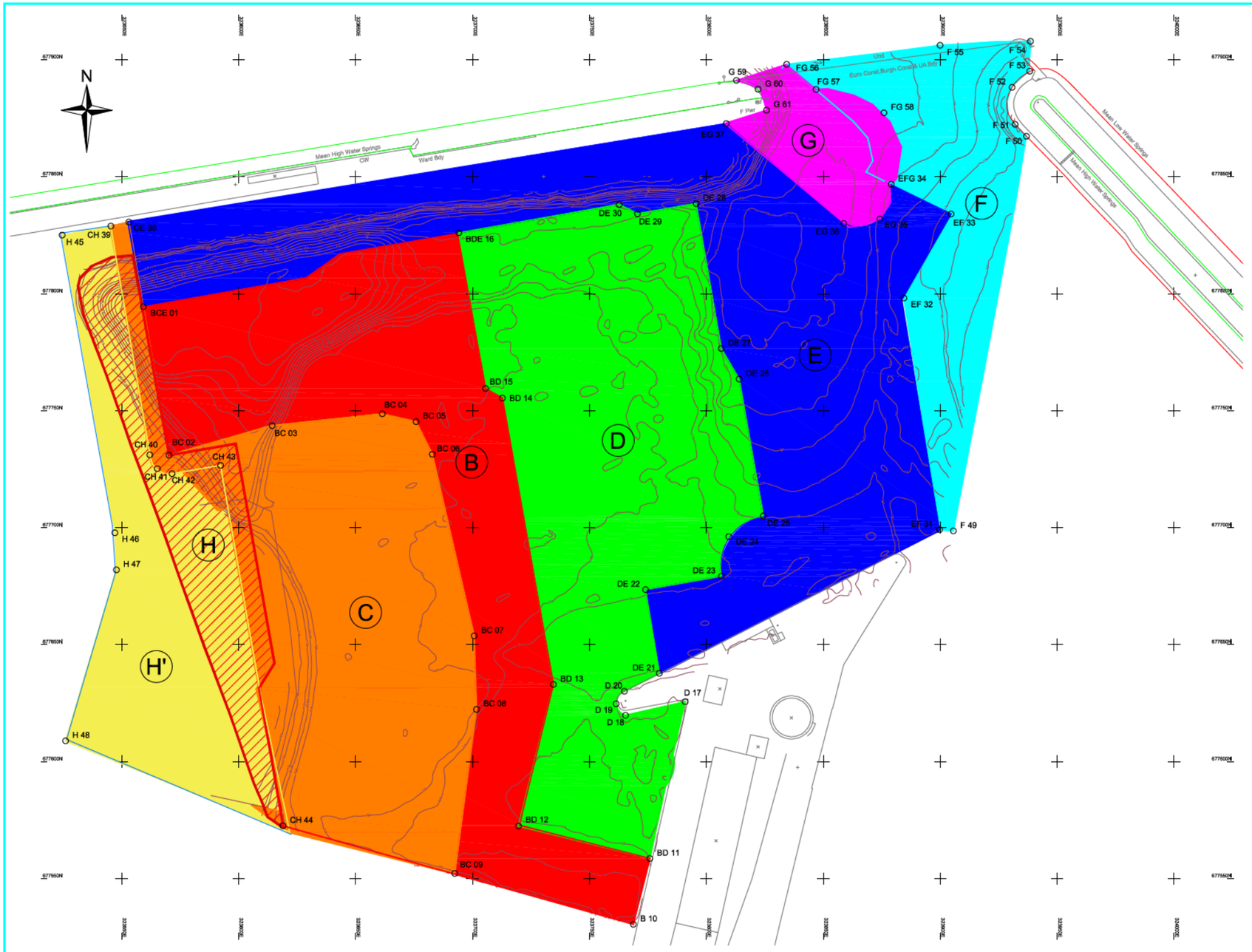

PLAN
(SCALE 1:1000)

Zone	Volume for Disposal at Sea (m^3) (Top 1.2m where applicable)	Volume for Disposal on Land (m^3)	NETT VOLUME (m^3)	Factored by 1.8 wet tonnes/m^3
A			N/A	
B	20,344	7,936	28,280	50,904
C		47,094	47,094	84,769
D	25,698	20,620	46,318	83,372
E	27,349	40,928	68,277	122,898
F	10,073	21,400	31,472	56,650
G	3,516	16,408	19,924	35,863
Total Nett Volume	**86,980**	**154,385**	**241,365**	**434,457**

H			19,322	34,780
Total Infill Volume			**19,322**	**34,780**

COORDINATES

POINTS	EASTING	NORTHING	LATITUDE	LONGITUDE
BCE 01	323559	677794	55° 59.220' N	3° 13.609' N
BC 02	323570	677731	55° 59.186' N	3° 13.597' N
BC 03	323614	677744	55° 59.194' N	3° 13.555' N
BC 04	323661	677749	55° 59.197' N	3° 13.510' N
BC 05	323676	677745	55° 59.195' N	3° 13.496' N
BC 06	323683	677731	55° 59.187' N	3° 13.489' N
BC 07	323701	677654	55° 59.146' N	3° 13.470' N
BC 08	323702	677622	55° 59.129' N	3° 13.468' N
BC 09	323692	677552	55° 59.091' N	3° 13.477' N
B 10	323769	677530	55° 59.080' N	3° 13.402' N
BD 11	323776	677559	55° 59.096' N	3° 13.396' N
BD 12	323720	677572	55° 59.102' N	3° 13.450' N
BD 13	323735	677633	55° 59.135' N	3° 13.437' N
BD 14	323713	677755	55° 59.201' N	3° 13.460' N
BD 15	323706	677759	55° 59.203' N	3° 13.467' N
BDE 16	323694	677826	55° 59.239' N	3° 13.480' N
D 17	323791	677626	55° 59.132' N	3° 13.383' N
D 18	323766	677620	55° 59.128' N	3° 13.407' N
D 19	323761	677625	55° 59.131' N	3° 13.412' N
D 20	323765	677630	55° 59.134' N	3° 13.408' N
DE 21	323780	677638	55° 59.138' N	3° 13.394' N
DE 22	323774	677673	55° 59.157' N	3° 13.400' N
DE 23	323806	677679	55° 59.161' N	3° 13.369' N
DE 24	323810	677696	55° 59.170' N	3° 13.366' N
DE 25	323824	677705	55° 59.175' N	3° 13.353' N
DE 26	323814	677763	55° 59.206' N	3° 13.363' N
DE 27	323806	677776	55° 59.213' N	3° 13.371' N
DE 28	323796	677838	55° 59.248' N	3° 13.382' N
DE 29	323771	677834	55° 59.244' N	3° 13.406' N
DE 30	323763	677838	55° 59.246' N	3° 13.413' N
EF 31	323900	677699	55° 59.172' N	3° 13.279' N
EF 32	323884	677798	55° 59.225' N	3° 13.296' N
EF 33	323905	677834	55° 59.245' N	3° 13.277' N
EFG 34	323879	677847	55° 59.252' N	3° 13.302' N
EG 35	323874	677832	55° 59.244' N	3° 13.307' N
EG 36	323859	677830	55° 59.242' N	3° 13.321' N
EG 37	323809	677873	55° 59.265' N	3° 13.370' N
CE 38	323553	677831	55° 59.240' N	3° 13.615' N
CH 39	323545	677829	55° 59.239' N	3° 13.623' N
CH 40	323562	677731	55° 59.186' N	3° 13.605' N
CH 41	323565	677725	55° 59.183' N	3° 13.602' N
CH 42	323572	677723	55° 59.182' N	3° 13.595' N
CH 43	323592	677727	55° 59.184' N	3° 13.576' N
CH 44	323619	677573	55° 59.102' N	3° 13.547' N
H 45	323525	677825	55° 59.237' N	3° 13.642' N
H 46	323547	677698	55° 59.168' N	3° 13.619' N
H 47	323548	677682	55° 59.160' N	3° 13.618' N
H 48	323526	677609	55° 59.120' N	3° 13.637' N
F 49	323906	677699	55° 59.172' N	3° 13.274' N
F 50	323937	677867	55° 59.263' N	3° 13.247' N
F 51	323932	677872	55° 59.266' N	3° 13.252' N
F 52	323931	677888	55° 59.274' N	3° 13.253' N
F 53	323938	677895	55° 59.278' N	3° 13.246' N
F 54	323939	677908	55° 59.285' N	3° 13.245' N
F 55	323900	677906	55° 59.284' N	3° 13.283' N
FG 56	323834	677898	55° 59.279' N	3° 13.346' N
FG 57	323847	677887	55° 59.273' N	3° 13.334' N
FG 58	323876	677877	55° 59.268' N	3° 13.305' N
G 59	323813	677891	55° 59.275' N	3° 13.366' N
G 60	323822	677887	55° 59.273' N	3° 13.358' N
G 61	323826	677878	55° 59.268' N	3° 13.354' N

NOTES:

1. DREDGE VOLUMES ARE ESTIMATED BASED ON BATHYMETRIC SURVEY COMPLETED BY ASPECT ON MAY 2017.
2. FINISHED DREDGE LEVELS TAKEN FROM WILSON AND GUNN ARCHITECTS DRAWING "A-P-00-G7-005 REV H" REVISED ON 26TH SEPTEMBER 2018.
3. VOLUMES HAVE BEEN FACTORED USING AN ASSUMED UNIT WEIGHT 1.8T/m^3 OF WET DENSITY.

Rev.	Date	Description	Drawn	Checked	Approved

Client: EDINBURGH MARINA

Project Title: MARINA BASIN

Drawing Title: PROPOSED DREDGE WORKS

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Scale at A1:	Status:	
AS SHOWN	For Information	
Drawn: KAB	Checked: MM	Approved: GSDS
Date: 27/09/2018	Date: 27/09/2018	Date: 27/09/2018
Drawing No.: 115875/0101		Revision: –

B SAMPLING REPORT

Granton Harbour Pre-Dredge Sampling 2017
Sediment Quality Report

November 2017

Granton Harbour Pre-Dredge Sampling 2017
Sediment Quality Report

Client:	Granton Central Developments
Document number:	7972
Project number:	769967jj
Status:	Final
Author:	[Redacted]
Reviewer:	[Redacted]
Date of issue:	24 November 2017
Filename:	Granton Sediment Samples Final

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Contents

Appendices

Tables

1 INTRODUCTION

1.1 Background

Granton Central Developments contracted EnviroCentre Ltd. to undertake the collection of cored samples within the Western Harbour at Granton Harbour. The samples were collected to inform proposed dredging and associated disposal options.

The purpose of these samples is to provide supporting information to Marine Scotland during the licensing process on sediment quality within the proposed dredge areas. The dredging and disposal activities are regulated by Marine Scotland under the Marine (Scotland) Act 2010. The licensing conditions require representative samples to be collected and the nature (i.e. physical composition), quality and contamination status to be determined.

The samples were sub-sampled for analysis in accordance with best practice.

1.2 Action Levels – AL1 Vs AL2

Two action levels are currently used to assess the suitability of sea based disposal of dredged sediment material AL1 and AL2.

Sediment with contaminant concentrations below AL1 is generally considered to be below background levels for contamination and is suitable for disposal at sea.

For samples between AL1 and AL2, additional risk assessment may be required including further sampling and testing to fully identify pockets of contamination or implementation of bioassays to assess the materials suitability for sea disposal. This would need to be agreed and approved by Marine Scotland.

Material above AL2 is generally considered to be unsuitable for disposal to sea. If the sea disposal route is to be pursued, further testing along the lines of bioassay accompanied by a robust justification for selecting sea disposal as the BPEO may be required. This would need to be supported further with additional information regarding any mitigation measures which could be put in place as part of these works. This would require further discussion and agreement with Marine Scotland.

1.3 Scope of Report

The following report details the sampling methodology, field and laboratory analysis and provides a summary of the sediment quality present within the proposed dredge areas.

2 SEDIMENT SAMPLING REQUIREMENTS

2.1 Sampling Locations

Sampling locations are provided in the table below

Table 2.1: Sample Coordinates

Location	Latitude/Longditude
VC01	55.987711,-3.2215627
VC02	55.986567,-3.2218151
VC03	55.987117,-3.2234354
VC04	55.986215,-3.2229260
VC05	55.987015,-3.2246665
VC06	55.986266,-3.2241138
VC07B	55.986942,-3.2257061
VC08	55.986207,-3.2255385
VC09	55.985428,-3.2252094
VC10	55.985260,-3.2240660
VC11	55.984771,-3.2234896

2.2 Field Information

The draft following field data is recorded for each sample obtained. This field data included the following information:-

- A unique sample ID;
- Sample location;
- Sample co-ordinates in latitude and longitude in degrees, minutes and decimals of minutes;
- Date, time and depth of collection;
- Sampler's ID;
- Sediment description; and
- Details of any deviation from sampling protocol.

2.3 Sampling Requirements

The laboratory analysis required, and undertaken as part of this investigation, included metals, organic and particle size analysis. Samples for metals and particle size analysis were sub-sampled using a plastic spoon and stored in polyethylene bags. Samples for organic analysis were collected using stainless steel spoons and stored in glass jars. Samples were sent to Socotec for analysis.

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3 SAMPLING METHODOLOGY

All core samples were collected between the 30th October and 1st November 2017. The following sections detail the sampling methodology used to retrieve sediment samples from the site.

3.1 Survey Vessel

The sampling vessel was the "Forth Fighter" which was operated by Briggs Marine.

3.2 Navigation and Sample Location

Positions were navigated to using a Trimble GPS. Once on position the on-board spud legs were deployed to keep the vessel in position. Sampling equipment was deployed and then recovered. Once the sample had been recovered, the leg was lifted and the vessel moved to the next sampling position. Sample co-ordinates are provided in Appendix B sample logs.

3.3 Sample Retrieval

Core samples were recovered using a viborocorer with 75mm aluminium sample tubes. The vibrocorer was lifted and lowered using the deck mounted crane as well as recovering the corer from the harbour sediments following cessation of coring.

Once the sample was recovered, the core detatched from the head unit, cut in to sub sample sections and each sub-sample extruded from the tube. Un-sampled sections of core were labelled, capped and retained for freezing.

Core logs are provided in Appendix B including coordinates and sample descriptions.

3.4 Sample Preparation

Following collection, core sections were extruded into a plastic core holder, spilt length wise, photographed and then logged prior to sub-sampling

The stainless steel (organic analysis) and plastic sampling spoons (inorganic analysis) were cleaned with sea water between samples. The sample tub was washed with sea water between samples.

Once samples had been placed within appropriate containers, they were labelled and placed immediately into cool boxes. Samples were packed with 2kg bags of ice to cool the samples prior to dispatch to the project laboratory.

3.5 Sampling Constraints

There were no significant sampling constraints encountered during the sampling.

Sample location 7 was relocated on site as the original location identified was within an area which was already at or below the proposed dredge level. A sample from this area was not considered appropriate as it would not

provide information on the material to be dredged. The sample was relocated to an area where material will be dredged.

4 ANALYTICAL RESULTS

A summary table comparing the data to assessment criteria and the laboratory certificates are provided in Appendix C. It should be noted that the results presented in the summary table are in different units. Metals, PAHs and TPH are provided in mg/kg (ppm) and the TBT and PCBs have been provided in µg/kg (ppb). The corresponding action levels have been converted to µg/kg to facilitate direct comparison of the data and appropriate action level.

4.1 Physical Analysis

4.1.1 Particle Size Distribution (PSD)

Particle Size Distribution data set for each sample is included within Appendix C. Sediments sampled within the proposed dredge area is reported as being predominately medium and coarse silt.

Field descriptions of the sediments and accompanying comment on sedimentology are included within Appendix B within the sample logs. PSD descriptions for each of the samples are provided in Table 4.1.

Table 4.1: Particle Size Analysis Results

Sample ID	Particle Size Description
VC01	Coarse Silt
VC02	Coarse Silt
VC03	Medium Silt
VC04	Coarse/Medium Silt
VC05	Medium Silt
VC06	Medium/Coarse Silt
VC07	Medium Silt
VC08	Medium Silt
VC09	Medium Silt
VC10	Medium/Coarse Silt
VC11	Medium/Coarse Silt

4.2 Chemical Analysis

4.2.1 Chemical Analysis Assessment Criteria

All chemical analytical results were assessed against Revised Action levels criteria as adopted by Marine Scotland. The results are summarised in the following sections with respect to the Marine Scotland Revised Action Levels (RAL).

4.2.2 Metals

- Arsenic – 3 of 31 samples recorded arsenic levels above REV AL1. The maximum concentration recorded was 23 mg/kg.
- Cadmium –23 of 31 samples recorded cadmium levels above REV AL1. The maximum concentration recorded was 2.8mg/kg.

- Chromium - 31 of 31 samples recorded chromium levels above REV AL1. The maximum concentration recorded was 93.8 mg/kg.
- Copper –31 of 31 samples recorded copper levels above REV AL1. The maximum concentration recorded was 106.9 mg/kg.
- Lead –31 of 31 samples recorded lead levels above REV AL1. The maximum concentration recorded was 255 mg/kg.
- Mercury – 31 of 31 samples recorded mercury levels above REV Al1.The maximum concentration recorded was 3.15 mg/kg.
- Nickel – 30 of 31 samples recorded nickel levels above REV Al1.The maximum concentration recorded was 45 mg/kg.
- Zinc – 31 of 31 samples recorded zinc levels above REV Al1.The maximum concentration recorded was 317 mg/kg.

All metal levels were below RAL 2 with the exception of mercury which recorded 13 samples in exceedance of RAL 2

4.2.3 Tributyl Tin (TBT)

All samples were recorded below RAL 1with the maximum concentration recorded as 4.69µg Sn/kg

4.2.4 Polyaromatic Hydrocarbons (PAHs)

All 31 samples recorded at least one PAH species above RAL 1. The maximum concentration was 5.33mg/kg for Pyrene.

4.2.5 Polychlorinated Biphenyls

9 of 31 samples recorded individual PCB congeners in exceedance of RAL 1. There were no exceedances of RAL 2.

4.2.6 Total Hydrocarbons (THC)

All 31 samples collected recorded hydrocarbons above Rev AL1. The maximum concentration was 2,854 mg/kg.

5 SUMMARY

The sediment sampling can be summarized as follows:

- 11 core samples were recovered from the Western Harbour at Granton Harbour up to 3.0m in depth
- 31 samples were submitted for chemical analysis with all 31 samples exceeding the REV Al1 levels for certain contaminants including metals, TBT, THC PAHs and PCBs
- 13 of the 31 samples recorded mercury above RAL2.

Table 5.1 summarises the results of the laboratory analysis with respect to the Action Levels adopted by Marine Scotland. Any concentration recorded below the action level is noted as a pass and above the action level as a fail.

Table 5.1: Chemical Analysis Screening Summary –

Sample ID	Metals		TBT		Hydrocarbons	PAHs	PCBs	
Action Level	AL1	AL2	AL1	AL2	AL1	AL1	AL1	AL2
VC01 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC01 0.50-1.00	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC02 0.00-0.65	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC02 0.65-1.30	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC03 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC03 1.50-2.00	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC03 2.50-3.00	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass
VC04 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC04 1.00-1.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC04 2.15-2.65	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC05 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC05 1.00-1.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC05 1.50-2.00	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass
VC06 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC06 1.20-1.70	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass

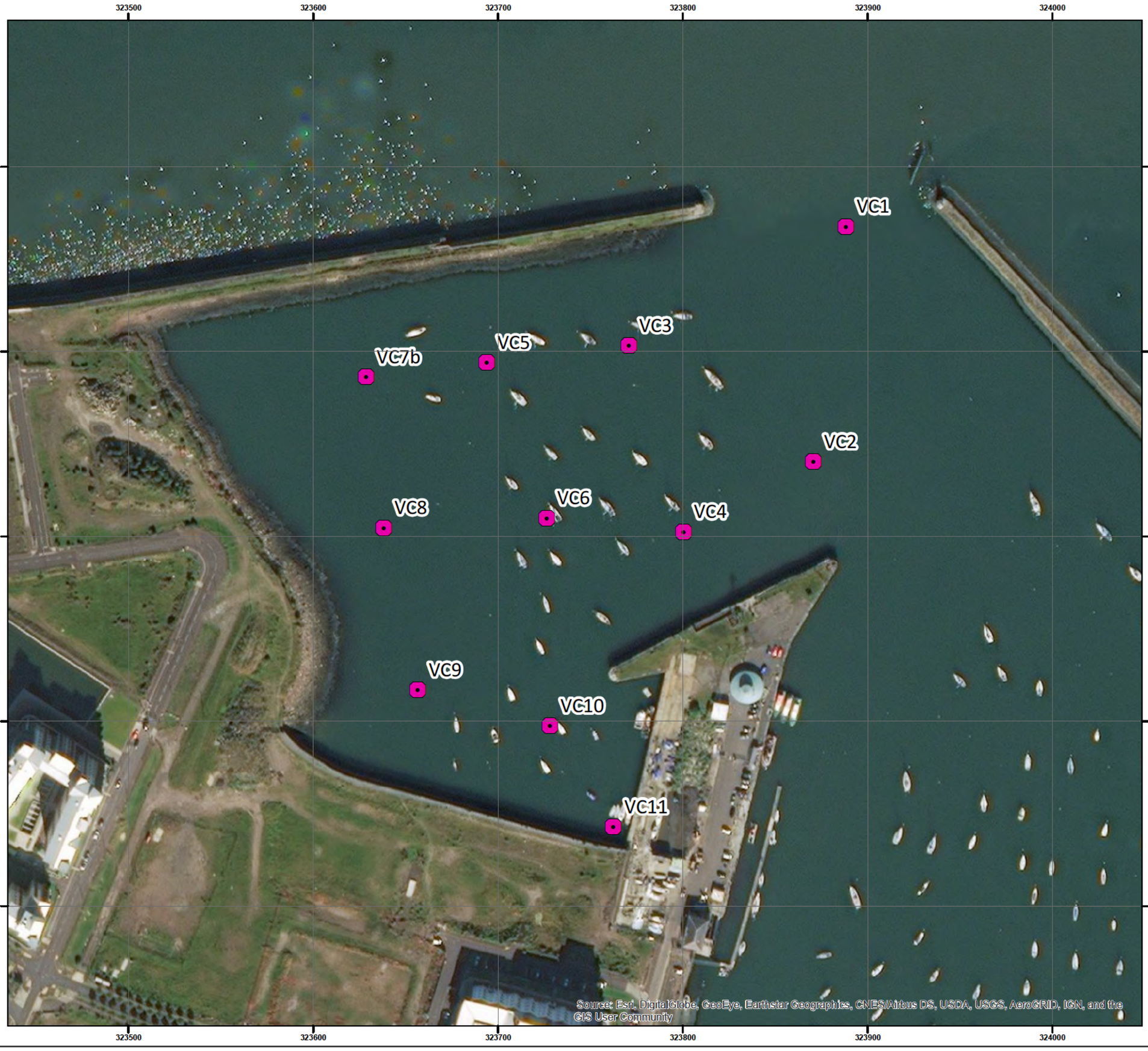
VC06 2.40-2.90	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass
VC07B 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC07B 1.25-1.75	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC07B 2.00-2.55	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC08 0.00-0.50	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC08 1.45-1.95	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC08 2.40-2.90	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass
VC09 0.00-0.50	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC09 1.30-1.80	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC09 0.65-1.15	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC10 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC10 1.25-1.75	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC10 2.00-2.50	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass
VC11 0.00-0.50	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC11 1.50-2.00	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass
VC11 2.50-3.00	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Pass

REFERENCES

Marine Scotland (2017). *Pre-DredgeSampling Guidance Version 1*: Scottish Government.

APPENDICES

A FIGURES



Legend

Locations Sampled

Do not scale this map

Client: Granton Central Developments

Project: Granton Harbour

Title: Locations Sampled

Status: Final

Drawing No.: 769967-001

Revision:

Scale: 1:2,000

A3

Date: 2 November 2017

Drawn	Checked	Approved
SMC	FR	CCAS

ENVIRO Centre
Craighall Business Park, Eagle Street, Glasgow, G4 9XA
Tel: 0141 341 5040
Fax: 0141 341 5045

B SAMPLE LOGS AND PHOTOGRAPHS

Granton Harbour	VC01	
Sample Date/Time:	31/10/2017	10:01
Position:	55.987711,-3.2215627	
Water Depth:	6.6m	
Core Length:	1m	
Remarks:	0.0 – 0.1m	Very fine brown silt
	1.0 – 1.0m	Black – grey silt with sandy bands
	0.85m	*small stick of wood*
	0.9m	*Plant remains*
Samples:	0.0 – 0.5m, 0.5 – 1.0m	
Biota:	None noted	
Notes:	Attempt 1 and 2 washed out; attempt 4 retained 0.77m.	

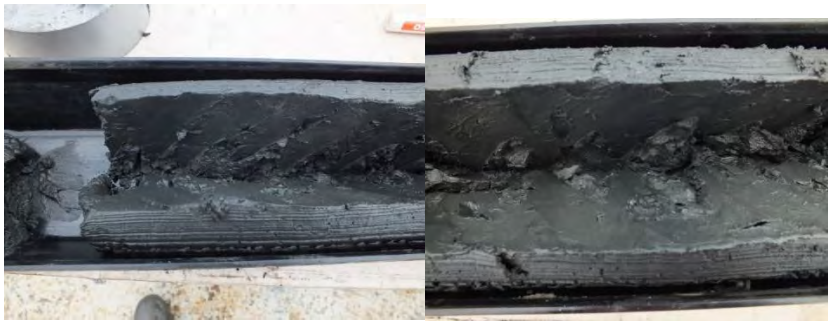
Granton Harbour	VC02	
Sample Date/Time:	31/10/2017	13:20
Position:	55.986567,-3.2218151	
Core Length:	1.3m	
Remarks:	0.0 – 0.1m	Very soft black silt
	0.1 – 1.3m	Soft black silt. Dark brown fine sand band at 0.55m.
Samples:	0-0.65m, 0.65-1.3m	
Biota:	None noted	
Notes:	Attempt 1 - 1.3m at gravel base	

Granton Harbour	VC03	
Sample Date/Time:	31/10/2017	10:25
Position:	55.987117,-3.2234354	
Core Length:	3.0m	
Remarks:	0.0 – 0.5m	Very soft brown silt over black silt.
	1.5 – 2.0m	Soft black silt
	2.5 – 3.0m	Slightly firm to firm black silt
Samples collected:	0 – 0.5m, 1.5 – 2.0m, 2.5 – 3.0m	
Biota:	None noted	
Notes:	-	

Granton Harbour	VC04	
Sample Date/Time:	30/10/2017	14:16
Position:	55.986215,-3.2229260	
Core Length:	2.65m	
Remarks:	0.0 – 0.5m	Soft black silt. Very slight anoxic odour. Very soft at top. Drier with depth.
	1.0 – 1.5m	Soft black silt. Drier than top length.
	2.15 – 2.65m	Black silt. Firmer than previous.
Samples collected:	0 – 0.5m, 1.0 – 1.5m, 2.15 – 2.65m	
Biota:	None noted	
Notes:	-	

0.0 – 0.5m:

1.0 – 1.5m:

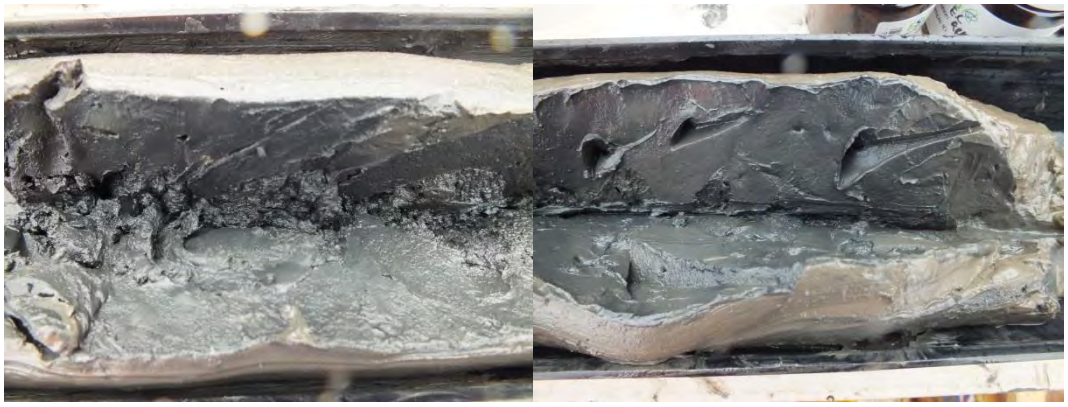


2.15 – 2.65m:

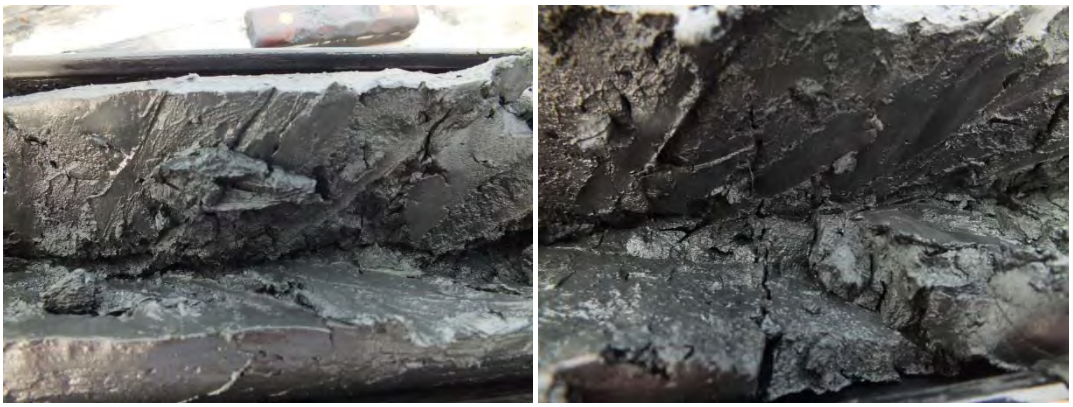
Granton Harbour	VC05	
Sample Date/Time:	31/10/2017	11:00
Position:	55.987015,-3.2246665	
Core Length:	2.0m	
Remarks:	0.0 – 0.5m	Very soft to soft silt. Brown at top over dark brown-grey silt.
	1.0 – 1.5m	Soft to firm black-grey silt.
	1.5 – 2.0m	Soft to firm black silt
Samples collected:	0 – 0.5m, 1.0 – 1.5m, 1.5 – 2.0m	
Biota:	None noted	
Notes:	Attempt 1 – 1.8m; Attempt 2 – 2.0m	

Granton Harbour	VC06	
Sample Date/Time:	30/10/2017	
Position:	55.986266,-3.2241138	
Core Length:	2.9m	
Remarks:	0.0 – 0.5m	Very soft to soft black silt. 0.2m.
	1.2 – 1.7m	Very rare black shell fragments (fine gravel) at top. Soft black silt.
	2.4 – 2.8m	Firm black silt.
	2.8 – 2.9m	Firmer grey-brown slightly sandy silt. Rare black seashell fragments. Black sub-rounded coarse gravel at interface.
Samples collected:	0.0 – 0.5m, 1.2 – 1.7m, 2.4 – 2.9m	
Biota:	None noted	
Notes:	-	

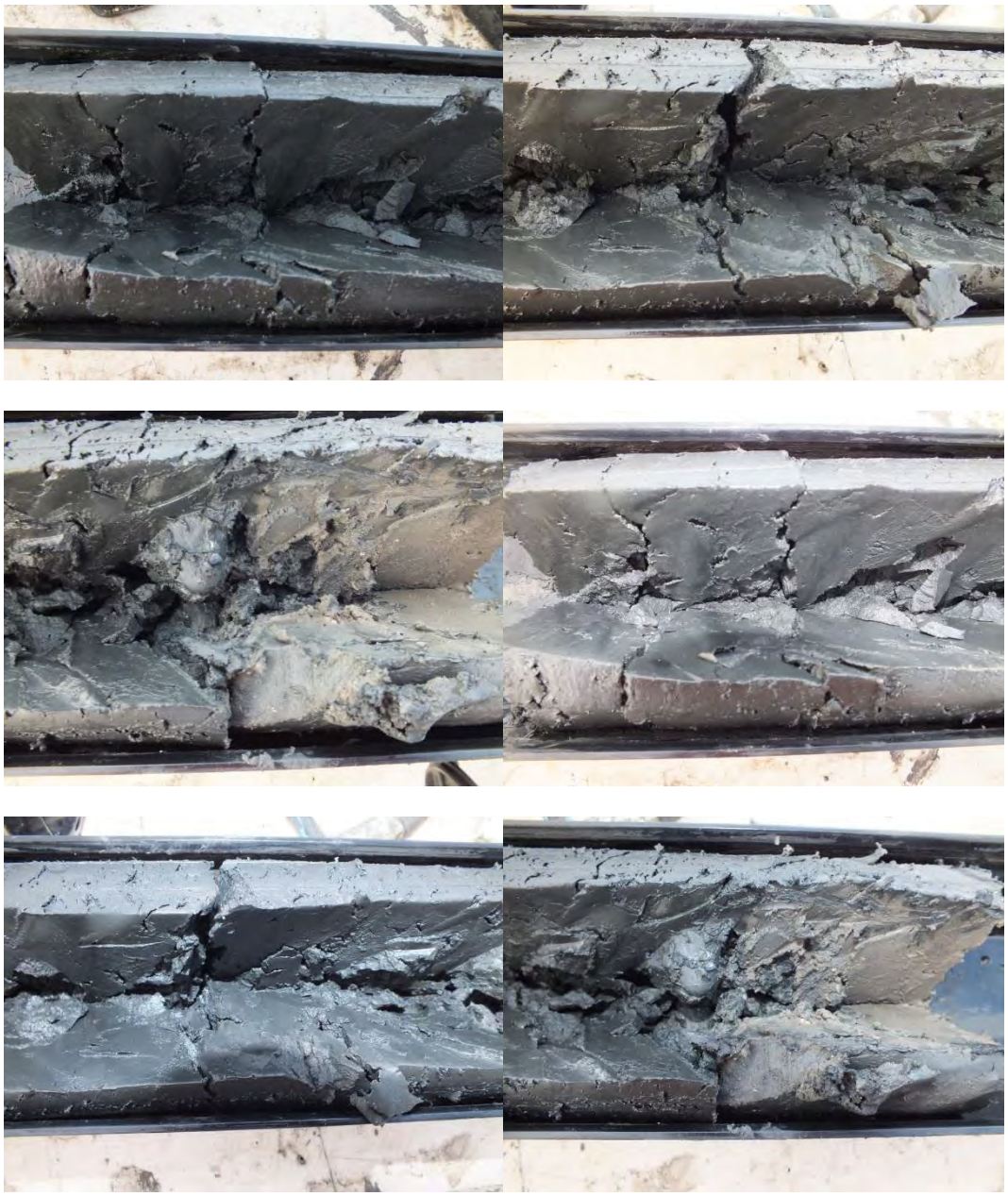
0.0 – 0.5m



1.2 – 1.7m



2.4 – 2.9m



Granton Harbour	VC07B	
Sample Date/Time:	31/10/2017	14:04
Position:	55.986942,-3.2257061	
Core Length:	2.55m	
Remarks:	0.0 – 0.5m	Very soft brown and black silt
	1.20 – 1.75m	Soft to slightly firm black – grey silt
	2.0 – 2.55m	Slightly firm black silt
Samples collected:	0.0 – 0.5m, 1.20 – 1.75m, 2.0 – 2.55m	
Biota:	None noted	
Notes:	-	

Granton Harbour	VC08	
Sample Date/Time:	30/10/2017	12:56
Position:	55.986207,-3.2255385	
Core Length:	2.9m	
Remarks:	0.0 – 0.5m	Soft black silt becoming firmer with depth. H_2S odour
	1.45 – 1.95m	Black silt, firmer with depth.
	2.4 – 2.9m	Black silt, firmer with depth. Dryer than top.
Samples collected:	0 – 0.5m, 1.45 – 1.95m, 2.4 – 2.9m	
Biota:	None noted	
Notes:	Attempt 1 – 1.7m; Attempt 2 – 2.9m.	

0.0 – 0.5m


1.45 – 1.95m

2.4 – 2.9m

Granton Harbour	VC09	
Sample Date/Time:	30/10/2017	11:52
Position:	55.985428,-3.2252094	
Core Length:	1.8m	
Remarks:	0.0 – 0.5m	Soft black silt. Very soft for top 0.1m.
	0.65 – 1.15m	Black-grey silt with fine sand beds. Moderately firm. Few fibres.
	1.15 – 1.8m	Black-grey silt. Becoming drier at base. Moderately firm.
Samples collected:	0.0 – 0.5m, 0.65 – 1.15m. 1.3 – 1.8m	
Biota:	None noted	
Notes:	Slight sulphurous odour.	

0.0 – 0.5m

0.65 – 1.15m

1.3 – 1.8m

Granton Harbour	VC10	
Sample Date/Time:	31/10/2017	12:56
Position:	55.985260,-3.2240660	
Core Length:	2.5m	
Remarks:	0.0 – 0.5m	Very soft – soft black silt. Brown at top.
	1.25 – 1.75m	Soft black silt
	2.0 – 2.5m	Soft black silt. Firmer with depth. Minor gravel.
Samples collected:	0.0 – 0.5m, 1.25 – 1.75m, 2.0 – 2.5m	
Biota:	None noted	
Notes:	-	

Granton Harbour	VC11	
Sample Date/Time:	31/10/2017	12:20
Position:	55.984771,-3.2234896	
Core Length:	3.0m	
Remarks:	0.0 – 0.5m	Very soft - soft silt. Brown at surface, depth uncertain since smeared.
	1.5 – 2.0m	Black-grey soft silt.
	2.5 – 3.0m	Black silt with fine sandy bands. Soft becoming firm with depth. Dry at base. Fine gravel layer at 2.6m.
Samples collected:	0.0 – 0.5m, 1.5 – 2.0m, 2.5 – 3.0m.	
Biota:	None noted	
Notes:	-	


Project number
Site
GRANTON HARBOUR
Sample number
VC11
Sample location
2.5 - 3.0m
Date / Time
31/10/17


Project number
Site
GRANTON HARBOUR
Sample number
VC11
Sample location
2.5 - 3.0m
Date / Time
31/10/17

C SUMMARY TABLE AND ANALYTICAL DATA

Granton Harbour Sediments
November 2017

	Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug Sn/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
ID Number	Sample ID	Copper	Arsenic	Cadmium	Chromium	Lead	Mercury	Nickel	Zinc	Tributyl Tin	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene *	Pyrene	Benzo[a]anthracene	Chrysene	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Benzo[a]pyrene	Perylene *	Indeno[123,cd]pyrene	Dibenzo[a,h]anthracene	Benzo[ghi]perylene *	Total Oil	PCB28*	PCB52*	PCB101*	PCB118*	PCB153*	PCB138*	PCB180*
	RAL1/RAL2	30/300	20/70	0.4/4	50/370	50/400	0.25/1.5	30/150	130/160	100/500	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	100	20/180	20/180	20/180	20/180	20/180	20/180	20/180
S1782106	VC01 0.00-0.50	42.1	15.8	0.45	57.8	79.6	0.88	32.9	141.1	1.29	0.18	0.05	0.13	0.15	0.85	0.32	1.17	1.49	0.67	0.54	0.45	0.32	0.68	0.18	0.31	0.08	0.34	510	5.0	3.2	4.3	3.1	4.8	7.6	4.3
S1782107	VC01 0.50-1.00	51.6	16.7	0.87	57	93.9	1.13	30.9	155.1	2.71	0.20	0.06	0.27	0.29	1.31	0.45	1.88	2.06	1.11	0.94	0.84	0.46	1.01	0.27	0.43	0.11	0.50	330	10.2	8.8	9.9	6.4	11.2	14.0	8.5
S1782108	VC02 0.00-0.65	46.5	15.1	0.52	52.8	83.2	1.04	29.6	141.7	<1	0.22	0.06	0.17	0.19	1.12	0.40	1.66	2.00	1.34	1.08	0.92	0.60	1.28	0.38	0.58	0.14	0.63	474	8.6	5.8	7.7	4.9	9.3	13.2	8.5
S1782109	VC02 0.65-1.30	60.6	17.6	0.99	75.5	107.6	1.42	33.9	172.1	2.32	0.31	0.12	0.26	0.23	1.12	0.50	1.75	2.28	1.01	0.82	0.75	0.47	0.98	0.34	0.48	0.12	0.78	817	11.9	7.6	10.9	8.5	13.0	17.3	9.7
S1782110	VC03 0.00-0.50	40.2	17.4	0.29	56.4	77.9	0.86	31.9	141.3	<1	0.20	0.05	0.06	0.11	0.45	0.19	0.63	0.84	0.40	0.33	0.62	0.29	0.41	0.20	0.23	0.05	0.27	530	5.9	3.4	5.0	3.7	6.0	8.8	5.3
S1782111	VC03 1.50-2.00	55.6	19.5	0.44	72.7	107.2	1.22	38.4	173.7	<1	0.22	0.06	0.09	0.13	0.59	0.26	0.89	1.16	0.52	0.50	0.56	0.25	0.53	0.25	0.28	0.07	0.32	571	9.3	6.5	8.6	6.2	11.1	16.5	10.9
S1782112	VC03 2.50-3.00	60.4	19.4	0.74	80.1	116.3	1.5	36.4	179.8	<1	0.33	0.09	0.15	0.24	0.91	0.49	1.47	1.93	0.88	0.64	0.76	0.41	0.89	0.32	0.48	0.12	0.55	939	8.3	4.2	7.0	5.4	7.1	10.9	5.4
S1782113	VC04 0.00-0.50	40.3	17.9	0.35	54.1	78.5	0.88	31.9	141.5	<1	0.22	0.07	0.10	0.16	0.54	0.22	0.82	1.04	0.48	0.43	0.40	0.27	0.52	0.20	0.29	0.07	0.33	540	5.9	3.6	5.0	3.9	6.1	8.6	5.8
S1782114	VC04 1.00-1.50	58.2	19.4	0.72	68.2	119	1.3	35.7	183.3	<1	0.28	0.08	0.12	0.18	0.65	0.29	0.99	1.33	0.62	0.45	0.69	0.32	0.60	0.29	0.35	0.09	0.38	775	11.0	5.9	9.5	6.2	11.8	16.4	10.7
S1782115	VC04 2.15-2.65	81	18.1	2.83	84.5	162.7	1.88	38.1	223.5	2.03	0.27	0.10	0.14	0.25	0.72	0.39	1.27	1.53	0.71	0.56	0.48	0.33	0.65	0.27	0.37	0.09	0.30	163	22.7	13.7	17.6	10.3	21.8	24.3	17.3
S1782116	VC05 0.00-0.50	47.6	18.7	0.38	59.6	152	0.93	33.8	151.9	<1	0.22	0.07	0.13	0.19	0.73	0.27	1.01	1.24	0.60	0.51	0.53	0.30	0.60	0.22	0.32	0.08	0.37	574	6.8	4.1	5.8	4.1	7.0	8.9	6.5
S1782117	VC05 1.00-1.50	55.1	18.7	0.63	69.3	110.1	1.19	35.4	177.2	1.24	0.25	0.07	0.10	0.17	0.62	0.31	0.75	1.33	0.60	0.46	0.46	0.30	0.67	0.28	0.26	0.07	0.30	659	10.0	6.1	8.9	5.5	10.8	13.7	8.2
S1782118	VC05 1.50-2.00	63.3	19.6	0.75	77	126.3	1.5	37.2	184.7	1.14	0.29	0.06	0.11	0.18	0.72	0.35	1.30	1.46	0.68	0.51	0.74	0.34	0.70	0.31	0.50	0.12	0.58	1074	11.1	7.9	10.0	7.0	11.6	17.4	8.4
S1782119	VC06 0.00-0.50	45.5	17.5	0.42	57.3	96.7	1	32.6	151.2	<1	0.24	0.06	0.09	0.15	0.62	0.27	1.00	1.20	0.59	0.52	0.62	0.29	0.63	0.21	0.44	0.10	0.49	672	8.3	5.7	7.3	5.1	9.0	11.2	8.6
S1782120	VC06 1.20-1.70	59.9	18.2	0.81	72.2	110.4	1.38	34.3	175.9	3.33	0.33	0.07	0.18	0.24	0.85	0.38	1.34	1.62	0.74	0.52	0.70	0.36	0.77	0.34	0.56	0.14	0.65	2854	9.4	6.0	8.6	6.0	10.8	14.4	8.4
S1782121	VC06 2.40-2.90	79.9	18.4	1.69	65.1	176.6	2.02	32.6	230.5	<1	0.54	0.11	0.23	0.40	1.12	0.63	2.10	2.30	1.31	0.97	1.15	0.59	1.30	0.41	0.91	0.22	0.99	1323	12.2	9.3	12.0	7.2	13.2	15.2	10.0
S1782122	VC07B 0.00-0.50	40.3	18.8	0.34	56.7	83	0.88	33.5	146.8	<1	0.20	0.04	0.05	0.10	0.41	0.16	0.61	0.72	0.37	0.28	0.42	0.20	0.39	0.15	0.31	0.07	0.34	544	4.1	2.8	3.4	2.5	4.1	5.6	3.4
S1782123	VC07B 1.25-1.75	48.8	20.2	0.35	71.8	97.2	1.05	37.1	164.4	<1	0.24	0.05	0.07	0.14	0.48	0.20	0.73	0.85	0.44	0.35	0.50	0.23	0.48	0.25	0.40	0.09	0.45	590	7.1	4.3	5.7	3.9	6.9	9.7	5.7
S1782124	VC07B 2.00-2.55	90.6	18.2	1.62	83.6	188.6	2.16	39.2	252.6	1.26	0.26	0.07	0.11	0.20	0.67	0.34	1.12	1.41	0.69	0.58	0.52	0.34	0.74	0.31	0.54	0.13	0.60	836	21.5	15.2	17.4	10.5	21.5	26.7	20.8
S1782646	VC08 0.00-0.50	98.4	18.2	2.41	85.7	185.3	2.41	36.1	256.3	4.34	0.35	0.08	0.15	0.25	0.86	0.48	1.43	1.69	0.84	0.59	0.61	0.37	0.79	0.29	0.58	0.15	0.68	1309	41.8	22.0	25.2	15.3	35.3	41.3	33.1
S1782647	VC08 1.45-1.95	106.9	16.7	2.28	93.8	182.9	2.64	37	253.9	4.69	0.44	0.09	0.17	0.28	1.05	0.56	1.65	1.98	1.01	0.74	0.89	0.44	0.95	0.34	0.70	0.18	0.82	179	27.5	16.2	20.4	12.7	25.2	31.5	24.8
S1782648	VC08 2.40-2.90	86.7	22.6	1.14	67.5	241.1	3.15	35.3	268.2	<1	0.75	0.28	0.39	0.83	2.24	1.49	4.53	5.33	2.91	2.01	1.68	1.13	2.68	0.81	1.76	0.41	1.92	1663	6.5	6.1	7.1	3.5	10.9	11.9	12.7
S1782649	VC09 0.00-0.50	76.3	18.2	1.49	64.4	197.7	2.1	36.1	251.8	11.8	0.34	0.14	0.23	0.34	1.29	0.67	2.52	2.96	1.41	1.01	0.94	0.65	1.50	0.48	1.02	0.25	1.15	1229	32.4	29.7	35.5	24.1	28.1	35.8	24.1
S1782650	VC09 1.30-1.80	90.4	19.5	1.97	80.2	206.1	2.3	40.1	255.8	3.31	0.43	0.15	0.28	0.47	1.56	0.79	2.79	3.08	1.65	1.09	1.36	0.72	1.65	0.57	1.12	0.27	1.24	2510	39.0	32.2	32.7	22.2	20.8	32.4	11.7
S1782125	VC09 0.65-1.15	98.9	20.5	2	85.2	255.1	2.39	45.1	317	3.69	0.45	0.11	0.20	0.34	1.24	0.65	2.17	2.49	1.26	0.96	1.19	0.56	1.22	0.50	0.94	0.24	1.08	1634	24.8	19.5	24.7	16.0	22.0	26.8	16.0
S1782126	VC10 0.00-0.50	43.7	19.3	0.34	62	92	1.01	34.9	153.4	<1	0.20	0.04	0.06	0.11	0.39	0.16	0.57	0.67	0.33	0.24	0.31	0.17	0.35	0.15	0.29	0.06	0.32	508	5.1	3.5	4.1	3.0	4.7	6.7	3.9
S1782127	VC10 1.25-1.75	48.7	19.7	0.43	59.8	102.9	0.98	34.4	158.2	<1	0.24	0.05	0.08	0.14	0.62	0.24	0.95	1.05	0.54	0.43	0.45	0.27	0.57	0.23	0.45	0.11	0.50	598	7.1	4.8	6.0	3.8	6.6	9.4	5.8
S1782128	VC10 2.00-2.50	65.2	19.2	0.78	76.8	168	1.58	39.4	199.9	<1	0.27	0.06	0.11	0.19	0.69	0.32	1.23	1.36	0.69	0.52	0.70	0.33	0.73	0.31	0.55	0.13	0.60	796	11.9	11.0	12.8	7.4	19.2	21.3	14.9
S1782129	VC11 0.00-0.50	45.1	19	0.28	63.6	92.8	0.97	35.7	154.4	<1	0.22	0.04	0.06	0.11	0.42	0.17	0.65	0.76	0.40	0.30	0.38	0.22	0.45	0.19	0.39	0.09	0.44	658	5.5	3.4	5.0	3.8	5.7	7.5	5.3
S1782130	VC11 1.50-2.00	46.7	19.4	0.32	66.8	113.8	1.08	37	164.7	<1	0.24	0.05	0.07	0.13	0.54	0.23	0.89	1.03	0.54	0.41	0.57	0.28	0.60	0.30	0.49	0.11	0.55	720	7.7	4.9	6.0	4.7	7.2	10.7	5.6
S1782131	VC11 2.50-3.00	82.8	16.3	0.97	62.7	208.8	1.67	39.6	251.6	<1	0.39	0.11	0.34	0.43	1.99	0.87	3.60	3.70	2.06	1.57	1.47	0.97	2.22	0.67	1.53	0.36	1.56	1927	33.0	40.9	53.3	30.6	55.0	66.2	47.9

Our Ref: EFS/180403 (Ver. 1)
Your Ref:

December 1, 2017

Environmental Chemistry
SOCOTEC UK Limited
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

[Redacted]
EnviroCentre
Envirocentre
Craighall Business Park
Eagle St
Glasgow
G4 9XA

For the attention of [Redacted]

Dear [Redacted]

Sample Analysis - Granton Harbour 769967j

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

The samples will be kept until the agreed date when they will be discarded. Please call 01283 554467 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with SOCOTEC UK Limited (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for SOCOTEC UK Limited
[Redacted]

Project Co-ordinator
01283 554467

TEST REPORT

UKAS TESTING
1252

Report No. EFS/180403 (Ver. 1)

EnviroCentre
Envirocentre
Craighall Business Park
Eagle St
Glasgow
G4 9XA

Site: Granton Harbour 769967j

The 37 samples described in this report were registered for analysis by SOCOTEC UK Limited on 07-Nov-2017. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 01-Dec-2017

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

On behalf of SOCOTEC UK Lim [Redacted]
[Redacted] Operations Director
Energy & Waste Services

Date of Issue: 01-Dec-2017

Tests marked '^' have been subcontracted to another laboratory.
Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	ug Sn/kg	µg/kg	%	µg/kg	
		Method Codes :	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PAHSED	OGSNSED	PCBMS3Q	Sub061	TPHSED	
		Method Reporting Limits :	0.5	0.5	0.04	0.5	0.5	0.5	0.5	0.015	0.5	2	1	1	0.08		10	
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Copper (MS) Sediment**	**Arsenic (MS) Sediments**	**Cadmium (MS) Sediments**	**Chromium (MS) Sediments**	**Cobalt (MS) Sediments**	**Lead (MS) Sediments**	**Manganese (MS) Sediments**	**Mercury (MS) Sediments**	**Nickel (MS) Sediments**	**Zinc (MS) Sediments**	**PAH by MS Dti**	**Tributyl Tin (Sediments)**	**PCB- 7 Congeners (Marine Sediments)**	**^Particle Size Analysis (Sediment)**	**TPH GCFID (Si)+Sats**	
1782106	VC01 0.00-0.50	31-Oct-17	42.1	15.8	0.45	57.8	11.5	79.6	429.7	0.88	32.9	141.1	Req	1.29	Req	Req	Req	
1782107	VC01 0.50-1.00	31-Oct-17	51.6	16.7	0.87	57	10.7	93.9	400	1.13	30.9	155.1	Req	2.71	Req	Req	Req	
1782108	VC02 0.00-0.65	31-Oct-17	46.5	15.1	0.52	52.8	10.6	83.2	404.7	1.04	29.6	141.7	Req	<1	Req	Req	Req	
1782109	VC02 0.65-1.30	31-Oct-17	60.6	17.6	0.99	75.5	11.9	107.6	468.6	1.42	33.9	172.1	Req	2.32	Req	Req	Req	
1782110	VC03 0.00-0.50	31-Oct-17	40.2	17.4	0.29	56.4	11.8	77.9	590.4	0.86	31.9	141.3	Req	<1	Req	Req	Req	
1782111	VC03 1.50-2.00	31-Oct-17	55.6	19.5	0.44	72.7	13.3	107.2	587.2	1.22	38.4	173.7	Req	<1	Req	Req	Req	
1782112	VC03 2.50-3.00	31-Oct-17	60.4	19.4	0.74	80.1	12.9	116.3	715.4	1.5	36.4	179.8	Req	<1	Req	Req	Req	
1782113	VC04 0.00-0.50	31-Oct-17	40.3	17.9	0.35	54.1	11.6	78.5	603.1	0.88	31.9	141.5	Req	<1	Req	Req	Req	
1782114	VC04 1.00-1.50	31-Oct-17	58.2	19.4	0.72	68.2	12.4	119	559.1	1.3	35.7	183.3	Req	<1	Req	Req	Req	
1782115	VC04 2.15-2.65	31-Oct-17	81	18.1	2.83	84.5	12.5	162.7	463.6	1.88	38.1	223.5	Req	2.03	Req	Req	Req	
1782116	VC05 0.00-0.50	31-Oct-17	47.6	18.7	0.38	59.6	12.1	152	564.3	0.93	33.8	151.9	Req	<1	Req	Req	Req	
1782117	VC05 1.00-1.50	31-Oct-17	55.1	18.7	0.63	69.3	12.3	110.1	561.4	1.19	35.4	177.2	Req	1.24	Req	Req	Req	
1782118	VC05 1.50-2.00	31-Oct-17	63.3	19.6	0.75	77	12.9	126.3	604	1.5	37.2	184.7	Req	1.14	Req	Req	Req	
1782119	VC06 0.00-0.50	30-Oct-17	45.5	17.5	0.42	57.3	11.5	96.7	517.1	1	32.6	151.2	Req	<1	Req	Req	Req	
1782120	VC06 1.20-1.70	30-Oct-17	59.9	18.2	0.81	72.2	12.2	110.4	539.5	1.38	34.3	175.9	Req	3.33	Req	Req	Req	
1782121	VC06 2.40-2.90	30-Oct-17	79.9	18.4	1.69	65.1	10.8	176.6	330.3	2.02	32.6	230.5	Req	<1	Req	Req	Req	
1782122	VC07B 0.00-0.50	31-Oct-17	40.3	18.8	0.34	56.7	12	83	668	0.88	33.5	146.8	Req	<1	Req	Req	Req	
1782123	VC07B 1.25-1.75	31-Oct-17	48.8	20.2	0.35	71.8	13.3	97.2	685.4	1.05	37.1	164.4	Req	<1	Req	Req	Req	
1782124	VC07B 2.00-2.55	31-Oct-17	90.6	18.2	1.62	83.6	13	188.6	374.3	2.16	39.2	252.6	Req	1.26	Req	Req	Req	
1782125	VC09 0.65-1.15	30-Oct-17	98.9	20.5	2	85.2	15.3	255.1	505.7	2.39	45.1	317	Req	3.69	Req	Req	Req	

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Client Name EnviroCentre

Contact [Redacted]

Granton Harbour 769967j

Sample Analysis

Date Printed	**23-Nov-2017**
Report Number	**EFS/180284**
Table Number	**1**

Where individual results are flagged see report notes for status.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	ug Sn/kg	µg/kg	%	µg/kg	
Method Codes :			ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PAHSED	OGSNSED	PCBMS3Q	Sub061	TPHSED	
Method Reporting Limits :			0.5	0.5	0.04	0.5	0.5	0.5	0.5	0.015	0.5	2	1	1	0.08		10	
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Copper (MS) Sediment**	**Arsenic (MS) Sediments**	**Cadmium (MS) Sediments**	**Chromium (MS) Sediments**	**Cobalt (MS) Sediments**	**Lead (MS) Sediments**	**Manganese (MS) Sediments**	**Mercury (MS) Sediments**	**Nickel (MS) Sediments**	**Zinc (MS) Sediments**	**PAH by MS Dti**	**Tributyl Tin (Sediments)**	**PCB- 7 Congeners (Marine Sediments)**	**^Particle Size Analysis (Sediment)**	**TPH GCFID (Si)+Sats**	
1782126	VC10 0.00-0.50	31-Oct-17	43.7	19.3	0.34	62	12.5	92	642.4	1.01	34.9	153.4	Req	<1	Req	Req	Req	
1782127	VC10 1.25-1.75	31-Oct-17	48.7	19.7	0.43	59.8	12.4	102.9	633.3	0.98	34.4	158.2	Req	<1	Req	Req	Req	
1782128	VC10 2.00-2.50	31-Oct-17	65.2	19.2	0.78	76.8	13.7	168	602	1.58	39.4	199.9	Req	<1	Req	Req	Req	
1782129	VC11 0.00-0.50	31-Oct-17	45.1	19	0.28	63.6	12.8	92.8	665.3	0.97	35.7	154.4	Req	<1	Req	Req	Req	
1782130	VC11 1.50-2.00	31-Oct-17	46.7	19.4	0.32	66.8	13.4	113.8	734.7	1.08	37	164.7	Req	<1	Req	Req	Req	
1782131	VC11 2.50-3.00	31-Oct-17	82.8	16.3	0.97	62.7	13.6	208.8	495.3	1.67	39.6	251.6	Req	<1	Req	Req	Req	
1782132	CRM	31-Oct-17											Req §		Req			
1782133	QC Blank	31-Oct-17	<0.5 §	<0.5 §	<0.04 §	<0.5 §	<0.5 §	<0.5 §	<0.5 §	<0.015 §	<0.5 §	<2 §	Req §	<1	Req		Req	
1782134	Reference Material (% Recovery)	31-Oct-17	103 §	100 §	91 §	103 §	100 §	95 §	99 §	94 §	101 §	102 §	Req §	84	Req		Req	
1782646	VC08 0.00-0.50	31-Oct-17	98.4	18.2	2.41	85.7	11.8	185.3	334.9	2.41	36.1	256.3	Req	4.34	Req	Req	Req	
1782647	VC08 1.45-1.95	31-Oct-17	106.9	16.7	2.28	93.8	12.1	182.9	317.6	2.64	37	253.9	Req	4.69	Req	Req	Req	
1782648	VC08 2.40-2.90	31-Oct-17	86.7	22.6	1.14	67.5	11.9	241.1	300.8	3.15	35.3	268.2	Req	<1	Req	Req	Req	
1782649	VC09 0.00-0.50	31-Oct-17	76.3	18.2	1.49	64.4	12.5	197.7	435.7	2.1	36.1	251.8	Req	11.8	Req	Req	Req	
1782650	VC09 1.30-1.80	30-Oct-17	90.4	19.5	1.97	80.2	13.5	206.1	402.7	2.3	40.1	255.8	Req	3.31	Req	Req	Req	
1782651	CRM	30-Oct-17											Req §		Req			
1782652	QC Blank	30-Oct-17	<0.5 §	<0.5 §	<0.04 §	<0.5 §	<0.5 §	<0.5 §	<0.5 §	<0.015 §	<0.5 §	<2 §	Req §	<1	Req		Req	
1782653	Reference Material (% Recovery)	31-Oct-17	104 §	93 §	96 §	99 §	95 §	103 §	96 §	104 §	96 §	100 §	Req §	95	Req		Req	
		31-Oct-17																
		31-Oct-17																
		30-Oct-17																

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Client Name EnviroCentre

Contact [Redacted]

Granton Harbour 769967j

Sample Analysis

Date Printed	**23-Nov-2017**
Report Number	**EFS/180284**
Table Number	**1**

Polychlorinated Biphenyls (congeners)

Customer and Site Details: EnviroCentre: Granton Harbour 769967j
Job Number: S18_0284
QC Batch Number: 170012
Directory: 151117PCB.TQ1
Method: Ultrasonic

Matrix: Soil
Date Booked in: 02-Nov-17
Date Extracted: 15-Nov-17
Date Analysed: 17-Nov-17

Compounds marked * are not UKAS or MCerts accredited

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28***	**PCB52***	**PCB101***	**PCB118***	**PCB153***	**PCB138***	**PCB180***
CL1782106	VC01 0.00-0.50	5.0	3.2	4.3	3.1	4.8	7.6	4.3
CL1782107	VC01 0.50-1.00	10.2	8.8	9.9	6.4	11.2	14.0	8.5
CL1782108	VC02 0.00-0.65	8.6	5.8	7.7	4.9	9.3	13.2	8.5
CL1782109	VC02 0.65-1.30	11.9	7.6	10.9	8.5	13.0	17.3	9.7
CL1782110	VC03 0.00-0.50	5.9	3.4	5.0	3.7	6.0	8.8	5.3
CL1782111	VC03 1.50-2.00	9.3	6.5	8.6	6.2	11.1	16.5	10.9
CL1782112	VC03 2.50-3.00	8.3	4.2	7.0	5.4	7.1	10.9	5.4
CL1782113	VC04 0.00-0.50	5.9	3.6	5.0	3.9	6.1	8.6	5.8
CL1782114	VC04 1.00-1.50	11.0	5.9	9.5	6.2	11.8	16.4	10.7
CL1782115	VC04 2.15-2.65	22.7	13.7	17.6	10.3	21.8	24.3	17.3
CL1782116	VC05 0.00-0.50	6.8	4.1	5.8	4.1	7.0	8.9	6.5
CL1782117	VC05 1.00-1.50	10.0	6.1	8.9	5.5	10.8	13.7	8.2
CL1782118	VC05 1.50-2.00	11.1	7.9	10.0	7.0	11.6	17.4	8.4
CL1782119	VC06 0.00-0.50	8.3	5.7	7.3	5.1	9.0	11.2	8.6
CL1782120	VC06 1.20-1.70	9.4	6.0	8.6	6.0	10.8	14.4	8.4
CL1782121	VC06 2.40-2.90	12.2	9.3	12.0	7.2	13.2	15.2	10.0
CL1782122	VC07B 0.00-0.50	4.1	2.8	3.4	2.5	4.1	5.6	3.4
CL1782123	VC07B 1.25-1.75	7.1	4.3	5.7	3.9	6.9	9.7	5.7
CL1782124	VC07B 2.00-2.55	21.5	15.2	17.4	10.5	21.5	26.7	20.8
CL1782132	CRM	2.9	4.9	5.1	2.8	4.4	4.7	3.1
CL1782133	QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CL1782134	Reference Material (% Recovery)	96	101	100	94	95	98	99

Where individual results are flagged see report notes for status.

Polychlorinated Biphenyls (congeners)

Customer and Site Details:	EnviroCentre: Granton Harbour 769967j	**Matrix:**	Soil
Job Number:	S18_0284	**Date Booked in:**	02-Nov-17
QC Batch Number:	170013	**Date Extracted:**	15-Nov-17
Directory:	151117PCB.TQ1	**Date Analysed:**	17-Nov-17
Method:	Ultrasonic		

Compounds marked * are not UKAS or MCerts accredited

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28***	**PCB52***	**PCB101***	**PCB118***	**PCB153***	**PCB138***	**PCB180***
CL1782125	VC09 0.65-1.15	39.0	32.2	32.7	22.2	20.8	32.4	11.7
CL1782126	VC10 0.00-0.50	5.1	3.5	4.1	3.0	4.7	6.7	3.9
CL1782127	VC10 1.25-1.75	7.1	4.8	6.0	3.8	6.6	9.4	5.8
CL1782128	VC10 2.00-2.50	11.9	11.0	12.8	7.4	19.2	21.3	14.9
CL1782129	VC11 0.00-0.50	5.5	3.4	5.0	3.8	5.7	7.5	5.3
CL1782130	VC11 1.50-2.00	7.7	4.9	6.0	4.7	7.2	10.7	5.6
CL1782131	VC11 2.50-3.00	33.0	40.9	53.3	30.6	55.0	66.2	47.9
CL1782132	CRM	3.1	4.6	5.0	2.4	4.0	4.5	2.7
CL1782133	QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CL1782134	Reference Material (% Recovery)	101	104	105	98	107	108	108

Where individual results are flagged see report notes for status.

Polychlorinated Biphenyls (congeners)

Customer and Site Details:	EnviroCentre: Granton Harbour 769967j	**Matrix:**	Soil
Job Number:	S18_0403	**Date Booked in:**	07-Nov-17
QC Batch Number:	170013	**Date Extracted:**	15-Nov-17
Directory:	151117PCB.TQ1	**Date Analysed:**	17-Nov-17
Method:	Ultrasonic		

Compounds marked * are not UKAS or MCerts accredited

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28***	**PCB52***	**PCB101***	**PCB118***	**PCB153***	**PCB138***	**PCB180***
CL1782646	VC08 0.00-0.50	41.8	22.0	25.2	15.3	35.3	41.3	33.1
CL1782647	VC08 1.45-1.95	27.5	16.2	20.4	12.7	25.2	31.5	24.8
CL1782648	VC08 2.40-2.90	6.5	6.1	7.1	3.5	10.9	11.9	12.7
CL1782649	VC09 0.00-0.50	32.4	29.7	35.5	24.1	28.1	35.8	24.1
CL1782650	VC09 1.30-1.80	24.8	19.5	24.7	16.0	22.0	26.8	16.0
CL1782651	CRM	3.1	4.6	5.0	2.4	4.0	4.5	2.7
CL1782652	QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CL1782653	Reference Material (% Recovery)	101	104	105	98	107	108	108

Where individual results are flagged see report notes for status.

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

		Sample ID :	CL1782133a	CL1782134a	CL1782106	CL1782107	CL1782108	CL1782109	CL1782110	CL1782111	CL1782112	CL1782113	CL1782114	CL1782115	CL1782116	CL1782117
		Station :	QC Bl nk	ce Material (% R	VC01 0.00-0 50	VC01 0.50-1.00	VC02 0.00-0.65	VC02 0.65-1.30	VC03 0.00-0.50	VC03 1.50-2.00	VC03 2.50-3.00	VC04 0.00-0.50	VC04 1.00-1.50	VC04 2.15-2 65	VC05 0.00-0.50	VC05 1 00-1 50
PAH Fraction	***# PAH***	***Mass***														
Naphthalene	1	128	<1	94.8	183.3	203 6	218.3	312 0	201.6	224 2	332.7	219.3	283.8	267.4	217.8	252.1
C1 Naphthalenes *	2	142	<1	95.5	513.1	749 0	646.4	818 6	568.0	629.4	832.8	816.8	883.1	976.6	668.1	679.9
C2 Naphthalenes *		156	<1	N D	609.0	941 6	756.4	1107.1	621.1	677 9	923.5	868.5	978.6	1066.2	774.2	744.8
C3 Naphthalenes *		170	<1	N D	636.3	1120.1	883.5	1258.2	700.3	121 2	1102 5	894.3	987.3	1185.9	980.3	827.6
C4 Naphthalenes *		184	<1	N D	547.7	723.1	558.3	681.7	409.2	438.1	766.8	548.9	588.1	708.2	619.7	533.5
Sum Naphthalenes *			0	95	2489	3737	3063	4178	2500	2091	3958	3348	3721	4204	3260	3038
Phenanthrene / Anthracene	2	178	0.0	94.5	1162 9	1751.8	1516.7	1613.6	639.1	847 5	1402 8	755.6	936.8	1117.2	1003.0	929.6
C1 178 *		192	<1	N D	796.8	1109.9	1073 6	1246.7	615.3	740 3	1277 3	686.9	860.6	966.0	881.6	843.4
C2 178 *		206	<1	N D	645.4	839 6	898.0	1050.2	561.1	638 9	1181.1	642.6	753.6	782.3	702.7	751.2
C3 178 *		220	<1	N D	586.3	730 6	578.8	1022.1	605.2	397.4	868.7	369.6	581.9	715.5	690.9	643.7
Sum 178 *			0	94	3191.4	4432.0	4067.1	4932.6	2420.7	2624.1	4729 8	2454.7	3132 9	3581.1	3278.2	3167.9
Dibenzothiophene *		184	<1	95	65 8	86.1	73 9	95.2	42 8	55.8	115.0	50.1	61.4	76.8	58.7	73.3
C1 Dibenzothiophenes *		198	<1	N D	110.2	150 5	142.5	213 2	107.8	121.4	288.1	115.3	138.3	179.4	132.1	178.1
C2 Dibenzothiophenes *		212	<1	N D	172.2	211.1	246.6	386 9	185.2	218 0	670.5	205.7	299.7	331.5	212.5	335.1
C3 Dibenzothiophenes *		226	<1	N D	89 8	92.2	131.4	188.1	139.5	111 2	560.4	121.5	186.9	204.7	107.7	261.9
Sum Dibenzothiophenes *			0	95	437.9	539 9	594.4	883 3	475.4	506 3	1634 2	492.6	686.4	792.3	510.9	848.5
Fluoranthene * / pyrene	2	202	0	90	2667 3	3941.1	3660 8	4032.9	1467 3	2050.7	3399 0	1853.4	2321 5	2806.0	2254.3	2083.3
C1 202 *		216	<1	N D	1110 2	1764.5	1556.4	1764.2	795.8	939 8	1673.1	916.7	1092 8	1159.0	1117.3	1158.8
C2 202 *		230	<1	N D	790.9	1272.0	875.0	1692.3	659.4	553 5	1062 3	742.8	889.1	874.8	869.7	871.7
C3 202 *		244	<1	N D	493.3	669 9	821.7	641 5	362.4	511.7	913.0	383.4	480.8	614.1	463.6	502.8
Sum 202 *			0	90	5061.7	7647.6	6913 9	8130.9	3284 9	4055.7	7047.4	3896.4	4784.1	5453.9	4705.0	4616.7
Benzoanthracene / Chrysene	2	228	0	84	1206 8	2050.7	2412 6	1833.0	724.5	1019.1	1525 9	913.2	1066 8	1274.6	1105.1	1065.5
C1 228 *		242	<1	N D	698.1	1060.4	1279 5	1010.3	518.0	622.1	1080 8	623.7	703.8	767.2	730.7	769.8
C2 228 *		256	<1	N D	582.5	742 3	707.9	608.7	458.3	374 2	677.3	439.4	471.7	518.4	513.2	645.5
Sum 228 *			0	84	2487.4	3853.5	4400 0	3451.9	1700 8	2015.5	3284 0	1976.2	2242.4	2560.1	2348.9	2480.8
Benzofluoranthenes / benzopyrenes	4	252	0	87	1972.7	3080.7	3834 5	3010.4	1711.1	1816.9	2844 3	1635.6	2148 3	2026.4	1946.1	2003.7
C1 252 *		266	<1	N D	825.7	1203.8	1602.1	1294.5	648.9	723.7	1314 3	758.0	871.4	693.6	873.3	730.5
C2 252 *		280	<1	N D	485.2	676 9	832.4	779 3	353.7	358 2	861.7	395.1	545.2	487.1	462.8	429.3
Sum 252 *			0	87	3283 6	4961.4	6269.1	5084.2	2713.7	2898.8	5020 3	2788.6	3564 9	3207.2	3282.2	3163.5
Dibenzoanthracene / Indenopyrene / Benzoperylene *	3	276	0	57	730.1	1038.1	1356 5	1386.6	561.4	662 9	1155 9	687.4	819.1	753.0	773.9	623.6
C1 276 *		290	<1	N D	155.3	266 2	303.3	255 8	141.8	201.7	391.1	180.3	300.1	213.5	162.3	169.2
C2 276 *		304	<1	N D	67.1	100.7	88 2	93.2	51 6	82.2	79 3	70.7	77.7	55.8	56 3	56.1
Sum 276 *			0	57	952.5	1405.1	1747 9	1735.7	754.8	946 8	1626 3	938.5	1196 9	1022.2	992.4	848.9
Sum of all fractions *			0	86	17904.0	26576.7	27055.4	28396.3	13850.4	15137.8	27300.3	15894.8	19328.5	20821.1	18377 8	18164.2
Sum of NPD fraction *			0	95	6118 8	8709.1	7724 5	9993.6	5396 3	5221.0	10322.3	6295.1	7540 2	8577.6	7049.3	7054.3
NPD / 4-6 ring PAH ratio *			#DIV/0!	0.30	0.52	0.49	0.40	0.54	0.64	0.53	0 61	0.66	0 64	0.70	0 62	0.63

N D = Not Determined as these compounds are not in the reference material spike.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

* Denotes not UKAS accredited

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

EPA 16 PAHs Compounds marked with a * are reported not UKAS.

	Sample ID :	CL1782133a	CL1782134a	CL1782106	CL1782107	CL1782108	CL1782109	CL1782110	CL1782111	CL1782112	CL1782113	CL1782114	CL1782115	CL1782116	CL1782117
	Station :	QC Bl nk	:e Material (% R	VC01 0 00-0.50	VC01 0 50-1.00	VC02 0 00-0.65	VC02 0 65-1.30	VC03 0 00-0.50	VC03 1 50-2.00	/C03 2.50-3.0	/C04 0 00-0.5	/C04 1 00-1.5	/C04 2.15-2 6	/C05 0.00-0.5	/C05 1.00-1.5
PAH	***Mass***														
Naphthalene	128	<1	94.8	183.3	203.6	218.3	312.0	201.6	224.2	332.7	219.3	283.8	267.4	217.8	252.1
Acenaphthylene	152	<1	97.0	45.4	62.6	55.8	119.4	50.8	57.0	85.6	71.7	79.8	96.7	70.9	72.3
Acenaphthene	154	<1	99.0	131.2	268.2	168.7	261.7	64.4	85.0	154.5	102.9	121.9	141.6	128.4	104.3
Fluorene	166	<1	99.3	154.1	285.9	191.5	231.9	113.0	134.3	240.0	162.7	177.6	252.4	187.1	169.6
Phenanthrene	178	<1	98.1	845.3	1305.3	1117.5	1118.2	451.2	587.0	910.6	537.6	646.4	723.3	729.0	624.3
Dibenzothiophene *	184	<1	94.7	65.8	86.1	73.9	95.2	42.8	55.8	115.0	50.1	61.4	76.8	58.7	73.3
Anthracene	178	<1	90.8	317.6	446.5	399.3	495.4	188.0	260.5	492.1	218.0	290.4	393.9	274.0	305.4
Fluoranthene *	202	<1	83.7	1172.6	1882.5	1660.2	1749.6	628.9	894.1	1467.9	817.9	994.4	1274.4	1010.3	752.2
Pyrene	202	<1	96.0	1494.7	2058.6	2000.6	2283.3	838.4	1156.5	1931.1	1035.5	1327.1	1531.6	1244.1	1331.1
Benzo[a]anthracene	228	<1	82.0	668.3	1111.6	1336.5	1010.1	399.0	521.4	883.3	483.6	618.8	713.1	596.6	600.5
Chrysene	228	<1	86.9	538.5	939.1	1076.1	822.9	325.5	497.7	642.6	429.6	448.0	561.5	508.5	465.0
Benzo[b]fluoranthene	252	<1	94.2	450.6	841.4	918.9	747.9	617.3	560.5	755.8	402.9	691.9	481.1	529.9	462.1
Benzo[k]fluoranthene	252	<1	89.3	315.6	458.8	601.6	466.2	293.3	254.6	410.9	267.2	319.7	327.7	298.4	298.2
Benzo[e]pyrene	252	<1	83.3	530.3	771.9	1030.5	818.4	391.0	468.4	786.4	446.8	534.6	568.8	518.0	574.1
Benzo[a]pyrene	252	<1	80.0	676.2	1008.6	1283.6	977.9	409.5	533.5	891.2	518.6	602.2	648.8	599.8	669.3
Perylene *	252	<1	<1	180.6	268.1	376.3	336.2	195.3	251.3	322.4	195.3	289.1	273.3	222.9	277.6
Indeno[123,cd]pyrene	276	<1	57.1	308.2	428.3	582.0	482.5	234.4	277.3	481.2	291.4	351.2	365.3	324.0	261.2
Dibenzo[a,h]anthracene	278	<1	53.4	81.6	108.8	139.8	123.1	53.8	69.8	122.0	69.4	86.6	90.1	78.9	67.4
Benzo[ghi]perylene *	276	<1	61.8	340.2	501.0	634.8	780.9	273.2	315.8	552.7	326.7	381.4	297.5	371.0	295.1

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

		Sample ID :	CL1782133b	CL1782134b	CL1782118	CL1782119	CL1782120	CL1782121	CL1782122	CL1782123	CL1782124	CL1782125	CL1782126	CL1782127	CL1782128	CL1782129	CL1782130	CL1782131	CL1782132
		Station :	QC Bl nk	ce Material (% R	VC05 1.50-2.00	VC06 0.00-0.50	VC06 1.20-1.70	VC06 2.40-2.90	VC07B 0.00-0.50	VC07B 1.25-1.75	VC07B 2.00-2.55	VC09 0.65-1.15	VC10 0.00-0.50	VC10 1.25-1.75	VC10 2.00-2.50	VC11 0.00-0.50	VC11 1.50-2.00	VC11 2.50-3.00	CRM 1941b
PAH Fraction	***# PAH***	***Mass***																	
Naphthalene	1	128	<1	94.9	292.2	237.1	327.1	539.6	199.9	241.5	264.7	431.9	195.1	239.9	270.9	220.2	241.0	393.5	463.8
C1 Naphthalenes *	2	142	<1	96.4	813.7	669.6	923.5	1189.5	553.7	726.6	705.8	1040.3	582.0	684.4	754.2	667.1	590.1	779.5	309.3
C2 Naphthalenes *		156	<1	N.D	911.4	726.4	1070.7	1295.1	608.7	774.3	792.1	1246.4	630.2	660.5	784.7	704.8	643.8	984.5	210.9
C3 Naphthalenes *		170	<1	N.D	967.2	807.5	1400.3	1417.3	694.6	850.4	901.1	1639.6	684.0	767.2	900.8	750.3	690.6	1130.5	168.7
C4 Naphthalenes *		184	<1	N.D	632.9	501.9	670.3	984.5	399.0	523.2	416.6	1184.9	405.6	434.2	574.9	445.8	462.2	747.5	122.3
Sum Naphthalenes *			0	96	3617	2942	4392	5426	2456	3116	3080	5543	2497	2786	3286	2788	2628	4036	1275
Phenanthrene * / Anthracene	2	178	0.0	92.9	1071.5	883.6	1225.5	1747.6	563.3	684.1	1013.3	2353.8	550.5	866.1	1011.3	587.8	769.1	2857.4	423.4
C1 178 *		192	<1	N.D	896.9	780.8	1094.5	1464.5	544.7	654.4	863.3	1902.5	507.4	738.0	798.2	597.6	711.1	1824.2	231.7
C2 178 *		206	<1	N.D	857.2	716.6	985.2	1583.2	588.0	676.9	828.4	1831.8	478.0	663.7	957.6	629.1	779.6	1598.5	204.2
C3 178 *		220	<1	N.D	868.9	658.5	946.9	1114.7	472.8	422.4	531.6	1517.8	383.7	549.6	729.7	540.5	447.4	1404.2	157.6
Sum 178 *			0	93	3694.5	3039.5	4252.0	5909.9	2168.8	2437.8	3236.6	7605.9	1919.7	2817.5	3496.9	2354.9	2707.3	7684.3	1016.9
Dibenzothiophene *		184	<1	93	71.3	62.5	84.8	191.2	39.5	48.9	89.0	187.0	37.6	50.9	71.8	40.9	52.1	177.6	36.5
C1 Dibenzothiophenes *		198	<1	N.D	182.6	144.0	205.6	400.7	96.6	120.9	213.9	426.4	92.0	122.3	153.3	106.2	127.0	317.6	58.9
C2 Dibenzothiophenes *		212	<1	N.D	172.0	255.9	373.0	874.6	181.6	206.1	411.7	899.6	152.5	201.5	266.5	192.5	221.5	569.0	93.5
C3 Dibenzothiophenes *		226	<1	N.D	380.9	301.4	516.6	904.8	159.2	228.5	433.8	1105.1	182.6	203.0	324.6	185.3	235.8	635.9	50.3
Sum Dibenzothiophenes *			0	93	806.9	763.7	1179.9	2371.2	476.9	604.5	1148.4	2618.0	464.8	577.7	816.2	524.8	636.4	1700.1	239.2
Fluoranthene * / pyrene	2	202	0	89	2756.1	2200.3	2957.2	4399.6	1330.2	1583.5	2532.6	5869.0	1236.3	1996.1	2594.8	1404.9	1919.4	7302.3	852.5
C1 202 *		216	<1	N.D	1279.6	1118.9	1420.8	2301.6	674.7	833.9	1328.9	3153.0	646.7	963.1	1164.2	735.5	970.9	2737.2	246.6
C2 202 *		230	<1	N.D	1039.6	877.8	1201.1	1340.9	604.7	730.5	802.2	1694.4	556.3	803.2	898.1	687.6	840.0	2173.9	212.3
C3 202 *		244	<1	N.D	571.6	497.9	693.5	966.3	387.2	436.9	596.8	1126.6	318.8	476.1	517.7	501.2	478.2	1291.3	105.7
Sum 202 *			0	89	5646.9	4694.8	6272.7	9008.4	2996.8	3584.8	5260.5	11843.0	2758.0	4238.5	5174.7	3329.2	4208.5	13504.7	1417.1
Benzoanthracene / Chrysene	2	228	0	92	1194.8	1110.4	1266.2	2277.7	645.2	797.1	1275.4	2734.8	572.7	977.8	1205.3	702.3	949.0	3632.6	611.8
C1 228 *		242	<1	N.D	850.0	727.8	1112.6	1432.4	476.0	586.9	889.3	1960.3	431.4	677.0	826.9	560.7	737.5	2155.0	274.4
C2 228 *		256	<1	N.D	549.2	506.5	573.1	862.6	336.0	397.5	877.7	1153.8	400.8	684.9	514.1	457.2	562.1	1942.3	163.5
Sum 228 *			0	92	2594.0	2344.7	2951.9	4572.6	1457.1	1781.5	3042.5	5848.9	1404.9	2339.7	2546.2	1720.2	2248.5	7729.9	1049.8
Benzofluoranthenes / benzopyrenes	4	252	0	87	2440.5	2083.9	2563.6	4154.4	1372.6	1675.2	2260.8	5135.3	1168.5	1800.4	2408.3	1460.4	2000.2	6395.6	1294.6
C1 252 *		266	<1	N.D	993.5	919.9	1184.5	1883.9	582.8	774.1	1150.5	2590.6	571.6	863.5	1008.6	759.1	913.2	2634.2	417.3
C2 252 *		280	<1	N.D	604.6	577.0	787.2	1248.4	396.9	468.1	653.5	1348.4	373.8	525.0	601.7	446.5	547.4	1387.6	199.7
Sum 252 *			0	87	4038.6	3580.7	4535.2	7286.7	2352.3	2917.4	4064.8	9074.3	2113.9	3188.9	4018.6	2666.0	3460.8	10417.4	1911.5
Dibenzoanthracene / Indenopyrene / Benzoperylene *	3	276	0	59	1201.2	1024.4	1352.7	2120.9	727.0	945.8	1269.8	2627.0	672.3	1052.0	1276.5	920.2	1161.3	3444.7	662.4
C1 276 *		290	<1	N.D	302.9	246.2	477.3	587.7	182.7	253.1	488.1	743.6	171.3	389.8	282.6	230.4	269.1	997.3	110.4
C2 276 *		304	<1	N.D	73.2	67.9	110.9	221.6	65.6	84.4	129.5	301.0	79.1	80.4	110.7	111.6	108.1	261.6	45.4
Sum 276 *			0	59	1577.3	1338.6	1940.9	2930.2	975.2	1283.3	1887.3	3671.6	922.7	1522.2	1669.8	1262.2	1538.6	4703.5	818.2
Sum of all fractions *			0	87	21975.6	18704.5	25524.7	37505.2	12883.0	15725.3	21720.3	46204.7	12080.8	17470.8	21008.0	14645.6	17427.7	49775.6	7727.6
Sum of NPD fraction *			0	94	8118.7	6745.7	9823.9	13707.2	5101.6	6158.4	7465.3	15767.0	4881.3	6181.4	7598.7	5668.0	5971.3	13420.0	2531.0
NPD / 4-6 ring PAH ratio *			#DIV/0!	0.29	0.59	0.56	0.63	0.58	0.66	0.64	0.52	0.52	0.68	0.55	0.57	0.63	0.52	0.37	0.49

N.D = Not Determined as these compounds are not in the reference material spike.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

* Denotes not UKAS accredited

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

EPA 16 PAHs Compounds marked with a * are reported not UKAS.

	Sample ID :	CL1782133b	CL1782134b	CL1782118	CL1782119	CL1782120	CL1782121	CL1782122	CL1782123	CL1782124	CL1782125	CL1782126	CL1782127	CL1782128	CL1782129	CL1782130	CL1782131	CL1782132
	Station :	QC Blank	:e Material (% R	VC05 1.50-2.00	VC06 0.00-0.50	VC06 1.20-1.70	VC06 2.40-2.90	VC07B 0.00-0.50	/C07B 1.25-1.7	C07B 2.00-2.5	/C09 0.65-1.1	/C10 0.00-0.5	/C10 1.25-1.7	/C10 2.00-2.5	/C11 0.00-0.5	/C11 1.50-2.0	/C11 2.50-3.0	CRM 1941b
PAH	***Mass***																	
Naphthalene	128	<1	94.9	292 2	237.1	327.1	539.6	199.9	241.5	264.7	431.9	195.1	239.9	270.9	220.2	241.0	393.5	463.8
Acenaphthylene	152	<1	97.0	59.0	62.0	73 2	106.5	35.1	54.8	73.3	152.6	36.1	45.1	56.8	39.8	50.5	109.4	56.7
Acenaphthene	154	<1	98.3	106 5	93.0	177.9	231.3	54.4	68.6	111.0	281.0	57.7	83.7	109.6	57 3	71.1	339.4	28.6
Fluorene	166	<1	98.5	178 2	147 2	242.8	401.2	101.9	137.0	204.1	468.3	109.8	135.9	188.4	112.9	128.0	428.2	49.1
Phenanthrene *	178	<1	95.7	720.7	616 8	850.4	1118.1	405.1	484.0	672.7	1560.5	394.2	624.6	689.0	419.5	541.0	1986.7	302.0
Dibenzothiophene *	184	<1	92.7	71.3	62.5	84 8	191.2	39.5	48.9	89.0	187.0	37.6	50.9	71.8	40.9	52.1	177.6	36.5
Anthracene *	178	<1	90.1	350 8	266 8	375.0	629.6	158.2	200.2	340.6	793.4	156.3	241 6	322.3	168.2	228.1	870.7	121.4
Fluoranthene *	202	<1	84.0	1297.2	1004.4	1341.4	2100.5	610.4	729.6	1121.2	2786.5	568.2	945.8	1231.4	646.0	887.8	3600.9	477.3
Pyrene	202	<1	94.8	1458.8	1195.9	1615.8	2299.1	719.7	853.9	1411.4	3082.5	668.0	1050.3	1363.4	758.9	1031.6	3701.4	375.2
Benzo[a]anthracene	228	<1	89.6	683 0	594 3	743.0	1311.3	369.8	443.8	693.8	1649.4	333.0	544 2	685.5	403.0	542.4	2060.6	255.9
Chrysene	228	<1	95.0	511 8	516 0	523.2	966.4	275.4	353.2	581.6	1085.4	239.7	433.6	519.8	299.3	406.6	1571.9	356.0
Benzo[b]fluoranthene	252	<1	88.8	743 6	624 6	698.7	1147.5	419.9	504.5	524.3	1364.7	312.4	448.5	703.3	375.5	567.4	1465.4	464.9
Benzo[k]fluoranthene	252	<1	92.8	344 0	291 6	360.2	592.4	197.5	234.4	339.5	715.9	169.5	265.8	334.0	220.3	280.4	969.6	213.8
Benzo[e]pyrene	252	<1	85.5	657 3	541 2	736.1	1116.5	368.6	459.1	658.4	1400.6	335.8	513.5	641.2	416.1	554.5	1739.4	359.3
Benzo[a]pyrene	252	<1	81.4	695 6	626 5	768.5	1298.1	386.6	477.2	738.6	1654.0	350.9	572.6	729.9	448.5	597.9	2221.3	256.7
Perylene *	252	<1	<1	306 0	212.4	338.8	414.1	151.6	254.0	314.0	567.9	148.8	232.8	312.2	185.8	296.0	672.9	279.0
Indeno[123,cd]pyrene	276	<1	59.0	502 2	435 9	564.8	910.7	310.2	399.9	542.2	1118.6	286.8	446.5	550.6	391.4	492.7	1525.9	337.4
Dibenzo[a,h]anthracene	278	<1	54.7	119 5	103 3	136.4	221.2	73.4	91.8	130.4	272.7	63.8	105.2	130.4	89.4	114.4	356.9	76.6
Benzo[ghi]perylene *	276	<1	63.8	579.4	485 3	651.5	989.0	343.3	454.1	597.2	1235.7	321.7	500.3	595.5	439.4	554.2	1562.0	248.4

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

AREA RECOVERIES

n-alkanes (ng/g) **UKAS accredited?: No** As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

Sample ID :	CL1782133a	CL1782134a	CL1782133b	CL1782134b	CL1782106	CL1782107	CL1782108	CL1782109	CL1782110	CL1782111	CL1782112	CL1782113	CL1782114
Station :	QC Blan	nce Material (% Re	QC Blank	ence Material (% Rec	VC01 0.00-0.50	VC01 0.50-1.00	VC02 0.00-0.65	VC02 0.65-1.30	VC03 0 00-0 50	VC03 1.50-2.00	VC03 2.50-3.00	VC04 0.00-0.50	VC04 1 00-1 50
Alkane													
nC10	<1	101.0	<1	99.2	134.1	131.7	151.0	168.1	124.4	132.8	162.7	117.0	142.8
nC11	<1	<0.08	<1	<0.08	156.4	157.5	144.0	47.4	132.6	148.4	16.1	124.0	161.6
nC12	<1	107.5	<1	90.7	220.7	246.4	233.2	44.0	167.3	173.2	48.9	175.4	275.2
nC13	<1	<0.08	<1	<0.08	155.8	196.6	205.0	104.0	165.3	199.6	79.7	207.3	241.0
nC14	<1	96.9	<1	92.0	335.7	286.6	326.1	140.7	217.9	194.7	160.0	237.7	291.2
nC15	<1	<0.08	<1	<0.08	518.3	606.1	518.5	493.5	327.8	283.5	443.9	383.6	492.4
nC16	<1	121.7	<1	107.8	417.5	473.8	417.0	285.0	280.6	253.8	292.1	324.6	413.5
nC17	<1	<0.08	<1	<0.08	423.9	353.6	452.4	408.1	603.6	379.5	466.5	545.6	553.8
pristane	<1	<0.08	<1	<0.08	760.2	1,072.3	932.0	1,111.0	654.6	579.7	1,088.1	704.0	977.8
nC18	<1	96.7	<1	102.8	281.4	244.7	349.7	326.9	185.0	185.5	406.6	242.4	362.7
phytane	<1	<0.08	<1	<0.08	1,260.6	2,137.2	1,754.6	1,729.0	434.0	537.0	1,432.8	835.0	949.8
nC19	<1	<0.08	<1	<0.08	341.7	365.4	398.0	496.6	300.8	249.7	469.9	333.2	365.9
nC20	<1	104.9	<1	108.3	488.8	720.0	778.1	887.4	460.2	349.0	786.5	456.6	776.5
nC21	<1	<0.08	<1	<0.08	766.4	483.6	834.6	3,301.0	562.6	536.4	2,835.4	462.0	617.7
nC22	<1	105.1	<1	113.1	602.0	690.4	770.4	654.3	565.4	751.4	633.0	605.6	741.0
nC23	<1	<0.08	<1	<0.08	530.5	275.0	448.9	789.9	469.2	455.0	796.2	380.9	465.5
nC24	<1	104.6	<1	111.8	352.9	288.7	278.9	546.5	339.8	343.9	560.0	282.4	318.9
nC25	<1	<0.08	<1	<0.08	805.1	849.2	881.9	661.1	310.4	387.6	719.4	357.5	545.9
nC26	<1	107.7	<1	109.3	501.3	404.8	590.5	950.7	588.9	682.4	1,000.0	2,638.8	589.0
nC27	<1	<0.08	<1	<0.08	1,190.4	799.1	1,118.5	1,607.7	1,247.6	1,228.0	1,765.1	1,152.9	1,026.8
nC28	<1	105.4	<1	104.4	479.9	358.1	399.2	644.0	499.5	440.1	892.9	374.7	592.2
nC29	<1	<0.08	<1	<0.08	1,196.1	800.0	1,063.8	1,960.5	1,557.1	1,415.2	2,723.5	1,317.7	1,566.2
nC30	<1	112.7	<1	97.7	546.2	403.6	549.9	916.7	594.1	630.5	1,021.2	517.4	725.0
nC31	<1	<0.08	<1	<0.08	1,818.0	1,111.5	1,996.8	2,695.0	2,226.4	2,105.2	4,002.5	1,953.2	2,942.1
nC32	<1	106.5	<1	101.7	226.8	104.3	291.0	479.0	236.0	213.4	427.0	264.5	232.9
nC33	<1	<0.08	<1	<0.08	2,055.7	1,846.2	2,035.7	2,937.8	1,757.8	2,184.8	3,117.0	1,609.4	2,438.0
nC34	<1	113.2	<1	118.8	89.6	547.6	290.7	347.4	132.1	316.6	227.0	84.1	754.2
nC35	<1	<0.08	<1	<0.08	77.1	72.1	317.6	500.8	293.9	221.1	774.8	400.3	239.9
nC36	<1	117.7	<1	112.0	52.3	4.4	19.7	58.1	234.6	46.5	102.0	16.9	19.5
nC37	<1	<0.08	<1	<0.08	85.1	6.7	36.2	121.6	257.0	176.8	108.3	11.5	27.4
Total Oil (ug/kg)	29.6	0.0	48.7	0.0	509,613.1	330,411.5	474,379.2	817,296.6	530,188.4	570,916.7	938,969.3	539,779.9	775,019.9
Total n a kanes (ng/g)	0	1,502	0	1,470	14,850	12,828	15,897	22,574	14,838	14,684	25,038	15,577	17,919
Carbon Preference Index	#DIV/0!	0.00	#DIV/0!	0.00	2.14	1.62	1.92	2.50	2.21	2.12	2.73	1.46	1.87
Pristane	<1	<0.08	<1	<0.08	760	1072	932	1111	655	580	1088	704	978
Phytane	<1	<0.08	<1	<0.08	1261	2137	1755	1729	434	537	1433	835	950
Pristane / phytane ratio					0.6	0.5	0.5	0.6	1.5	1.1	0.8	0.8	1.0

Note: sample data are NOT blank corrected

AREA RECOVERIES

n-alkanes (ng/g) **UKAS accredited? No** As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

Sample ID :	CL1782133a	CL1782134a	CL1782133b	CL1782134b	CL1782115	CL1782116	CL1782117	CL1782118	CL1782119	CL1782120	CL1782121	CL1782122	CL1782124	CL1782123	CL1782125	CL1782126	CL1782127	CL1782128	CL1782129	CL1782130	CL1782131
Station :	QC Blank	nce Material (% Re	QC Blank	nce Material (% Rec	VC04 2.15-2.65	VC05 0.00-0.50	VC05 1.00-1.50	VC05 1.50-2.00	VC06 0.00-0.50	VC06 1.20-1.70	VC06 2.40-2.90	VC07B 0.00-0.50	VC07B 1.25-1.75	VC07B 2.00-2.55	VC09 0.65-1.15	VC10 0.00-0.50	VC10 1.25-1.75	VC10 2.00-2.50	VC11 0 00-0.50	VC11 1.50-2.00	VC11 2.50-3.00
Alkane																					
nC10	<1	101.0	<1	99.2	19.3	96.4	117.4	164.9	141.1	224.0	345.0	96.0	164.6	95.7	251.5	137.5	89.7	164.4	112.2	144.2	242.3
nC11	<1	<0.08	<1	<0.08	5.6	113.1	120.0	128.9	92.0	699.4	258.1	116.8	119.2	42.3	285.5	103.5	79.8	153.7	90.4	95.7	184.2
nC12	<1	107.5	<1	90.7	10.6	146.9	194.1	168.9	91.9	567.5	401.6	90.1	188.1	227.9	383.2	76.4	102.2	181.1	104.8	169.5	329.8
nC13	<1	<0.08	<1	<0.08	34.4	148.5	183.2	162.5	92.1	524.1	391.4	140.6	208.6	80.4	308.2	147.0	152.2	188.5	161.8	127.1	401.9
nC14	<1	96.9	<1	92.0	33.9	182.3	254.2	325.3	192.9	1,368.2	416.3	203.3	272.0	118.3	424.8	170.7	196.7	237.7	173.3	151.2	465.9
nC15	<1	<0.08	<1	<0.08	64.9	340.2	463.8	516.1	398.5	1,476.8	746.0	321.5	603.1	442.5	844.6	331.4	352.7	505.4	297.0	330.7	1,066.6
nC16	<1	121.7	<1	107.8	44.6	266.0	386.3	280.8	349.7	1,638.2	695.1	242.7	503.8	230.2	781.5	252.1	269.0	292.8	258.4	233.9	903.5
nC17	<1	<0.08	<1	<0.08	51.6	499.6	476.2	540.7	476.3	1,203.8	704.4	484.8	524.4	459.6	659.2	471.7	517.3	439.5	549.7	537.5	766.1
pristane	<1	<0.08	<1	<0.08	263.0	590.9	767.1	1,132.3	698.1	2,897.9	1,999.1	527.8	1,088.7	539.2	1,997.1	564.7	761.7	833.4	638.7	694.7	1,563.1
nC18	<1	96.7	<1	102.8	71.5	213.0	221.3	333.4	238.2	1,280.3	608.2	501.1	376.2	499.0	661.9	206.7	262.1	372.6	281.5	263.0	624.7
phytane	<1	<0.08	<1	<0.08	348.5	712.7	659.7	814.3	708.0	1,000.9	1,412.0	559.9	876.7	162.3	1,738.8	576.3	855.6	997.8	569.4	648.7	2,694.8
nC19	<1	<0.08	<1	<0.08	77.4	302.4	306.0	397.3	335.6	1,045.3	717.2	264.0	444.3	342.9	702.9	276.6	363.4	429.7	350.2	402.1	793.1
nC20	<1	104.9	<1	108.3	122.7	540.1	536.2	764.4	360.8	1,104.4	1,331.8	410.1	641.5	415.0	1,396.5	386.5	545.8	655.4	503.8	564.6	1,320.8
nC21	<1	<0.08	<1	<0.08	115.1	307.4	511.5	769.7	490.0	1,173.6	1,056.7	385.6	648.3	499.6	1,005.8	368.5	533.1	577.8	497.7	484.4	602.4
nC22	<1	105.1	<1	113.1	92.5	502.4	738.2	911.6	468.4	917.0	1,533.1	391.6	716.2	480.0	1,474.5	365.8	662.2	691.3	426.0	608.1	1,179.0
nC23	<1	<0.08	<1	<0.08	98.2	404.4	461.4	846.9	571.6	761.8	889.7	495.2	738.6	593.7	931.4	478.9	691.9	678.3	639.9	732.9	719.0
nC24	<1	104.6	<1	111.8	61.2	286.5	368.2	648.2	362.5	586.6	732.5	341.5	557.2	391.1	699.4	301.3	403.0	606.6	484.0	499.1	601.0
nC25	<1	<0.08	<1	<0.08	89.0	502.1	325.6	803.4	640.4	557.5	1,511.5	305.6	801.5	682.5	1,745.4	320.6	413.0	566.8	345.7	571.5	1,621.2
nC26	<1	107.7	<1	109.3	87.0	400.4	656.1	875.2	615.0	1,428.7	1,375.2	549.8	1,140.0	655.3	1,025.9	475.6	711.6	877.2	687.7	836.4	1,149.9
nC27	<1	<0.08	<1	<0.08	174.1	1,027.7	1,673.5	2,192.5	1,195.0	1,985.0	2,974.3	1,435.2	2,067.6	1,629.9	2,807.6	1,211.4	2,034.8	1,812.1	1,594.3	1,810.1	2,087.3
nC28	<1	105.4	<1	104.4	87.8	490.4	746.3	1,014.2	607.0	831.9	1,517.3	632.6	928.8	704.7	1,251.2	505.0	644.5	937.1	624.1	823.8	977.7
nC29	<1	<0.08	<1	<0.08	348.2	1,335.2	1,670.6	3,613.6	2,271.6	2,887.0	4,531.9	2,093.5	3,441.2	2,586.2	3,888.3	2,125.3	3,022.9	2,791.8	2,926.9	3,261.5	2,652.8
nC30	<1	112.7	<1	97.7	137.1	489.2	770.1	1,149.9	835.8	1,162.1	1,489.5	695.8	1,159.8	795.8	1,561.3	645.5	913.2	1,112.2	859.4	1,082.3	1,156.5
nC31	<1	<0.08	<1	<0.08	547.8	1,974.5	2,962.2	6,433.2	4,324.9	5,415.2	14,159.3	3,521.8	7,454.9	4,887.0	9,651.4	3,759.0	4,661.3	5,188.6	5,027.4	5,994.2	5,906.5
nC32	<1	106.5	<1	101.7	64.0	253.7	196.8	535.6	382.4	473.9	744.6	314.1	575.4	482.1	999.3	371.4	423.0	551.7	488.4	677.1	367.3
nC33	<1	<0.08	<1	<0.08	316.5	1,858.2	1,700.6	5,207.9	3,367.5	4,695.5	10,318.3	2,696.5	6,034.9	3,649.3	6,850.5	2,541.1	4,227.0	4,135.1	3,179.8	4,297.1	4,962.8
nC34	<1	113.2	<1	118.8	32.3	77.5	371.4	453.2	217.6	389.0	1,382.4	551.2	718.6	234.3	1,433.2	324.0	488.6	658.1	376.4	370.8	706.3
nC35	<1	<0.08	<1	<0.08	45.6	143.6	446.2	609.7	234.2	911.5	842.3	387.4	283.4	1,037.5	772.0	138.8	444.8	381.2	390.7	153.9	173.3
nC36	<1	117.7	<1	112.0	11.8	1.2	36.4	76.4	50.8	175.6	35.4	96.2	84.9	160.0	46.3	49.3	57.7	35.2	72.1	32.6	7.3
nC37	<1	<0.08	<1	<0.08	16.5	6.9	9.3	238.8	35.4	155.9	32.5	274.2	165.3	165.2	51.7	256.8	184.1	112.1	288.4	85.1	14.6
Total Oil (ug/kg)	29.6	0.0	48.7	0.0	162,807.2	574,357.7	659,344.0	1,074,000.0	671,507.5	2,854,456.1	1,323,284.5	544,209.8	589,673.1	835,987.2	2,510,083.8	508,313.7	598,053.7	796,128.9	658,331.3	719,592.5	1,927,495.3
Total n alkanes (ng/g)	0	1,502	0	1,470	2,862	12,910	16,903	30,163	19,439	35,640	51,742	18,039	31,562	22,588	42,895	16,799	23,448	25,334	21,792	25,340	31,984
Carbon Preference Index	#DIV/0!	0.00	#DIV/0!	0.00	2.27	2.27	2.02	2.92	2.96	1.93	3.10	2.53	2.93	3.11	2.46	2.94	3.06	2.44	3.00	2.92	2.19
Pristane	<1	<0.08	<1	<0.08	263	591	767	1132	698	2898	1999	528	1089	539	1997	565	762	833	639	695	1563
Phytane	<1	<0.08	<1	<0.08	349	713	660	814	708	1001	1412	560	877	162	1739	576	856	998	569	649	2695
Pristane / phytane ratio					0.8	0.8	1.2	1.4	1.0	2.9	1.4	0.9	1.2	3.3	1.1	1.0	0.9	0.8	1.1	1.1	0.6

Note: sample data are NOT blank corrected

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

		Sample ID :	CL1782652	CL1782653	CL1782646	CL1782647	CL1782648	CL1782649	CL1782650	CL1782651
		Station :	QC B ank	ce Material (% R	VC08 0.00-0.50	VC08 1.45-1.95	VC08 2.40-2.90	VC09 0.00-0.50	VC09 1.30-1.80	CRM 1941b
PAH Fraction	***# PAH***	***Mass***								
Naphthalene	1	128	<1	106.2	350.0	439.0	754.0	343.7	453.7	463.8
C1 Naphthalenes *	2	142	<1	114.9	903.3	1184.0	1750.9	818.4	1150.6	309.3
C2 Naphthalenes *		156	<1	N.D	1057.5	1274.6	2178.1	998.3	1241.1	210.9
C3 Naphthalenes *		170	<1	N.D	1187.2	1434.3	2303.6	1230.1	1197.6	168.7
C4 Naphthalenes *		184	<1	N.D	730.6	991.9	1607.2	884.8	1071.5	122.3
Sum Naphthalenes *			0	111	4229	5324	8594	4275	5114	1275
Phenanthrene * / Anthracene *	2	178	0.0	92.3	1336.0	1609.2	3730.7	1959.7	1888.8	423.4
C1 178 *		192	<1	N.D	1118.5	1445.5	3269.2	1554.5	1627.8	231.7
C2 178 *		206	<1	N.D	1120.4	1412.2	3396.8	1463.2	1584.7	204.2
C3 178 *		220	<1	N.D	1171.6	1429.3	1895.1	1129.8	1684.1	157.6
Sum 178 *			0	92	4746.4	5896.2	12291.9	6107.3	6785.4	1016.9
D benzothiophene *		184	<1	91	136.5	152.5	599.1	141.8	162.7	36.5
C1 D benzothiophenes *		198	<1	N.D	365.4	400.0	1274.6	292.7	393.6	58.9
C2 D benzothiophenes *		212	<1	N.D	985.0	1158.5	2408.3	602.5	933.4	93.5
C3 D benzothiophenes *		226	<1	N.D	1215.1	1453.0	1682.1	681.8	1169.3	50.3
Sum Dibenzothiophenes *			0	91	2701.9	3164.0	5964.1	1718.8	2658.9	239.2
Fluoranthene * / pyrene *	2	202	0	83	3118.7	3638.2	9861.3	5485.5	4662.4	852.5
C1 202 *		216	<1	N.D	1649.8	1837.2	5769.5	2780.4	2479.8	246.6
C2 202 *		230	<1	N.D	1271.7	1534.5	3908.6	2020.9	1869.1	212.3
C3 202 *		244	<1	N.D	787.6	1041.8	1831.0	1108.2	1231.9	105.7
Sum 202 *			0	83	6827.8	8051.7	21370.4	11395.0	10243.2	1417.1
Benzoanthracene / Chrysene	2	228	0	90	1428.2	1750.2	4924.9	2424.1	2213.7	611.8
C1 228 *		242	<1	N.D	1038.4	1107.1	3146.0	1760.2	1434.7	274.4
C2 228 *		256	<1	N.D	1052.0	882.5	2798.5	1445.8	1420.0	163.5
Sum 228 *			0	90	3518.6	3739.8	10869.5	5630.1	5068.4	1049.8
Benzofluoranthenes / benzopyrenes	4	252	0	107	2468.5	3163.4	7747.1	4361.0	4095.1	1294.6
C1 252 *		266	<1	N.D	1265.7	1436.3	3803.6	2212.7	1878.1	417.3
C2 252 *		280	<1	N.D	706.3	824.3	2013.6	1140.1	1238.4	199.7
Sum 252 *			0	107	4440.4	5424.0	13564.2	7713.7	7211.6	1911.5
D benzoanthracene / Indenopyrene / Benzoperylene	3	276	0	88	1412.5	1704.9	4099.7	2421.8	2265.9	662.4
C1 276 *		290	<1	N.D	417.4	442.5	1102.5	646.7	609.3	110.4
C2 276 *		304	<1	N.D	114.1	148.8	450.1	180.5	193.6	45.4
Sum 276 *			0	88	1943.9	2296.2	5652.2	3249.0	3068.8	818.2
Sum of all fractions *			0	95	28407.6	33895.7	78306.2	40089.2	40150.7	7727.6
Sum of NPD fraction *			0	98	11676.9	14384.0	26849.9	12101.4	14558.8	2531.0
NPD / 4-6 ring PAH ratio *			#DIV/0!	0.27	0.70	0.74	0.52	0.43	0.57	0.49

N.D = Not Determined as these compounds are not in the reference material spike.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

* Denotes not UKAS accredited

Polyaromatic Hydrocarbon Concentrations (ng/g dry weight basis) UKAS accredited?: Yes

EPA 16 PAHs Compounds marked with a * are reported not UKAS.

	Sample ID :	CL1782652	CL1782653	CL1782646	CL1782647	CL1782648	CL1782649	CL1782650	CL1782651
	Station :	QC Blank	ce Material (% R	VC08 0.00-0.50	VC08 1.45-1.95	VC08 2.40-2.90	VC09 0.00-0.50	VC09 1.30-1.80	CRM 1941b
PAH	***Mass***								
Naphthalene	128	<1	106.2	350.0	439.0	754.0	343.7	453.7	463.8
Acenaphthylene	152	<1	117.9	78.2	92.6	283.9	140.3	114.4	56.7
Acenaphthene	154	<1	117.5	152.8	168.8	390.3	228.6	200.8	28.6
Fluorene *	166	<1	125.5	246.3	277.2	827.6	340.2	335.3	49.1
Phenanthrene *	178	<1	94.8	858.4	1047.3	2235.8	1289.2	1236.9	302.0
Dibenzothiophene *	184	<1	91.2	136.5	152.5	599.1	141.8	162.7	36.5
Anthracene *	178	<1	89.7	477.5	561.9	1494.9	670.5	652.0	121.4
Fluoranthene *	202	<1	78.5	1426.6	1653.5	4528.0	2523.2	2172.1	477.3
Pyrene *	202	<1	88.2	1692.2	1984.7	5333.3	2962.3	2490.3	375.2
Benzo[a]anthracene	228	<1	88.5	840.0	1013.9	2912.6	1414.5	1257.9	255.9
Chrysene	228	<1	92.1	588.2	736.4	2012.3	1009.6	955.7	356.0
Benzo[b]fluoranthene	252	<1	84.6	606.1	890.8	1683.8	936.7	1187.8	464.9
Benzo[k]fluoranthene	252	<1	111.2	369.4	440.2	1132.2	645.0	557.8	213.8
Benzo[e]pyrene	252	<1	116.2	699.8	882.9	2248.0	1277.0	1133.5	359.3
Benzo[a]pyrene	252	<1	114.1	793.2	949.5	2683.1	1502.2	1216.0	256.7
Perylene *	252	<1	<1	286.5	337.5	808.7	476.9	497.7	279.0
Indeno[123,cd]pyrene	276	<1	89.1	583.5	704.1	1762.0	1021.5	938.3	337.4
Dibenzo[a,h]anthracene	278	<1	83.0	145.9	177.1	413.9	249.9	243.1	76.6
Benzo[ghi]perylene	276	<1	90.7	683.0	823.7	1923.8	1150.4	1084.6	248.4

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

AREA RECOVERIES

n-alkanes (ng/g) **UKAS accredited?: No** As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

Sample ID :	CL1782652	CL1782653	CL1782646	CL1782647	CL1782648	CL1782649	CL1782650
Station :	QC Blan	nce Material (% Re	VC08 0.00-0.50	VC08 1.45-1.95	VC08 2.40-2 90	VC09 0 00-0 50	VC09 1 30-1 80
Alkane							
nC10	<1	88.3	302.6	291.3	393.0	163.1	229.8
nC11	<1	<0.08	30.5	219.4	350.6	152.9	117.1
nC12	<1	89.4	107.0	226.5	730.7	96.6	84.0
nC13	<1	<0.08	264.8	356.2	620.1	295.0	301.9
nC14	<1	78.8	193.5	275.1	611.9	291.8	214.7
nC15	<1	<0.08	545.7	634.3	1,365.1	778.1	681.2
nC16	<1	121.0	451.0	585.5	1,203.8	585.2	793.3
nC17	<1	<0.08	496.6	761.8	918.2	629.5	766.5
pristane	<1	<0.08	1,795.1	2,792.8	2,555.6	1,593.2	2,355.7
nC18	<1	88.9	496.3	719.5	653.2	476.8	713.9
phytane	<1	<0.08	658.3	1,220.0	2,522.0	1,660.5	892.3
nC19	<1	<0.08	551.0	853.0	1,148.8	615.1	731.3
nC20	<1	110.8	784.5	1,123.2	2,125.8	1,097.3	1,370.2
nC21	<1	<0.08	865.3	1,067.4	1,442.3	750.3	1,182.4
nC22	<1	101.2	860.7	1,725.1	1,971.9	782.7	1,225.5
nC23	<1	<0.08	1,056.7	1,073.0	1,179.5	867.3	1,284.3
nC24	<1	110.2	818.5	871.5	782.2	637.2	747.1
nC25	<1	<0.08	614.2	695.1	2,795.0	1,340.8	808.2
nC26	<1	100.3	1,142.8	1,706.6	1,891.5	1,455.9	1,197.3
nC27	<1	<0.08	1,920.3	2,763.0	4,077.5	1,795.5	2,526.9
nC28	<1	106.6	1,095.9	1,494.9	2,005.8	910.0	1,301.2
nC29	<1	<0.08	4,012.7	5,018.0	8,024.1	4,008.5	5,033.1
nC30	<1	106.0	1,325.8	1,851.0	2,148.6	1,472.9	1,759.3
nC31	<1	<0.08	8,375.4	10,537.1	25,116.1	9,224.7	10,437.8
nC32	<1	110.4	680.3	932.3	1,122.7	590.6	973.2
nC33	<1	<0.08	5,939.9	7,424.4	16,591.0	7,430.8	7,147.2
nC34	<1	123.9	222.1	610.7	661.0	423.6	423.9
nC35	<1	<0.08	148.0	402.3	3,137.8	662.6	272.2
nC36	<1	107.3	246.3	291.1	317.1	145.0	214.9
nC37	<1	<0.08	97.2	236.6	298.3	202.6	75.1
Total Oil (ug/kg)	54.2	0.0	1,309,331.8	178,696.2	1,663,373.9	1,228,836.7	1,634,056.0
Total n alkanes (ng/g)	0	1,443	33,646	44,746	83,684	37,882	42,614
Carbon Preference Index	#DIV/0!	0.00	2.86	2.52	4.04	3.15	2.79
Pristane	<1	<0.08	1795	2793	2556	1593	2356
Phytane	<1	<0.08	658	1220	2522	1661	892
Pristane / phytane ratio			2.7	2.3	1.0	1.0	2.6

Note: sample data are NOT blank corrected

DATA SUBMISSION REPORT

FROM:	[Redacted]
EMAIL:	[Redacted]
TO:	[Redacted]

PROJECT NO:	ESG051117
CLIENT:	ESG
DATA:	Particle Size Analysis
DATA REFERENCE:	S180284
SAMPLE NUMBER:	31
LEAD ANALYST:	[Redacted]
QUALITY CONTROL:	[Redacted]

LOGIN DATE:	13/11/17
COMPLETION DATE:	22/11/17
QC DATE:	23/11/17
SUBMISSION DATE:	23/11/17

COVER NOTES
Sample S1782107 completed by a combination of dry sieve and laser diffraction due to mixed nature of sediments, in line with NMBAQC guidance. Subsample taken for laser analysis. All remaining samples completed by laser diffraction only due to sediment being <1mm, in line with NMBAQC guidance. No subsample needed to be taken for laser analysis due to small sample size. Samples were determined to be either Mud (M) or Sandy Mud (sM). No TOC analysis was undertaken on these samples by request of the client.

Sample Processing								
Sample ID	Client sample description		Storage	Visual Sediment Description	Wet Split (Y/N)	Dry Sieve (Y/N)	Laser Analysis	Analyst(s)
S1782106	VC01 0.00-0.50	ID991	Nalgene	Sandy Mud	N	N	Y	ST
S1782107	VC01 0.50-1.00	ID992	Foil Tray / Nalgene / PSA Bag	Sandy Mud (shell and organic detritus)	Y	Y	Y	ST
S1782108	VC02 0.00-0.65	ID993	Nalgene	Sandy Mud	N	N	Y	ST
S1782109	VC02 0.65-1.30	ID994	Nalgene	Sandy Mud	N	N	Y	ST
S1782110	VC03 0.00-0.50	ID995	Nalgene	Mud	N	N	Y	ST
S1782111	VC03 1.50-2.00	ID996	Nalgene	Sandy Mud	N	N	Y	ST
S1782112	VC03 2.50-3.00	ID997	Nalgene	Sandy Mud	N	N	Y	ST
S1782113	VC04 0.00-0.50	ID998	Nalgene	Sandy Mud	N	N	Y	ST
S1782114	VC04 1.00-1.50	ID999	Nalgene	Sandy Mud	N	N	Y	ST
S1782115	VC04 2.15-2.65	IE001	Nalgene	Sandy Mud	N	N	Y	ST
S1782116	VC05 0.00-0.50	IE002	Nalgene	Sandy Mud	N	N	Y	ST
S1782117	VC05 1.00-1.50	IE003	Nalgene	Sandy Mud	N	N	Y	ST
S1782118	VC05 1.50-2.00	IE004	Nalgene	Sandy Mud	N	N	Y	ST
S1782119	VC06 0.00-0.50	IE005	Nalgene	Sandy Mud	N	N	Y	ST
S1782120	VC06 1.20-1.70	IE006	Nalgene	Sandy Mud	N	N	Y	ST
S1782121	VC06 2.40-2.90	IE007	Nalgene	Sandy Mud	N	N	Y	ST
S1782122	VC07B 0.00-0.50	IE008	Nalgene	Sandy Mud	N	N	Y	ST
S1782123	VC07B 1.25-1.75	IE009	Nalgene	Mud	N	N	Y	ST
S1782124	VC07B 2.00-2.55	IE010	Nalgene	Sandy Mud	N	N	Y	ST
S1782125	VC09 0.65-1.15	IE012	Nalgene	Sandy Mud	N	N	Y	ST
S1782126	VC10 0.00-0.50	IE014	Nalgene	Sandy Mud	N	N	Y	ST
S1782127	VC10 1.25-1.75	IE015	Nalgene	Sandy Mud	N	N	Y	ST
S1782128	VC10 2.00-2.50	IE016	Nalgene	Sandy Mud	N	N	Y	ST
S1782129	VC11 0.00-0.50	IE017	Nalgene	Mud	N	N	Y	ST
S1782130	VC11 1.50-2.00	IE018	Nalgene	Sandy Mud	N	N	Y	ST
S1782131	VC11 2.50-3.00	IE019	Nalgene	Sandy Mud	N	N	Y	ST

Sample Tracking											
Sample ID		S1782106	S1782107	S1782108	S1782109	S1782110	S1782111	S1782112	S1782113	S1782114	S1782115
Sample Log In	Sample Wet Weight (g)	139.22	108.69	164.68	126.77	148.41	145.29	148.64	145.54	140.93	137.84
	Initials	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE
	Date	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17
Dry Sieving	<1mm Dry weight (g)	-	56.37	-	-	-	-	-	-	-	-
	Pan weight (g)	-	0.10	-	-	-	-	-	-	-	-
	>1mm Dry Weight (g)	-	0.46	-	-	-	-	-	-	-	-
	Sample Total Dry Weight (g)	-	56.93	-	-	-	-	-	-	-	-
	Initials	-	ST/SE	-	-	-	-	-	-	-	-
	Date	-	20/11/17	-	-	-	-	-	-	-	-
Laser Diffraction	Subsample Wet Weight (g)	-	49.10	-	-	-	-	-	-	-	-
	Date	-	14/11/17	-	-	-	-	-	-	-	-
	Initials	-	ST	-	-	-	-	-	-	-	-
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
	Initial	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
LOI / TOC	Start weight (g)	-	-	-	-	-	-	-	-	-	-
	Final weight (g)	-	-	-	-	-	-	-	-	-	-
	Initials	-	-	-	-	-	-	-	-	-	-
	Date	-	-	-	-	-	-	-	-	-	-
Data Merge	Initials	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
QC	Initials	GR	GR	GR	GR	GR	GR	GR	GR	GR	GR
	Date	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17

Sample Tracking											
Sample ID		S1782116	S1782117	S1782118	S1782119	S1782120	S1782121	S1782122	S1782123	S1782124	S1782125
Sample Log In	Sample Wet Weight (g)	114.21	147.70	152.26	127.30	125.57	152.84	152.01	158.06	141.04	170.04
	Initials	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE
	Date	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17
Dry Sieving	<1mm Dry weight (g)	-	-	-	-	-	-	-	-	-	-
	Pan weight (g)	-	-	-	-	-	-	-	-	-	-
	>1mm Dry Weight (g)	-	-	-	-	-	-	-	-	-	-
	Sample Total Dry Weight (g)	-	-	-	-	-	-	-	-	-	-
	Initials	-	-	-	-	-	-	-	-	-	-
	Date	-	-	-	-	-	-	-	-	-	-
Laser Diffraction	Subsample Wet Weight (g)	-	-	-	-	-	-	-	-	-	-
	Date	-	-	-	-	-	-	-	-	-	-
	Initials	-	-	-	-	-	-	-	-	-	-
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
	Initial	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
LOI / TOC	Start weight (g)	-	-	-	-	-	-	-	-	-	-
	Final weight (g)	-	-	-	-	-	-	-	-	-	-
	Initials	-	-	-	-	-	-	-	-	-	-
	Date	-	-	-	-	-	-	-	-	-	-
Data Merge	Initials	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
QC	Initials	GR	GR	GR	GR	GR	GR	GR	GR	GR	GR
	Date	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17

Sample Tracking							
Sample ID		S1782126	S1782127	S1782128	S1782129	S1782130	S1782131
Sample Log In	Sample Wet Weight (g)	144.62	126.84	146.14	142.81	149.50	171.75
	Initials	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE	ST/SE
	Date	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17	14/11/17
Dry Sieving	<1mm Dry weight (g)	-	-	-	-	-	-
	Pan weight (g)	-	-	-	-	-	-
	>1mm Dry Weight (g)	-	-	-	-	-	-
	Sample Total Dry Weight (g)	-	-	-	-	-	-
	Initials	-	-	-	-	-	-
	Date	-	-	-	-	-	-
Laser Diffraction	Subsample Wet Weight (g)	-	-	-	-	-	-
	Date	-	-	-	-	-	-
	Initials	-	-	-	-	-	-
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
	Initial	ST	ST	ST	ST	ST	ST
LOI / TOC	Start weight (g)	-	-	-	-	-	-
	Final weight (g)	-	-	-	-	-	-
	Initials	-	-	-	-	-	-
	Date	-	-	-	-	-	-
Data Merge	Initials	ST	ST	ST	ST	ST	ST
	Date	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17	22/11/17
QC	Initials	GR	GR	GR	GR	GR	GR
	Date	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17

Summary of Methods

Methods followed the NMBAQC PSA SOP for supporting biological data:

Mason, C. 2016. NMBAQC's Best Practice Guidance. Particle Size Analysis (PSA) for Supporting Biological Analysis. National Marine Biological AQC Coordinating Committee, 77pp, First published 2011, updated January 2016.

Dry Sieve Equipment	
Sieve Shaker	Retsch AS200 Sieve Shaker
Sieves	Retsch Test Sieves ISO 3310-1
Sieve Series	Wentworth half-phi
Drying Oven	Memmert / Gallenkamp
Weighing Scales	Ohaus PA2202 (Max' Capacity 2200g and Readability 0.01g)

Laser Equipment	
Laser model/manufacturer	Malvern Mastersizer Hydro 3000 MU
Optical model (Refractive index, Absorption index; Fraunhofer)	Blue Light
Obscuration (%)	10-15%
Pump speed (%, rpm, unit of speed)	
Stirrer speed (%, rpm, unit of speed)	2550rpm
Ultrasonic duration (seconds)	Continuous
Ultrasonic level (eg %, unit as described by instrument manual)	100%
Background duration (seconds)	10
Measurement duration (seconds)	10
Number of runs	1 x 5

DATA SUBMISSION REPORT

FROM:	[Redacted]
EMAIL:	[Redacted]
TO:	[Redacted]

PROJECT NO:	ESG051117
CLIENT:	ESG
DATA:	Particle Size Analysis
DATA REFERENCE:	S180403
SAMPLE NUMBER:	5
LEAD ANALYST:	Stacey Tonkin
QUALITY CONTROL:	Gary Robinson

LOGIN DATE:	13/11/17
COMPLETION DATE:	22/11/17
QC DATE:	23/11/17
SUBMISSION DATE:	23/11/17

COVER NOTES
All samples completed by laser diffraction only due to sediment being <1mm in line with NMBAQC guidance. No subsample needed to be taken for laser analysis due to small sample size. Samples were determined to be either Mud (M) or Sandy Mud (sM). No TOC analysis was undertaken on these samples by request of the client.

Sample Processing								
Sample ID	Client Sample Description		Storage	Visual Sediment Description	Wet Split (Y/N)	Dry Sieve (Y/N)	Laser Analysis	Analyst(s)
S1782646	VC08 0.00-0.50	IE086	Nalgene	Mud	N	N	Y	ST
S1782647	VC08 1.45-1.95	IE087	Nalgene	Mud	N	N	Y	ST
S1782648	VC08 2.40-2.90	IE088	Nalgene	Mud	N	N	Y	ST
S1782649	VC09 0.00-0.50	IE011	Nalgene	Mud	N	N	Y	ST
S1782650	VC09 1.30-1.80	IE013	Nalgene	Mud	N	N	Y	ST

Sample Tracking						
Sample ID		S1782646	S1782647	S1782648	S1782649	S1782650
Sample Log In	Sample Wet Weight (g)	142.97	113.86	114.31	151.39	154.71
	Initials	ST	ST	ST	ST	ST
	Date	13/11/2017	13/11/2017	13/11/2017	13/11/2017	13/11/2017
Dry Sieving	<1mm Dry weight (g)	-	-	-	-	-
	Pan weight (g)	-	-	-	-	-
	>1mm Dry Weight (g)	-	-	-	-	-
	Sample Total Dry Weight (g)	-	-	-	-	-
	Initials	-	-	-	-	-
	Date	-	-	-	-	-
Laser Diffraction	Initials	ST	ST	ST	ST	ST
	Date	21/11/2017	21/11/2017	21/11/2017	21/11/2017	21/11/2017
LOI / TOC	Start weight (g)	-	-	-	-	-
	Final weight (g)	-	-	-	-	-
	Initials	-	-	-	-	-
	Date	-	-	-	-	-
Data Merge	Initials	ST	ST	ST	ST	ST
	Date	22/11/2017	22/11/2017	22/11/2017	22/11/2017	22/11/2017
QC	Initials	GR	GR	GR	GR	GR
	Date	23/11/17	23/11/17	23/11/17	23/11/17	23/11/17

Summary of Methods
Methods followed the NMBAQC PSA SOP for supporting biological data: *Mason, C. 2016. NMBAQC's Best Practice Guidance. Particle Size Analysis (PSA) for Supporting Biological Analysis. National Marine Biological AQC Coordinating Committee, 77pp, First published 2011, updated January 2016.*

Dry Sieve Equipment	
Sieve Shaker	Retsch AS200 Sieve Shaker
Sieves	Retsch Test Sieves ISO 3310-1
Sieve Series	Wentworth half-phi
Drying Oven	Memmert / Gallenkamp
Weighing Scales	Ohaus PA2202 (Max' Capacity 2200g and Readability 0.01g)

Laser Equipment	
Laser model/manufacturer	Malvern Mastersizer Hydro 3000 MU
Optical model (Refractive index, Absorption index; Fraunhofer)	Blue Light
Obscuration (%)	10-15%
Pump speed (%, rpm, unit of speed)	
Stirrer speed (%, rpm, unit of speed)	2550rpm
Ultrasonic duration (seconds)	Continuous
Ultrasonic level (eg %, unit as described by instrument manual)	100%
Background duration (seconds)	10
Measurement duration (seconds)	10
Number of runs	1 x 5

Sample Analysis

Socotec Environmental Chemistry

S180284

Analytical and Deviating Sample Overview

Customer EnviroCentre
Site Granton Harbour 769967j
Report No S180284

Consignment No S70221
Date Logged 02-Nov-2017
In-House Report Due 22-Nov-2017
Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	CustServ	ICPMSS										OGSNSED	PAHSED	PCBMS3Q	Sub061	TPHSED
		Sampled	Report C	Copper (MS) Sediment	Arsenic (MS) Sediments	Cadmium (MS) Sediments	Chromium (MS) Sediments	Cobalt (MS) Sediments	Lead (MS) Sediments	Manganese (MS) Sediments	Mercury (MS) Sediments	Nickel (MS) Sediments	Zinc (MS) Sediments	Tributyl Tin (Sediments)	PAH by MS Dti	PCB- 7 Congeners (Marine Sediments)	^Particle Size Analysis (Sediment)	TPH GCFID (Si)+Sats
CL/1782106	VC01 0.00-0.50	31/10/17																
CL/1782107	VC01 0.50-1.00	31/10/17																
CL/1782108	VC02 0.00-0.65	31/10/17																
CL/1782109	VC02 0.65-1.30	31/10/17																
CL/1782110	VC03 0.00-0.50	31/10/17																
CL/1782111	VC03 1.50-2.00	31/10/17																
CL/1782112	VC03 2.50-3.00	31/10/17																
CL/1782113	VC04 0.00-0.50	31/10/17																
CL/1782114	VC04 1.00-1.50	31/10/17																
CL/1782115	VC04 2.15-2.65	31/10/17																
CL/1782116	VC05 0.00-0.50	31/10/17																
CL/1782117	VC05 1.00-1.50	31/10/17																
CL/1782118	VC05 1.50-2.00	31/10/17																
CL/1782119	VC06 0.00-0.50	30/10/17																
CL/1782120	VC06 1.20-1.70	30/10/17																

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Sample Analysis

Socotec Environmental Chemistry

S180284

Analytical and Deviating Sample Overview

Customer EnviroCentre
Site Granton Harbour 769967j
Report No S180284

Consignment No S70221
Date Logged 02-Nov-2017
In-House Report Due 22-Nov-2017

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	CustServ	ICPMSS										OGSNSED	PAHSED	PCBMS3Q	Sub061	TPHSED
		Sampled	Report C	Copper (MS) Sediment	Arsenic (MS) Sediments	Cadmium (MS) Sediments	Chromium (MS) Sediments	Cobalt (MS) Sediments	Lead (MS) Sediments	Manganese (MS) Sediments	Mercury (MS) Sediments	Nickel (MS) Sediments	Zinc (MS) Sediments	Tributyl Tin (Sediments)	PAH by MS Dti	PCB- 7 Congeners (Marine Sediments)	^Particle Size Analysis (Sediment)	TPH GCFID (Si)+Sats
CL/1782121	VC06 2.40-2.90	30/10/17																
CL/1782122	VC07B 0.00-0.50	31/10/17																
CL/1782123	VC07B 1.25-1.75	31/10/17																
CL/1782124	VC07B 2.00-2.55	31/10/17																
CL/1782125	VC09 0.65-1.15	30/10/17																
CL/1782126	VC10 0.00-0.50	31/10/17																
CL/1782127	VC10 1.25-1.75	31/10/17																
CL/1782128	VC10 2.00-2.50	31/10/17																
CL/1782129	VC11 0.00-0.50	31/10/17																
CL/1782130	VC11 1.50-2.00	31/10/17																
CL/1782131	VC11 2.50-3.00	31/10/17																
CL/1782132	CRM	31/10/17																
CL/1782133	QC Blank																	
CL/1782134	Reference Material (% Recovery)																	

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Sample Analysis

Socotec Environmental Chemistry

S180403

Analytical and Deviating Sample Overview

Customer EnviroCentre
Site Granton Harbour 769967j
Report No S180403

Consignment No S70229
Date Logged 07-Nov-2017
In-House Report Due 22-Nov-2017

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	CustServ	ICPMSS										OGSNSED	PAHSED	PCBMS3Q	Sub061	TPHSED
		Sampled	Report C	Copper (MS) Sediment	Arsenic (MS) Sediments	Cadmium (MS) Sediments	Chromium (MS) Sediments	Cobalt (MS) Sediments	Lead (MS) Sediments	Manganese (MS) Sediments	Mercury (MS) Sediments	Nickel (MS) Sediments	Zinc (MS) Sediments	Tributyl Tin (Sediments)	PAH by MS Dti	PCB- 7 Congeners (Marine Sediments)	^Particle Size Analysis (Sediment)	TPH GCFID (Si)+Sats
CL/1782646	VC08 0.00-0.50	30/10/17																
CL/1782647	VC08 1.45-1.95	30/10/17																
CL/1782648	VC08 2.40-2.90	30/10/17																
CL/1782649	VC09 0.00-0.50	30/10/17																
CL/1782650	VC09 1.30-1.80	30/10/17																
CL/1782651	CRM																	
CL/1782652	QC Blank																	
CL/1782653	Reference Material (% Recovery)																	

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PAHSED	CL1782106 to CL1782117	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However 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 (Dibenzothiophene, Fluoranthene, Benzo[ghi]perylene) . These circumstances should be taken into consideration when utilising the data.
PAHSED	CL1782118 to CL1782132	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However 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 (Dibenzothiophene, Fluoranthene, Benzo[ghi]perylene, Anthracene, Phenanthrene) . These circumstances should be taken into consideration when utilising the data.
PAHSED	CL1782106 to CL1782132	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.
TPHSED	CL1782109 CL1782112 CL1782115	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted to improve the signal to noise ratio but in doing so, the scale for the WMF files is smaller. This should be taken into consideration when utilising the data.

Report Number : EFS/180403

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PAHSED	CL1782646 to CL1782652	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However 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 (Dibenzothiophene, Fluoranthene, Fluorene, Anthracene, Phenanthrene, Pyrene) . These circumstances should be taken into consideration when utilising the data.
PAHSED	CL1782646 to CL1782651	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.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	OGSNSED	As Received	Determination of Organo-tin compounds using sonic extraction in methanol , derivatiseation with Sodium Tetraethylborate and GCMS quantitation (SIM mode).
Soil	PAHSED	As Received	Determination of Polyaromatic Hydrocarbons in Sediments by Methanol/Dichloromethane ultrasonic extraction GC-MS quantification
Soil	PCBMS3Q	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners by hexane/acetone extraction followed by GCECD detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TPHSED	As Received	Determination of methanol/dichloromethane extractable Hydrocarbons in Marine & Esturine Sediments with GCFID detection including quantitation of Aliphatic fractions.

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : EnviroCentre

Site : Granton Harbour 769967j

Report Numbers : S18_0284 S18_0403

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1782106	VC01 0.00-0.50	MARINE SEDIMENTS
CL/1782107	VC01 0.50-1.00	MARINE SEDIMENTS
CL/1782108	VC02 0.00-0.65	MARINE SEDIMENTS
CL/1782109	VC02 0.65-1.30	MARINE SEDIMENTS
CL/1782110	VC03 0.00-0.50	MARINE SEDIMENTS
CL/1782111	VC03 1.50-2.00	MARINE SEDIMENTS
CL/1782112	VC03 2.50-3.00	MARINE SEDIMENTS
CL/1782113	VC04 0.00-0.50	MARINE SEDIMENTS
CL/1782114	VC04 1.00-1.50	MARINE SEDIMENTS
CL/1782115	VC04 2.15-2.65	MARINE SEDIMENTS
CL/1782116	VC05 0.00-0.50	MARINE SEDIMENTS
CL/1782117	VC05 1.00-1.50	MARINE SEDIMENTS
CL/1782118	VC05 1.50-2.00	MARINE SEDIMENTS
CL/1782119	VC06 0.00-0.50	MARINE SEDIMENTS
CL/1782120	VC06 1.20-1.70	MARINE SEDIMENTS
CL/1782121	VC06 2.40-2.90	MARINE SEDIMENTS
CL/1782122	VC07B 0.00-0.50	MARINE SEDIMENTS
CL/1782123	VC07B 1.25-1.75	MARINE SEDIMENTS
CL/1782124	VC07B 2.00-2.55	MARINE SEDIMENTS
CL/1782125	VC09 0.65-1.15	MARINE SEDIMENTS
CL/1782126	VC10 0.00-0.50	MARINE SEDIMENTS
CL/1782127	VC10 1.25-1.75	MARINE SEDIMENTS
CL/1782128	VC10 2.00-2.50	MARINE SEDIMENTS
CL/1782129	VC11 0.00-0.50	MARINE SEDIMENTS
CL/1782130	VC11 1.50-2.00	MARINE SEDIMENTS
CL/1782131	VC11 2.50-3.00	MARINE SEDIMENTS
CL/1782132	CRM	QUALITY CONTROL SAMPLE
CL/1782133	QC Blank	QUALITY CONTROL SAMPLE
CL/1782134	Reference Material (% Recovery)	QUALITY CONTROL SAMPLE
CL/1782646	VC08 0.00-0.50	MARINE SEDIMENTS
CL/1782647	VC08 1.45-1.95	MARINE SEDIMENTS
CL/1782648	VC08 2.40-2.90	MARINE SEDIMENTS
CL/1782649	VC09 0.00-0.50	MARINE SEDIMENTS
CL/1782650	VC09 1.30-1.80	MARINE SEDIMENTS
CL/1782651	CRM	QUALITY CONTROL SAMPLE
CL/1782652	QC Blank	QUALITY CONTROL SAMPLE
CL/1782653	Reference Material (% Recovery)	QUALITY CONTROL SAMPLE

C DATA SUMMARY TABLES

Summary Table A

Sample information - Granton Action Level 2 Exceedances Removed

All units in mg/kg

	AL1	AL2	BAC	<ERL	ISQG/TEL	PEL	VC01 0.00-0.50	VC01 0.50-1.00	VC02 0.00-0.65	VC02 0.65-1.30	VC03 0.00-0.50	VC03 1.50-2.00	VC04 0.00-0.50	VC04 1.00-1.50	VC05 0.00-0.50	VC05 1.00-1.50	VC06 0.00-0.50	VC06 1.20-1.70	VC07B 0.00-0.50	VC07B 1.25-1.75	VC10 0.00-0.50	VC10 1.25-1.75	VC11 0.00-0.50	VC11 1.50-2.00	Average	No. Exceed Al1?	No. Exceed Al 2?	No.Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Source			CSEMP	CSEMP	Canada																									
Arsenic	20	70	25	-	7.2	41.6	15.8	16.7	15.1	17.6	17.4	19.5	17.9	19.4	18.7	18.7	17.5	18.2	18.8	20.2	19.3	19.7	19	19.4	18.3	1	0	0	-	0
Cadmium	0.4	4	0.31	1.2	0.7	4.2	0.45	0.87	0.52	0.99	0.29	0.44	0.35	0.72	0.38	0.63	0.42	0.81	0.34	0.35	0.34	0.43	0.28	0.32	0.5	10	0	16	0	0
Chromium	50	370	81	81	52.3	160	57.8	57	52.8	75.5	56.4	72.7	54.1	68.2	59.6	69.3	57.3	72.2	56.7	71.8	62	59.8	63.6	66.8	63.0	18	0	0	0	0
Copper	30	300	27	34	18.7	108	42.1	51.6	46.5	60.6	40.2	55.6	40.3	58.2	47.6	55.1	45.5	59.9	40.3	48.8	43.7	48.7	45.1	46.7	48.7	18	0	18	18	0
Mercury	0.25	1.5	0.07	0.15	0.13	0.7	0.88	1.13	1.04	1.42	0.86	1.22	0.88	1.3	0.93	1.19	1	1.38	0.88	1.05	1.01	0.98	0.97	1.08	1.1	18	0	18	18	18
Nickel	30	150	36	-	-	-	32.9	30.9	29.6	33.9	31.9	38.4	31.9	35.7	33.8	35.4	32.6	34.3	33.5	37.1	34.9	34.4	35.7	37	34.1	17	0	3	N/A	N/A
Lead	50	400	38	47	30.2	112	79.6	93.9	83.2	107.6	77.9	107.2	78.5	119	152	110.1	96.7	110.4	83	97.2	92	102.9	92.8	113.8	99.9	18	0	18	18	3
Zinc	130	600	122	150	124	271	141.1	155.1	141.7	172.1	141.3	173.7	141.5	183.3	151.9	177.2	151.2	175.9	146.8	164.4	153.4	158.2	154.4	164.7	158.2	18	0	18	13	0
					-	-																								
Napthalene	0.1		0.08	0.16	-	0.319	0.18	0.20	0.22	0.31	0.20	0.22	0.22	0.28	0.22	0.25	0.24	0.33	0.20	0.24	0.20	0.24	0.22	0.24	0.23	18	N/A	18	18	1
Acenaphthylene	0.1		-	-	0.00587	0.128	0.05	0.06	0.06	0.12	0.05	0.06	0.07	0.08	0.07	0.07	0.06	0.07	0.04	0.05	0.04	0.05	0.04	0.05	0.06	1	N/A	N/A	N/A	0
Acenaphthene	0.1		-	-	0.00671	0.0889	0.13	0.27	0.17	0.26	0.06	0.09	0.10	0.12	0.13	0.10	0.09	0.18	0.05	0.07	0.06	0.08	0.06	0.07	0.12	9	N/A	N/A	N/A	0
Fluorene	0.1		-	-	0.0212	0.144	0.15	0.29	0.19	0.23	0.11	0.13	0.16	0.18	0.19	0.17	0.15	0.24	0.10	0.14	0.11	0.14	0.11	0.13	0.16	18	N/A	N/A	N/A	10
Phenanthrene	0.1		0.032	0.24	0.0867	0.544	0.85	1.31	1.12	1.12	0.45	0.59	0.54	0.65	0.73	0.62	0.62	0.85	0.41	0.48	0.39	0.62	0.42	0.54	0.68	18	N/A	18	18	11
Anthracene	0.1		0.05	0.085	0.0469	0.245	0.32	0.45	0.40	0.50	0.19	0.26	0.22	0.29	0.27	0.31	0.27	0.38	0.16	0.20	0.16	0.24	0.17	0.23	0.28	18	N/A	18	18	10
Fluoranthene	0.1		0.039	0.6	0.113	1.494	1.17	1.88	1.66	1.75	0.63	0.89	0.82	0.99	1.01	0.75	1.00	1.34	0.61	0.73	0.57	0.95	0.65	0.89	1.02	18	N/A	18	17	3
Pyrene	0.1		0.024	0.665	0.153	1.398	1.49	2.06	2.00	2.28	0.84	1.16	1.04	1.33	1.24	1.33	1.20	1.62	0.72	0.85	0.67	1.05	0.76	1.03	1.26	18	N/A	18	18	5
Benzo(a)anthracene	0.1		0.016	0.261	0.0748	0.693	0.67	1.11	1.34	1.01	0.40	0.52	0.48	0.62	0.60	0.60	0.59	0.74	0.37	0.44	0.33	0.54	0.40	0.54	0.63	18	N/A	18	18	4
Chrysene	0.1		0.02	0.384	0.108	0.846	0.54	0.94	1.08	0.82	0.33	0.50	0.43	0.45	0.51	0.46	0.52	0.52	0.28	0.35	0.24	0.43	0.30	0.41	0.51	18	N/A	18	13	2
Benzo(b)fluoranthene	0.1		-	-	-	-	0.45	0.84	0.92	0.75	0.62	0.56	0.40	0.69	0.53	0.46	0.62	0.70	0.42	0.50	0.31	0.45	0.38	0.57	0.57	18	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1		-	-	-	-	0.32	0.46	0.60	0.47	0.29	0.25	0.27	0.32	0.30	0.30	0.29	0.36	0.20	0.23	0.17	0.27	0.22	0.28	0.31	18	N/A	N/A	N/A	N/A
Benzo(a)pyrene	0.1		0.03	0.384	0.0888	0.763	0.68	1.01	1.28	0.98	0.41	0.53	0.52	0.60	0.60	0.67	0.63	0.77	0.39	0.48	0.35	0.57	0.45	0.60	0.64	18	N/A	18	17	4
Indeno(1 2 3cd)pyrene	0.1		0.103	0.24	-	-	0.31	0.43	0.58	0.48	0.23	0.28	0.29	0.35	0.32	0.26	0.44	0.56	0.31	0.40	0.29	0.45	0.39	0.49	0.38	18	N/A	18	17	N/A
Benzo(ghi)perylene	0.1		0.08	0.085	-	-	0.34	0.50	0.63	0.78	0.27	0.32	0.33	0.38	0.37	0.30	0.49	0.65	0.34	0.45	0.32	0.50	0.44	0.55	0.44	18	N/A	18	18	N/A
Dibenzo(a h)anthracene	0.01		-	-	0.00622	0.135	0.08	0.11	0.14	0.12	0.05	0.07	0.07	0.09	0.08	0.07	0.10	0.14	0.07	0.09	0.06	0.11	0.09	0.11	0.09	7	N/A	N/A	N/A	2
PCBs	0.02	0.18	-	-	0.0215	0.189	0.032	0.069	0.058	0.079	0.038	0.069	0.039	0.071	0.043	0.063	0.055	0.064	0.026	0.043	0.031	0.044	0.036	0.047	0.1	18	0	N/A	N/A	0
TBT	0.1	0.5	-	-	-	-	0.00129	0.00271	<0.001	0.00232	<0.001	<0.001	<0.001	<0.001	<0.001	0.00124	<0.001	0.00333	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0	0	N/A	N/A	N/A

Summary Table B

Granton Average Concentrations
All units in mg/kg

	AL1	AL2	BAC	<ERL	PEL	Dredge Average	Exceed Al1?	Exceed Al2?	Exceed BAC?	Exceed ERL ?	Exceed PEL?
Source			CSEMP	CSEMP	Canada						
Arsenic	20	70	25	-	41.6	18.3	No	No	No	-	No
Cadmium	0.4	4	0.31	1.2	4.2	0.5	**Yes**	No	**Yes**	No	No
Chromium	50	370	81	81	160	63.0	**Yes**	No	**Yes**	No	No
Copper	30	300	27	34	108	48.7	**Yes**	No	**Yes**	**Yes**	No
Mercury	0.25	1.5	0.07	0.15	0.7	1.07	**Yes**	No	**Yes**	**Yes**	**Yes**
Nickel	30	150	36	-	-	34.1	**Yes**	No	**Yes**	N/A	N/A
Lead	50	400	38	47	112	99.9	**Yes**	No	**Yes**	**Yes**	No
Zinc	130	600	122	150	271	158.2	**Yes**	No	**Yes**	**Yes**	No
					-						
Napthalene	0.1	-	0.08	0.16	0.319	0.234	**Yes**	N/A	**Yes**	**Yes**	No
Acenaphthylene	0.1	-	-	-	0.128	0.060	No	N/A	N/A	N/A	No
Acenaphthene	0.1	-	-	-	0.0889	0.117	**Yes**	N/A	N/A	N/A	**Yes**
Fluorene	0.1	-	-	-	0.144	0.162	**Yes**	N/A	N/A	N/A	**Yes**
Phenanthrene	0.1	-	0.032	0.24	0.544	0.683	**Yes**	N/A	**Yes**	**Yes**	**Yes**
Anthracene	0.1	-	0.05	0.085	0.245	0.277	**Yes**	N/A	**Yes**	**Yes**	**Yes**
Fluoranthene	0.1	-	0.039	0.6	1.494	1.016	**Yes**	N/A	**Yes**	**Yes**	No
Pyrene	0.1	-	0.024	0.665	1.398	1.259	**Yes**	N/A	**Yes**	**Yes**	No
Benzo(a)anthracene	0.1	-	0.016	0.261	0.693	0.629	**Yes**	N/A	**Yes**	**Yes**	No
Chrysene	0.1	-	0.02	0.384	0.846	0.505	**Yes**	N/A	**Yes**	**Yes**	No
Benzo(b)fluoranthene	0.1	-	-	-	-	0.565	**Yes**	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1	-	-	-	-	0.311	**Yes**	N/A	N/A	N/A	N/A
Benzo(a)pyrene	0.1	-	0.03	0.384	0.763	0.639	**Yes**	N/A	**Yes**	**Yes**	No
Indeno(1,2,3cd)pyrene	0.1	-	0.103	0.24	-	0.382	**Yes**	N/A	**Yes**	**Yes**	N/A
Benzo(ghi)perylene	0.1	-	0.08	0.085	-	0.443	**Yes**	N/A	**Yes**	**Yes**	N/A
Dibenzo(a,h)anthracene	0.01	-	-	-	0.135	0.092	No	N/A	N/A	N/A	No
PCBs	0.02	0.18	-	-	0.189	0.050	**Yes**	No	N/A	N/A	No
TBT	0.1	0.5	-	-	-	0.002	No	No	N/A	N/A	N/A

Summary Table C

Disposal S te Data Summary Narrow Deep
All un ts n mg/kg

	AL1	AL2	BAC	ERL	ISQG/TEL	PEL	1ND93	2ND93	3ND93	4ND93	5ND93	6ND93	7ND93	8ND93	9ND93	10ND93	11ND93
Sou ce			CSEMP	CSEMP	Canada												
	20	70	25	-	7 2	1 6	N	11 85 55	11 57009	7 620968	11 3301	10 9	7 626263	7 98	10 3960	11 1 63	10 375
Cadm um	0 4	4	0.31	1 2	0.7	4 2	NA	0.1	0 1	0.1	0.1	0 1	0.1	0.1	0 1	0.1	0.1
Ch	50	370	81	81	52 3	160	N	50 56818	33 8785	1 83 68	0 6553	7 15909	18 93939	30	5 55 5	37 0935	3 52679
Coppe	30	300	27	34	18 7	108	NA	25	21.96262	25	24 75728	29.09091	29.79798	26	34.65347	22.35772	23 21429
M	0 25	1 5	0 07	0 15	0 13	0 7	0 592	0 858	0 566	0 769	0 7 3	1 12	0 502	0 87	1 102	0 807	0 8 3
N ckel	30	150	36	-	-	-	NA	28 72909	22.18318	26.4871	24 65243	29.60727	19.93333	23 46	30.33267	23.78537	25 50536
Lead	50	400	38	47	30 2	112	NA	66.25	46.26168	57.43952	55 53398	70.75	35	39.325	68.61386	48.29268	50 82589
Z nc	130	600	122	150	124	271	NA	111.3636	100	101 8145	108.9806	117.9545	121 2121	76 25	121.0396	93.08943	98 88393
					-	-											
Napthalene	0 1		0.08	0.16	-	0.319	0.2084	0 0416		0.0725	0 0599			0 3935		0.0746	
Acenaphthylene	0 1		-	-	0.00587	0.128	0 001	0 0007		0.0012	0 0016			0 0066		0.0017	
Acenaphthene	0 1		-	-	0.00671	0.0889	0.0245	0 0107		0.0254	0 0446			0 1717		0.053	
Fluo ene	0 1		-	-	0.0212	0.144	0.2236	0 1463		0.2969	0 9614			1 5809		0.5766	
Phenanth ene	0 1		0 032	0.24	0.0867	0.544	0.1946	0 0918		0.1738	0 4649			1 1159		0.3268	
Anth acene	0 1		0.05	0.085	0.0469	0.245	0 065	0 0336		0.0649	0.179			0 4384		0.1216	
Fluo anthene	0 1		0 039	0 6	0.113	1.494											
Py ene	0 1		0 024	0.665	0.153	1.398	0.2373	0 1525		0.2945	0 7372			1.707		0.5384	
Benzo(a)anth acene	0 1		0 016	0.261	0.0748	0.693	0.1166	0 0737		0.1431	0 3486			0 7485		0.2815	
Ch ysene	0 1		0.02	0.384	0.108	0.846	0.1249	0 0803		0.1617	0 3698			0 8511		0.3235	
Benzo(b fluo anthene	0 1		-	-	-	-											
Benzo(k)fluo anthene	0 1		-	-	-	-											
Benzo(a)py ene	0 1		0.03	0.384	0.0888	0.763	0.1155	0 0778		0.1578	0 2845			0 9643		0.2775	
Indeno(1 2 3cd)py ene	0 1		0 103	0.24	-	-	0.0927	0 0623		0.1115	0 1975			0.723		0.1905	
Benzo(gh)pe ylene	0 1		0.08	0.085	-	-											
D benzo(a,h)anth acene	0.01		-	-	0.00622	0.135											
PCBs	0.02	0.18	-	-	0.0215	0.189											
TBT	0 1	0.5	-	-	-	-											

	17/ND/04	15/ND/04	13/ND/04	11/ND/04	9/ND/04	7/ND/04	5/ND/04	3ND/04	1/ND/04	2/ND/04	4/ND/04	6/ND/04	8/ND/04	10/ND/04	12/ND/04	16/ND/04	3NDTWL04	2NDTWL04	1NDTWL04	14ND07
Sou ce																				
	11 31612	11 60123	12 85831	8 62825	12 56628	10 85	11 32822	13 29725	12 21321	11 00569	12 3088	11 2728	11 0715	9 9359 1	9 5 7896	13 75				
Cadm um	0.264059	0.381571	1 092995	0.638582	1.310219	0 191	0.325858	0.205809	0 324007	0.193356	0.219276	0.253189	0.422571	0 626586	0.659168	1.06				
Ch	5 50959	90 20395	55 8881	29 6163	60 89382	6 75365	51 52715	2 7168	50 15931	51 6 3	57 78099	9 2 806	8 19 55	39 69152	38 513	57 78				
Coppe	30.77694	36.7711	54.14573	42.14269	95 77217	26.72853	30.70547	22 29938	28.85378	25.64324	28 40632	28.05683	29.29585	45.69644	47.05045	59.21				
M	0 879353	0 826282	1 3118 5	0 695996	1 77136	0 7 582	0 785837	0 7139	0 923201	0 772635	0 75216	0 791856	0 8 9 08	0 867013	1 35 108	1 52				
N ckel	29.08047	142.8995	34.70159	28.52668	41.8858	27.05888	28.93552	25 10778	28.56234	28.7906	30 90999	28.06042	28.45231	30.77752	32.76623	38.36				
Lead	72.21112	71 84391	105.5736	91.94215	132.1846	58.40353	68.28584	57 18527	69.05081	63.04809	63 10356	65.03776	69.54348	111.5318	92.6998	119.71				
Z nc	114.5822	137.2943	173.5485	162 9595	305.2746	106.9526	110 2609	89 68755	110.6192	101 5651	101.5495	104.5227	109.6514	146.1482	147 2111	189.50				
Napthalene												0.1136	0.1581	0.0794						
Acenaphthylene												0.0017	0.0025	0.0014						
Acenaphthene												0 033	0.0976	0.0248						
Fluo ene												0.4552	2.9621	0.2745						
Phenanth ene												0 286	1.2338	0.2344						
Anth acene												0.1091	0.603	0.0714						
Fluo anthene												0	0	0						
Py ene												0 464	2.2986	0.2716						
Benzo(a)anth acene												0.2344	1.8332	0.1192						
Ch ysene												0.2563	1.9267	0.1472						
Benzo(b fluo anthene												0	0	0						
Benzo(k)fluo anthene												0	0	0						
Benzo(a)py ene												0.2462	1.2795	0.1365						
Indeno(1 2 3cd)py ene												0.1915	0.7544	0.1168						
Benzo(gh)pe ylene																				
D benzo(a,h)anth acene												0	0	0						
PCBs	0.013479	0.011409	0 042314	0.015942	0.046179	0 009131	0.010105	0.014854	0 015902											
TBT																				

	15ND07	13ND07	17ND07	16ND07	12ND07	11ND07	10ND07	9ND07	8ND07	6ND07	7ND07	5ND07	4ND07	3ND07	2ND07	1ND07
Sou ce																
	10 80						11 30	12 10		10 0	11 90			9 38		
Cadm um	0 64						BDL	BDL		BDL	BDL			BDL		
Ch	51 70						39 00	50		7 90	38 0			53 80		
Coppe	36.30						30.00	65.70		25 50	19.60			24.30		
M	0 66						0 1	0 1		0 39	0 33			0 61		
N ckel	30.40						29.90	34.30		25 20	22.00			28.30		
Lead	84.20						66.70	69.40		43 20	35.80			57.20		
Z nc	136.00						163.00	243 00		87 20	87.00			96.90		
Napthalene		0 0443	0.0724	0.0431	0.1022	0.0609	0 0399	0.0299	0.0402	0 0628	0.2134	0.0625				
Acenaphthylene		0.001	0.0012	0.0008	0.0015	0.001	0 0009	0.0005	0.0009	0 0012	0.0027	0.0011				
Acenaphthene		0 0088	0.0118	0.0064	0.0275	0.0127	0 0119	0.0067	0.0239	0.0501	0.1753	0.0145				
Fluo ene		0 1007	0.1122	0.0754	0.1692	0.0884	0.129	0.0699	0.1934	0 3416	0.8844	0.1235				
Phenanth ene		0 0753	0.0884	0.0596	0.1212	0.0591	0 0855	0.0446	0.1159	0 2299	0.8403	0.0905				
Anth acene		0 0291	0 031	0.0192	0.0441	0.0246	0 0321	0.0178	0.0457	0 0895	0 255	0.0369				
Fluo anthene																
Py ene		0 1243	0.1207	0.083	0.1686	0.0892	0 1338	0.0688	0.1839	0 3042	0.8009	0.1348				
Benzo(a)anth acene		0 0719	0.0734	0.0473	0.0983	0 06	0 0775	0 041	0.1042	0 1859	0.4405	0.0773				
Ch ysene		0 0703	0.0719	0.0517	0.0971	0.0586	0 0781	0 041	0.1029	0.178	0.4232	0.0759				
Benzo(b fluo anthene																
Benzo(k)fluo anthene																
Benzo(a)py ene		0 0687	0.0698	0.0519	0.0952	0.0563	0 0716	0.0362	0.1022	0 1383	0.2435	0.0771				
Indeno(1 2 3cd)py ene		0 0806	0.0844	0.0561	0.0986	0.0559	0 0723	0.0374	0.098	0 1272	0.2438	0.0797				
Benzo(gh)pe ylene																
D benzo(a,h)anth acene																
PCBs		0.016756		0.037361			0.010107	0 283743		0.005155	0 005287			0 005932		
TBT																

	4/ND/11	3/ND/11	1/ND/11	6/ND/11	9/ND/11	13/ND/11	1/ND/15	2/ND/15	3/ND/15	4/ND/15	5/ND/15	6/ND/15	9/ND/02	8/ND/02	7/ND/02	6/ND/02	5/ND/02	4/ND/02	3/ND/02	2/ND/02	1/ND/02	Average	No Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Sou ce																									
	9 7	7 5	10 7	9 87	8 2	11 1	11 50	13 10		10 90	11 0		13 0	12 60	13 30	12 60	9 31	11 60	12 50	13 30	13	11 1	0	-	0
Cadm um	0.14	0.11	0.18	0 20	0.25	0 35	0 6	0 7		0 7	0 25		0 55	0.20	0 2	0 43	0 20	NA	NA	0.34	2	0.4	16	1	0
Ch	7 98	31 2	9 88	6 2	32 92	49 4	69 90	67 90		56 0	6 40		60 70	67 20	67 80	55 40	55 80	50 40	59 70	5 80	6 5	9 8	0	0	0
Coppe	16.80	15.76	25.36	25.02	23 79	22 77	22 30	24 70		22 90	28 50		3 60	28 20	28 80	28 90	27 50	25 70	28 30	29 50	47 6	31.3	28	11	0
M	0 53	0 35	0 5	0 8	0 6	0 67	0 66	0 74		0 45	0 5		0 69	0 66	0 80	0 72	0 77	0 6	0 82	0 7	3	0 75	52	52	29
N ckel	22.79	17.63	29.14	23.14	21 19	23 38	3 60	3 60		27 0	29 70		30 60	30 70	32 40	28 60	27 80	26 60	30 30	28 80	34 5	30.5	3	N/A	N/A
Lead	54.05	37.66	48.14	59.22	60 97	60 45	62 70	62 90		55 40	52 40		70 40	65 0	67 80	6 40	63 40	54 30	70 0	73 00	98 3	66.3	48	45	2
Z nc	81.81	64.27	91.30	149.11	168.41	0 26	09 00	00		95 60	08 00		29 00	23 00	7 00	3 00	04 00	97 00	09 00	48 00	58 0	123.0	17	8	1
Napthalene							0.02930	0.04330		0 0452	0 052	0.0442							0 0916			0.1	7	3	1
Acenaphthylene							0.00044	0.00102		0.00	0.00	0 00							0.001			0.0	N/A	N/A	0
Acenaphthene							0 00964	0 0 70		0.01	0.01	0 0							0.018			0.0	N/A	N/A	0
Fluo ene							0 0 080	0 0 570		0 02	0 02	0 0							0 2			0.151	N/A	N/A	14
Phenanth ene							0 08060	0 800		0	0 09	0 08							0 6			0.1	26	6	3
Anth acene							0.02670	0.04130		0.04	0.03	0 03							0.06			0.0	11	7	3
Fluo anthene							0 0700	0 7700		0 4	0 2	0 09							0 00			0.1	5	0	0
Py ene							0 700	0 8900		0 3	0 3	0 0							0 23			0.2	26	4	2
Benzo(a)anth acene							0 05590	0 09240		0 07	0 06	0 05							0			0.1	26	5	2
Ch ysene							0 05920	0 09590		0 07	0 06	0 06							0 9			0.1	26	3	2
Benzo(b fluo anthene							0 3500	0 24600		0 6	0 4	0 3							0 00			0.1	N/A	N/A	N/A
Benzo(k)fluo anthene							0 00000	0 00000		0 00	0 00	0 00							0 00			0.0	N/A	N/A	N/A
Benzo(a)py ene							0 05890	0 0500		0 07	0 06	0 06							0 3			0.1	26	2	2
Indeno(1 2 3cd)py ene							0 04730	0 08660		0 05	0 05	0 05							0			0.1	10	3	N/A
Benzo(gh)pe ylene																							0	0	N/A
D benzo(a,h)anth acene							0 00762	0 0 50		0 0	0 0	0 0							0 00			0.0	N/A	N/A	0
PCBs			0 009823	0 00835	0.005837					0.049	0 035	0.005										0.0367	N/A	N/A	1
TBT																						-	N/A	N/A	N/A

Summary Table D

Disposal S te Data Summary Oxcars

All un ts n mg/kg

	AL1	AL2	BAC	ERL	ISQG/TEL	PEL	1OXC93	2OXC93	3OXC93	4OXC93	5OXC93	6OXC93	7OXC93	8OXC93	9OXC93	10OXC93	11OXC93	12OXC93
Sou ce			CSEMP	CSEMP	Canada													
	20	70	25	-	7 2	1 6	12 15	10 29	10 33	12 11	11 03	1 10	16 67	28 29	11 10	18 27	1 67	13 15
Cadm um	0 4	4	0.31	1 2	0.7	4 2	0.1	0 1	0.1	0.16	0 1	0.1	0 1	0.1	0.1	0 1	0.1	0.1
Ch	50	370	81	81	52 3	160	0 66	27 98	36 18	0 87	27 2	1 8	16 77	1 25	28 98	31 89	56 9	6 27
Coppe	30	300	27	34	18 7	108	21.30	19.92	24 61	24.53	19.19	9.54	26.13	15 66	19.94	34.36	104 98	30.91
Me cu y	0.25	1.5	0.07	0.15	0.13	0 7	0.74	0.69	1 01	1.07	0.74	0.38	1.74	0 70	0.67	1.01	2 16	1.76
N ckel	30	150	36	-	-	-	16.48	15.77	20 09	21.89	16.39	10.33	12.90	17 67	18.44	19.01	29 59	24.15
Lead	50	400	38	47	30 2	112	45.12	43.21	51 86	53.15	45.13	58.17	43.60	45 11	43.50	218.32	90 17	55.79
Z nc	130	600	122	150	124	271	84.22	82.14	94 08	95.19	78.85	61.15	69.51	109 87	89.32	123.72	605 77	112.98
					-	-												
Napthalene	0 1		0.08	0.16	-	0.319	105.30	110.20	108 60									
Acenaphthylene	0 1		-	-	0.00587	0.128	2.60	2.00	2 50									
Acenaphthene	0 1		-	-	0.00671	0.0889	20	17.9	43 4									
Fluo ene	0 1		-	-	0.0212	0.144	185.2	129 2	219.5									
Phenanth ene	0 1		0 032	0.24	0.0867	0.544	135.7	107 4	220.6									
Anth acene	0 1		0.05	0.085	0.0469	0.245	54.7	41	69 9									
Fluo anthene	0 1		0 039	0 6	0.113	1.494												
Py ene	0 1		0 024	0.665	0.153	1.398	205.2	148 6	242.9									
Benzo(a)anth acene	0 1		0 016	0.261	0.0748	0.693	115	82.8	141.7									
Ch ysene	0 1		0.02	0.384	0.108	0.846	115.9	83.9	140.7									
Benzo(b fluo anthene	0 1		-	-	-	-												
Benzo(k)fluo anthene	0 1		-	-	-	-												
Benzo(a)py ene	0 1		0.03	0.384	0.0888	0.763	128.1	87.8	159.1									
Indeno(1 2 3cd)py ene	0 1		0 103	0.24	-	-	137.6	93.1	151.9									
B (h) l	0 1		0 08	0 085	-	-												
D benzo(a,h)anth acene	0.01		-	-	0.00622	0.135												
PCBs	0.02	0.18	-	-	0.0215	0.189												0.013479
TBT	0 1	0.5	-	-	-	-			2 192269	-5.84711	18 76351	29.23101	5		4		5	

	13OXC93	14OXC93	15OXC93	16OXC93	17OXC93	18OXC93	19OXC93	20OXC93	21OXC93	22OXC93	23OXC93
Sou ce											
	8 2	11 18	11 67	11 86	13 17	9 96	16 9	13 99	7 13	5 19	12 17
Cadm um	0 1	0.1	0.1	0 1	0.1	0.1	0.1	0.1	0 1	0.1	0.1
Ch	22 28	26 19	13 2	17 71	20 22	1 50	17 79	19 31	27 85	21 5	21 6
Coppe	11.62	20 41	16.00	10.66	11 37	14.07	46 33	30.77	15.30	14 11	26.92
Me cu y	0.23	0 49	0.66	0.53	0 28	0.33	1 60	0.65	0.50	0 39	0.67
N ckel	24.46	15 77	14.50	12.65	11 26	13.25	15 39	16.72	18.72	15 69	15.19
Lead	25.05	44 26	41.48	41.02	56 42	36.96	196 10	116.26	32.67	26 69	37.22
Z nc	66.34	79 52	72.03	72.71	78 86	79.80	99 81	87.20	68.56	64 95	68.69
Napthalene	156.30	151 80	177.00	92.10	292 20	165.10			262.30		
Acenaphthylene	2.00	2 50	2.60	1.20	3 90	2.60			2.80		
Acenaphthene	20.5	19	24.8	9 9	38 3	24.8			29.1		
Fluo ene	227	251.9	304.6	109.1	462.9	324 8			327 3		
Phenanth ene	176 8	202.1	244.2	95.1	386.4	254 5			276 9		
Anth acene	70.6	74 8	97.5	36.1	147.9	104 6			101 3		
Fluo anthene											
Py ene	266 4	293.6	372.8	137.4	560.2	392 4			393 5		
Benzo(a)anth acene	111 1	128.4	152	55.7	233.5	181			162 8		
Ch ysene	142 9	159.3	195.7	72.5	299.1	233 4			203 9		
Benzo(b fluo anthene											
Benzo(k)fluo anthene											
Benzo(a)py ene	139 9	190	200.7	81.7	293	210 5			192 8		
Indeno(1 2 3cd)py ene	99.6	133.3	146	59.8	216.1	146 9			143 9		
B (h) l											
D benzo(a,h)anth acene											
PCBs	0.011409	0 042314	0.015942	0.046179	0 009131	0.010105	0.014854	0 015902			
TBT	10		9		4		5			19	15

	13/OX/04	11/OX/04	9/OX/04	7/OX/04	5/OX/04	3/OX/04	1/OX/04	2/OX/04	4/OX/04	6/OX/04	8/OX/04	10/OX/04	12/OX/04	14/OX/04
Sou ce														
	16 8	1 57	15 35	16 00	1 59	1 79	16 37	17 19	16 25	16 6	11 08	17 1	13 92	29 13
Cadm um	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.19	BDL	BDL
Ch	3 59	95	52 37	5 25	2 96	66 1	52 5	5 81	5 53	0 65	2 10	59 38	0 70	25 85
Coppe	18.62	24 31	29.57	23.73	24 11	40.85	26.60	30.62	26.28	23 22	23.65	36.75	21 28	13.46
Me cu y	0.52	0 82	0.89	0.77	0 73	1.59	0.81	0.83	0.77	0 70	0.65	1.09	0 61	0.31
N ckel	19.93	23 50	27.62	24.29	21 89	30.12	26.61	28.35	25.00	22 04	26.66	30.84	21 05	17.60
Lead	47.37	57 25	64.50	55.26	53 44	74.47	69.38	66.99	57.81	54 90	56.41	70.53	47 75	45.87
Z nc	75.12	92 79	107.77	94.50	89 44	124.10	103.18	115.12	92.97	85 78	94.74	122.10	83 03	64.16
Napthalene									77.00	161 10	107.40			
Acenaphthylene									1.50	2 70	1.70			
Acenaphthene									13.3	28.3	19 5			
Fluo ene									189 9	367.2	270.2			
Phenanth ene									137 8	257.8	204.1			
Anth acene									57.3	110.2	85 7			
Fluo anthene														
Py ene									223 7	422.5	317			
Benzo(a)anth acene									103 4	198.5	139			
Ch ysene									122 7	230	155.9			
Benzo(b fluo anthene														
Benzo(k)fluo anthene														
Benzo(a)py ene									119 4	229.4	147.3			
Indeno(1 2 3cd)py ene									95.1	181.6	106.6			
B (h) l														
D benzo(a,h)anth acene														
PCBs										0.016756		0.037361		
TBT			8		6									

	11OX2007	12OX2007	5OX2007	13OX2007	6OX2007	1OX2007	4OX2007	7OX2007	14OX2007	8OX2007	9OX2007	10OX2007	3OX2007	2OX2007
Sou ce														
							11 80	16 00	15 10	1 0	12 0	13 30		
Cadm um							BDL	BDL	BDL	BDL	BDL	BDL		
Ch							5 80	69 50	0 90	72 90	5 70	61 80		
Coppe							25 60	35.00	17.90	37 30	21.60	32.50		
Me cu y							0 66	0.93	0.40	0 85	0.53	0.69		
N ckel							27 20	33.50	22.30	34 30	24.00	31.20		
Lead							53 30	69.00	43.00	71 80	46.20	65.80		
Z nc							100 00	123.00	80.50	126 00	81.10	114.00		
Napthalene														
Acenaphthylene														
Acenaphthene														
Fluo ene														
Phenanth ene														
Anth acene														
Fluo anthene														
Py ene														
Benzo(a)anth acene														
Ch ysene														
Benzo(b fluo anthene														
Benzo(k)fluo anthene														
Benzo(a)py ene														
Indeno(1 2 3cd)py ene														
B (h) l														
D benzo(a,h)anth acene														
PCBs	0.010107	0 283743		0.005155	0 005287			0 005932					0 009823	0 00835
TBT	4	4		4	4									

	10/OX/2011	12/OX/2011	3/OX/2011	7/OX/2011	4/OX/2011	8/OX/11	1/OX/15	3/OX/15	5/OX/15	7/OX/15	10/OX/15	4/OX/02	3/OX/02	2/OX/02	1/OX/02	Average	No.Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Sou ce																			
	13 3	12 30	7 8	9 75	13 89	10 7		16 30	15 20	15 50		10 0	16	13 3	12 5	13 8	2	-	0
Cadm um	0.09	0 11	0.22	0.12	0 12	0.11		0.12	0.1	0.67		NA	NA	NA	0 485	0.2	2	0	0
Ch	37 02	52 15	35 10	7 20	2 7	1 0		62 90	7 00	102 00		8 80	71 1	36 3	37 8	0 8	1	1	0
Coppe	17.16	21 21	24.79	20.95	22 76	26.23		23.90	26 70	7 .30		24.20	37 7	17.6	16	26.0	14	9	0
Me cu y	0.48	0 58	0.55	0.70	0 80	0.71		0.71	0 77	1.60		0.61	1.02	0.392	0 536	0.78	56	56	28
N ckel	20.84	24 65	24.98	19.27	22 76	21.43		29.10	30 50	7.80		23.10	31 1	18.6	14.4	22.2	1	N/A	N/A
Lead	49.17	61 10	655.37	45.53	54 70	54.86		56.10	63 30	115.00		46.40	70 2	40.4	46.2	71.0	51	35	5
Z nc	76.39	88 15	139.52	73.93	88 46	86.74		101.00	108 00	216.00		90.70	132	91.1	68.2	103.1	9	2	1
Napthalene												75.40	291 3	67.3	57.6	119.6	17	17	17
Acenaphthylene												2.10	5 6	2.4	1.5	2.5	N/A	N/A	17
Acenaphthene												21.4000	58 800	12 400	12.800	23.8	N/A	N/A	0
Fluo ene												65 0	488 40	46 20	24 00	250.1	N/A	N/A	17
Phenanth ene												24 20	4 4 90	27 30	83 50	192.8	17	17	17
Anth acene												50 60	261 70	48.80	35 20	92.8	17	17	17
Fluo anthene																	0	0	0
Py ene												86 60	557 20	5 00	38 20	285.2	17	17	17
Benzo(a)anth acene												0 0	29 40	87 30	75 60	143.6	17	17	17
Ch ysene												2 70	286 90	83 90	75 40	152.5	17	17	17
Benzo(b fluo anthene																	N/A	N/A	N/A
Benzo(k)fluo anthene																	N/A	N/A	N/A
Benzo(a)py ene												28 20	296 60	92 20	74 0	155.3	17	17	17
Indeno(1 2 3cd)py ene												28 0	324 0	94 90	78 0	144.1	17	17	N/A
B (h) l																	0	0	N
D benzo(a,h)anth acene																	N/A	N/A	0
PCBs	0.005837					0.049	0 035	0.005								0 037	N/A	0	1
TBT				6	10.8	83.9	0.0039	0.0051	0.008	0.0255	0.0029	14		11	7	11 562	N/A	N/A	N/A

Summary Table E

Disposal Site Data Summary Bo'ness

	AL1	AL2	BAC	<ERL	ISQG/TEL	PEL	07/BON/1 1	06/BON/1 1	05/BON/1 1	04/BON/1 1	03/BON/1 1	02/BON/1 1	0 /BON/1 1
Source			CSEMP	CSEMP	Canada								
Arsenic	20	70	25	-	7.2	41.6	13.96	13.26	6.46	17.51	12.45	14.38	13.29
Cadmium	0.4	4	0.31	1.2	0.7	4.2	0.16	0.14	0.10	0.11	0.13	0.16	0.15
Chromium	50	370	81	81	52.3	160	59.19	52.94	35.59	43.63	50.82	58.78	54.72
Copper	30	300	27	34	18.7	108	26.15	24.65	17.33	24.14	22.54	24.65	23.76
Mercury	0.25	1.5	0.07	0.15	0.13	0.7	0.86	0.78	0.55	0.96	0.76	0.85	0.83
Nickel	30	150	36	-	-	-	26.55	24.25	19.75	20.95	22.49	26.46	24.82
Lead	50	400	38	47	30.2	112	62.59	58.15	46.70	50.91	53.68	63.54	63.04
Zinc	130	600	122	150	124	271	06.96	98.42	81.48	88.58	94.36	101.51	98.39
					-	-							
Napthalene	0.1		0.08	0. 6	-	0.319			0.0831		0.1542	0 0649	
Acenaphthylene	0.1		-	-	0.00587	0.128			0.0013		0.0031	0.001	
Acenaphthene	0.1		-	-	0.00671	0.0889			0.0123		0.0253	0 0111	
Fluorene	0.1		-	-	0.0212	0.144			0.1567		0.3878	0.1224	
Phenanthrene	0.1		0.032	0.24	0.0867	0.544			0.1264		0.2733	0.095	
Anthracene	0.1		0.05	0.085	0.0469	0.245			0.0522		0.0986	0 0392	
Fluoranthene	0.1		0.039	0.6	0.113	1.494							
Pyrene	0.1		0.024	0.665	0.153	1.398			0.1833		0.375	0.1338	
Benzo(a)anthracene	0.1		0.016	0.261	0.0748	0.693			0.0825		0.2112	0 0645	
Chrysene	0.1		0.02	0.384	0. 08	0.846			0.0909		0.2252	0 0698	
Benzo(b)fluoranthene	0.1		-	-	-	-							
Benzo(k)fluoranthene	0.1		-	-	-	-							
Benzo(a)pyrene	0.1		0.03	0.384	0.0888	0.763			0.0981		0.249	0 0777	
Indeno(1 2 3cd)pyrene	0.1		0.103	0.24	-	-			0.0806		0.1894	0 0611	
Benzo(ghi)perylene	0.1		0.08	0.085	-	-							
D benzo(a h)anthracene	0.01		-	-	0.00622	0.135							
PCBs	0.02	0.18	-	-	0.0215	0.189		0 005864	0.004308	0	0.004385		
TBT	0.1	0.5	-	-	-	-	0.0081			0.00719			

	1BSS93	2BSS93	3BSS93	4BSS93	5BSS93	6BSS93	7BSS93	8BSS93	1BSS01	2BSS01	3BSS01	4BSS01	5BSS01	6BSS01	7BSS01	8BSS01	9BSS01	0BSS01	11BSS01
Source																			
Arsenic	13.34	12.91	11.23	11.96	9.26	16.67	17.43	23.77	13.90	15.50	17.20	13.40	16.80	25.10	12.90	13.80	16.50	13.20	12.70
Cadmium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21	0.14	0.11	0.05	0.02	0.02	0.07	0.12	0.15	0.11	0.07
Chromium	73.43	40.69	58.50	16.52	30 08	40.39	36.05	22.15	77.20	68.60	60.10	56.00	25.20	22.50	49.20	57.00	61.20	62.00	42.30
Copper	58.57	33.16	44.09	16.85	18.19	35.01	26.53	18.88	45.80	42.00	40.30	25.20	14.90	50.70	26.60	38.60	42.90	37.90	24.70
Mercury	2.34	1.33	1.75	0 65	0.64	1.66	1.49	0.79	1.62	1.13	0.88	0.33	0.30	0.27	0.43	0.79	1.28	0.84	0.56
Nickel	29.84	23.00	27.59	11.60	21 07	21. 0	18.45	14.88	28. 0	31. 0	30.00	24.00	14.20	13.40	26.30	27.20	28.40	28.20	21.10
Lead	84.41	49.50	60.07	29.32	29.13	58.24	47.58	38.23	69. 0	73.20	69.50	36.00	43.80	43.80	38.30	56.80	65.30	62.50	49.00
Zinc	173.27	109.50	134.71	70.52	78 22	110.54	100.75	94.75	121 00	119.00	119.00	72.30	68.00	76.70	85.50	109.00	115.00	116.00	88.40
Napthalene																			
Acenaphthylene																			
Acenaphthene																			
Fluorene																			
Phenanthrene																			
Anthracene																			
Fluoranthene																			
Pyrene																			
Benzo(a)anthracene																			
Chrysene																			
Benzo(b)fluoranthene																			
Benzo(k)fluoranthene																			
Benzo(a)pyrene																			
Indeno(1 2 3cd)pyrene																			
Benzo(ghi)perylene																			
D benzo(a h)anthracene																			
PCBs									0.012654	0.010207	0.007604	0.002889	0.002 82	0.002 02	0.00961	0.00699	0.007479	0 007108	0.005006
TBT														BDL					

	12BSS01	13BSS01	14BSS01	5BSS01	16BSS01	17BSS01	18BSS01	19BSS01	20BSS01	2 BSS01	22BSS01	23BSS01	1/BSS/15	2/BSS/ 5	3/BSS/15	5/BSS/15	6/BSS/ 5	Average	No.Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Source																					
Arsenic	12.80	8.32	13.90	16.80	14.10	15.40	18.00	13.20	8.40	16.00	14.00	14.40	17.00	17.50	20.30	17.80	20.30	15.3	1	-	0
Cadmium	0.03	0.0	0.06	0 09	0.05	0.12	0.13	0.13	0.16	0.1	0.12	0.15	0.13	0.14	0.14	0.15	0.08	0.1	0	0	0
Chromium	30.20	27.90	0.80	53.10	37.00	53.90	58 80	65.60	66.70	62.90	6 . 0	75.20	62.00	71.10	69.70	57.10	38.10	50.9	0	0	0
Copper	10.30	16.10	2 .00	33.90	13.90	37.60	36 90	39.90	.60	0.90	38.80	.80	26. 0	30.10	29. 0	28.60	17.90	0.7	22	17	0
Mercury	0.07	0.30	0. 8	0 75	0.72	0.81	0.99	0.96	1.10	0.9	0.89	1.08	0.77	0.86	0.82	0.7	0. 9	0.87	42	42	31
Nickel	20.00	13.90	22.10	25.10	20.50	25. 0	27 50	31.80	31.00	30.80	29.90	3 .00	26.60	31.00	30.80	29.60	19.60	24.5	0	N/A	N/A
Lead	25.20	30.60	7.50	58.50	50.30	57.90	6 90	66.70	65.60	6 .60	62.30	70.30	53.00	58.20	59.10	57.20	3.60	54.4	38	32	0
Zinc	57.20	62.30	89.60	109.00	70.90	11 .00	117.00	121.00	123.00	121.00	11 .00	131.00	110.00	119.00	128.00	117.00	95.80	103.1	5	1	0
Napthalene													0.0624	0.0837	0.0363	0 0527	0.0607	0 075	3	0	0
Acenaphthylene													0.001	0.008	0.001	0.001	0.001	0 002	N/A	N/A	0
Acenaphthene													0.011	0.079	0.007	0.009	0.010	0 021	N/A	N/A	0
Fluorene													0.02	0.02	0.01	0.01	0.02	0 094	N/A	N/A	0
Phenanthrene													0.11	0.16	0.06	0.09	0.10	0.127	8	1	0
Anthracene													0.04	0.09	0.03	0.03	0.04	0 052	3	2	0
Fluoranthene													0.1	0.21	0.09	0.11	0.12	0.135	5	0	0
Pyrene													0.15	0.23	0.10	0.12	0.1	0.180	8	0	0
Benzo(a)anthracene													0.07	0.12	0.05	0.06	0.06	0 089	5	0	0
Chrysene													0.08	0.12	0.05	0.06	0.07	0 096	8	0	0
Benzo(b)fluoranthene													0.18	0.28	0.11	0.15	0.17	0.178	N/A	N/A	N/A
Benzo(k)fluoranthene																		0 000	N/A	N/A	N/A
Benzo(a)pyrene													0.08	0.13	0.05	0.06	0.07	0.103	8	0	0
Indeno(1 2 3cd)pyrene													0.06	0.10	0.0	0.05	0.06	0 080	1	0	N/A
Benzo(ghi)perylene																			0	0	N/A
D benzo(a h)anthracene													0.01	0.01	0.01	0.01	0.01	0 009	N/A	N/A	0
PCBs	0.001	0.005	0.005	0.007	0.002	0.007	0.007	0.009	0.009	0.007	0.008	0.009	0.004		0.005	0.004		0.0060	N/A	N/A	0
TBT												0.0031	0.0047	0.006	0.00	0.004		0.005	N/A	N/A	N/A

Table F
Disposal Site Average Data

	AL1	AL2	BAC	<ERL	ISQG/TEL	PEL	Granton Harbour Dredge Average	Narrow Deep Average	Bo'ness Average
Source			CSEMP	CSEMP	Canada				
Arsenic	20	70	25	-	7 2	41.6	18.3	11.1	15 28
Cadmium	0.4	4	0.31	1.2	0.7	4.2	0.5	0.4	0.11
Chromium	50	370	81	81	52.3	160	63.0	49.8	50 91
Copper	30	300	27	34	18.7	108	48.7	31.3	30.66
Mercury	0 25	1.5	0.07	0.15	0.13	0.7	**1.07**	**0.7**	**0.87**
Nickel	30	150	36	-	-	-	34.1	30.5	24 53
Lead	50	400	38	47	30.2	112	99.9	66.3	54 37
Zinc	130	600	122	150	124	271	158.2	123.0	103 06
Napthalene	0.1		0.08	0.16	-	0 319	0 23	0.06	0.075
Acenaphthylene	0.1		-	-	0 00587	0.128	0 06	0.00	0.002
Acenaphthene	0.1		-	-	0 00671	0.0889	**0.12**	0.02	0.021
Fluorene	0.1		-	-	0.0212	0.144	**0.16**	0.15	0.094
Phenanthrene	0.1		0.032	0.24	0.0867	0 544	**0.68**	0.14	0.127
Anthracene	0.1		0.05	0 085	0.0469	0 245	**0.28**	0.05	0.052
Fluoranthene	0.1		0.039	0.6	0.113	1.494	1 02	0.11	0.135
Pyrene	0.1		0.024	0.665	0.153	1 398	1 26	0.18	0.180
Benzo(a)anthracene	0.1		0.016	0 261	0.0748	0.693	0.63	0.10	0.089
Chrysene	0.1		0.02	0 384	0.108	0 846	0 51	0.11	0.096
Benzo(b)fluoranthene	0.1		-	-	-	-	0 57	0.14	0.178
Benzo(k)fluoranthene	0.1		-	-	-	-	0 31	-	-
Benzo(a)pyrene	0.1		0.03	0 384	0.0888	0.763	0.64	0.09	0.103
Indeno(1,2,3cd)pyrene	0.1		0.103	0.24	-	-	0 38	0.08	0.080
Benzo(ghi)perylene	0.1		0.08	0 085	-	-	0.44	-	-
Dibenzo(a,h)anthracene	0 01		-	-	0 00622	0.135	0 09	0.0	0.009
PCBs	0 02	0.18	-	-	0.0215	0.189	0.050	0.0367	0.006
TBT	0.1	0.5	-	-	-	-	0.002	No data	0.005

Technical Appendix 5-1: Otter Survey

Edinburgh Marina Granton Harbour Ltd

Edinburgh Marina
Technical Appendix 5-1: Otter Survey

September 2018

Edinburgh Marina
Technical Appendix 5-1: Otter Survey

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Contents

Appendices

Tables

1 INTRODUCTION

1.1 Background

EnviroCentre Limited was commissioned by Edinburgh Marina Granton Harbour Ltd, to undertake an otter (*Lutra lutra*) survey within Granton Harbour, Edinburgh. The survey was required to inform an Ecological Impact Assessment (EcIA) for re-development works.

No definitive site boundary was available prior to survey design, therefore the 'site' was considered to be the physical extents of the harbour with a 50m buffer, and the survey effort was extended to 250m upstream and downstream, where accessible. A survey plan is presented in Appendix A.

1.2 Aims and Objectives

The aim of the survey was to establish the ecological baseline in terms of habitats present and evidence of otter. The main objectives of the survey were as follows:

- Search for field evidence of otter within the site boundary plus an appropriate buffer;
- Identify suitable habitat for otter in the survey area; and
- Identify the potential impacts of the develompent to otter and outline appropriate mitigation methods; and
- Make recommendations for any further survey and/or species licensing requirements.

1.3 Site Description and Proposed Development

The site is within Granton Harbour, north Edinburgh and fronts on to the Firth of Forth. The larger Leith docks is situated approximately 1.3km to the east of Granton Harbour. Granton Harbour consists of an east and west harbour which are separated by a middle pier. Much of the western harbour has been lost to land reclamation in the past. The proposed development will be situated within the western harbour.

The proposed development includes the creation of a new marina, extension and backfilling of the quay wall, extension of the western breakwater and dredging. The development received outline planning permission in 2003 as part of the larger Granton Harbour regeneration project.

Two tributaries of the River Forth are within 5km of the site: the mouth of the Water of Leith is 3.3 km east and the mouth of the River Almond is 4.5 km west of Granton Harbour.

Site photographs are provided in Appendix B.

1.4 Legislative Context

Otters are legally protected in Scotland by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) - "the Habitats Regulations"[1]. Under these Regulations, otters are classed as European Protected Species and are given the highest level of species protection. The following provides a summary of the offences in the Habitats Regulations in relation to wild otters.

It is an offence to deliberately or recklessly:

- capture, injure or kill an otter;
- harass an otter or group of otters;
- disturb an otter in a holt or any other structure or place it uses for shelter or protection;
- disturb an otter while it is rearing or otherwise caring for its young;
- obstruct access to a holt or other structure or place otters use for shelter or protection or to otherwise deny the animal use of that place;
- disturb an otter in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species;
- disturb an otter in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

It is also an offence to:

- damage or destroy a breeding site or resting place of such an animal (note that this does not need to be deliberate or reckless to constitute an offence);
- keep, transport, sell or exchange or offer for sale or exchange any wild otter or any part or derivative of one (if obtained after 10 June 1994).

Legal protection requires due care to be taken to the presence of the species and appropriate action taken to safeguard the places they use for shelter or protection. If a potential problem is identified, then often a modification to the development is sufficient to ensure that otters will not be adversely affected and no offence committed. Licences are available to allow specified people to carry out actions that could otherwise constitute an offence.

European and national legislation and policy relevant to this report include:

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- The Water Framework Directive (2000/60/EC);
- Nature Conservation (Scotland) Act 2004;
- The Wildlife and Countryside Act 1981 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011 (WANE);
- The British Standard for Biodiversity;
- The UK Biodiversity Action Plan (UKBAP);
- The Scottish Biodiversity List (SBL);
- Edinburgh Biodiversity Action Plan (EBAP) 2016-2018);
- Scottish Planning Policy (2014); and
- Edinburgh Local Development Plan (2016).

A summary of protected species legislation is provided in Appendix C.

[1] https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-species/protected-species-z-guide/protected-species-otters (Accessed: 13/08/2018

1.5 Report Usage

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre.

If this report is to be submitted for regulatory approval more than 12 months following the report date, it is recommended that it is referred to EnviroCentre for review to ensure that any relevant changes in data, best practice, guidance or legislation in the intervening period are integrated into an updated version of the report.

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2 METHODS

All survey work was undertaken and verified by an experienced and competent ecologists who are Members of the Chartered Institute of Ecology and Environmental Management (CIEEM). The survey followed standard methods endorsed by Scottish Natural Heritage[2] (SNH) and CIEEM (CIEEM, 2013). This section provides details of the methods adopted.

2.1 Desk Study

In order to anticipate the potential ecological sensitivities at the site for otter, a desk study was conducted in advance of the survey in August 2018. The following sources of information were used:

- Data on designated sites available through Scottish Natural Heritage (SNH) Sitelink website (SNH, n.d.) (up to 5km from the site);
- Existing data on non-statutory designated sites up to 2km from the site , available through the Edinburgh Local Development Plan (LDP) (City of Edinburgh Council, 2016);
- NBN Atlas[3] for otter records within 5km of the site – only records created within the last 10 years and which are licenced for commercial use are reported;
- EBAP 2016-2018 (City of Edinburgh Council, 2016) for priority habitats and species;
- UKBAP (JNCC, n.d.);
- SBL (Scottish Government, 2013); and
- Water of Leith Conservation Trust website[4].

A general internet search was carried out to find otter records on the River Almond.

2.2 Otter Survey

The field survey was carried out by Lorna Wilkie on 15th August 2018. The weather conditions were sunny with scattered showers and a light breeze, and the temperature was 15 degrees.

The field survey for otter was undertaken in accordance with CIEEM guidelines as referenced above. The survey area encompassed the wider landscape, within the site boundary and 250m up-stream and down-stream of the site. The survey followed best practice guidelines (Chanin, 2003), and searched for suitable habitat along with field signs, including:

- Spraints (otter faeces/droppings used as territorial signposts. Often located in prominent positions and placed on deliberate piles of soil or sand); Three categories are used for describing otter spraint: Dried fragmented (Df); Dried intact (Di); and Not fully dry (Nd);
- Footprints;
- Feeding remains (can often be a useful indication of otter presence);
- Paths/slides (otter can often leave a distinctive path from and into the watercourse);
- Holts (underground shelter) are generally found:

[2] https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/licensing/species-licensing-z-guide/otters-and-licensing/otters-licences-surveys-and (Accessed 13/08/2018)
[3] NBN Atlas available from: https://nbnatlas.org (Accessed: 13/08/2018)
[4] http://www.waterofleith.org.uk/ (Accessed 13/08/2018)

  - Within trees roots at the edge of the bank of a river;
  - Within hollowed out trees;
  - In naturally formed holes in the river banks that can be easily extended;
  - Or preferably in ready-made holes created by other large mammals or humans such as badger setts, rabbit burrows or outlet pipes; and
- Couches/lay-ups (couches or lay-ups are places for lying up above ground are usually located near a watercourse, between rocks or boulders, under dense vegetation).

In order to assess their importance the status of otter resting sites are to be assigned from Low to High according to Table 2- below (Bassett & Wynn, 2010).

Table 2-1: Guidance for Assigning Status of Otter Resting Sites

Resting Site Status	Definition
Low	Feature with limited evidence of otter activity – low number of spraints, not all age classes present. Insufficient seclusion to be a breeding site or key resting site, unlikely to have links to the key otter requirements. Most likely to provide a temporary 'stop off' for otters when moving through their territory. Loss/disturbance of such a feature is unlikely to be significant in terms of the individual or population.
Moderate	Feature containing sprainting with a range of age classes, but not in significant quantities. Availability may be limited by season, tides or flow. Unlikely to be suitable as a breeding/natal site but will be a key resting site and may be linked to other important features within the territory. The impact arising from a loss or disturbance of such a feature will be determined by the availability of more suitable or well used sites within an otter territory.
High	Feature has a high level of otter activity, including an abundance of sprainting of all age classes, large spraint mounds, well used grooming hollows, paths and slides. Affords a high degree of cover and is linked to key features such as fresh water and abundance of prey. May be suitable as a breeding area (spraints may be absent from natal holts). The site is usually available at all times of year and at high and low tide/flow. The loss/ disturbance of such as feature will often be considered significant in terms of the individual or population.

Where evidence of otter activity was identified, the location was mapped and photographs were taken for further interpretation.

2.3 Assessment Limitations

Desk Study

It should be noted that the desk study is limited by the reliability of third party information and the geographical availability of biological and/or ecological records and data. This emphasises the need to collate up-to-date, site-specific data based on field surveys by experienced surveyors. The absence of species from biological records cannot be taken to represent actual absence. Species distribution patterns should be interpreted with caution as they may reflect survey/reporting effort rather than actual distribution.

Field Study

Access to internal harbour walls to the south and east and external walls to the north and east were limited due to water depth. These areas were viewed from a distance using binoculars.

3 RESULTS

3.1 Desk Study

The results of the desk study are provided in Table 3-1. Otter have not previously been recorded at the site.

There are no designated sites with otter as a qualifying feature within 5km. However, the Firth of Forth (SSSI/SPA/RAMSAR), Imperial Dock Lock, Leith (SPA), Forth Islands (SPA), Inchmickery (SSSI) and Ravelston Woods (LNR) may all provide habitat for foraging and sheltering.

As well as reporting the location of several sightings by the public, the Water of Leith Conservation Trust website also shows images of pairs of otters displaying territorial behaviour on the watercourse. No specific locations are specified for these sightings.

Otter are known to live on the River Almond and there are number of references to otters including video footage by the Forth Rivers Trust[5]. The River Almond Walkway Management Plan (City of Edinburgh Council, 2011) and the River Almond 5-year Fisheries Management Plan (Howieson, 2011) refer to otter breeding on the watercourse.

Table 3-1: Pre-Survey Data Search Results

Source	**Information Provided**		
Water of Leith Conservation Trust	**Location**	**Distance and orientation (closest)**	**Date of sighting**
	Sandport Street, Leith	3.4 km east	November 2011
	Stockbridge	3.2 km south	November 2015
	St Marks Park, Leith	2.6 km south east	February 2016
	Comely Bank Road, Stockbridge	3.3 km south	March 2016
	Dean Village	3.5 km south	July 2016
NBN Atlas	**Species**	**Approximate Distance and Orientation to Site**	**Number of Records and year**
	Otter (*Lutra lutra)*	2.8km south west	1 (2009)
Otter Designations	UKBAP, SBL, EBAP.		
UKBAP	Priority Habitats: • Supralittoral sediment: Coastal Vegetated shingle; • Littoral Rock: Littoral Chalk; • Littoral sediment: Coastal saltmarsh, mudflats, seagrass beds (Zostera marina), sheltered muddy gravels • Inshore subittoral sediment: seagrass beds (Zostera marina), Maerl beds, Saline lagoons, mud in deep water, Serpulid reefs.		
SBL	Priority Habitats: • Coastal saltmarsh; and • Coastal vegetated shingle.		
EBAP	Priority Habitats: • Coastal habitats; • Intertidal habitats; and • Marine		

[5] https://www.youtube.com/watch?v=inUgJ5JyKZc

3.2 Field Study

The results of the field survey are shown in Appendix A and site photographs are provided in Appendix B of this document.

Otter spraints were recorded upon the harbour wall on the northern site boundary (Nd) (OS Grid Reference NT 23570 77834); and 55m north (NT 23419 77812) west of the site (Nd); and on waste ground 20m south of the site (Di) (NT 23683 77535) (Photographs 9 & 10). Spraints were intact, indicating recent otter activity. Feeding signs were found 75m south of the site (Photograph 11).

No otter holts or couches were found but a number of holes and cavities in the harbour walls, behind sheet piling, and within piles of boulders could provide potential sheltering habitat for otters (Photographs 2, and 12 to 16). There is no sheltering habitat within the external wall to the north or the adjacent harbour to east.

It is likely that otter are active within the area regularly and utilise the coastal habitats in a range of ways. The marine environment constitutes a typical hunting area and is likely to provide a reliable range of prey items from crustaceans to small and medium sized fish. Coastal bird's eggs may also feature in their diet. It is likely that adolescent otters will use the marine environment to socialise and hone their hunting skills.

Otter are most active between dusk and dawn. However, in this habitat, they are likely to adapt their behaviour to maximise the benefits of hunting during optimal tide times, including the shoreline.

Otter, utilising marine environments, require a source of fresh water in order to maintain good fur condition. Two freshwater sources, the Water of Leith and the River Almond are within 5km of Granton Harbour.

4 EVALUATION OF ECOLOGICAL FEATURES AND POTENTIAL IMPACTS

4.1 Evaluation

The habitats on site offer foraging, commuting and resting/breeding resources for otter. Otter are a European Protected Species (EPS) and are therefore of international importance.

The site's proximity to the shoreline of the Firth of Forth, and its location between the mouths of the main watercourses flowing through Edinburgh – the Water of Leith and the River Almond – suggest that the site is utilised by otters commuting and dispersing between the two water courses.

4.2 Potential Impacts

Below is a list of the potential impacts of the development:

- Construction works may disturb otters commuting or foraging;
- Construction works may cause disturbance to otters present in the locale via increased noise, vibration, turbidity, lighting and dust;
- Pollution events would affect water quality and the species which otter are foraging upon in the vicinity;
- Operation of the new development may increase the frequency of vessel movements which would increase the risk of collision with otter;
- The completed onshore development may dissuade otter from utilising these areas and force otter to adapt their current behaviour.

5 FURTHER SURVEY, LICENSING & MITIGATION

5.1 Further Survey and Licensing

Ecological data is considered valid for a period of 12 months. Providing that works commence before August 2019, no further survey work in relation to protected species is considered necessary.

Pre-works checks will be required for otter is suggested in Section 5.2 below. If the site boundary were to change, further survey work may be required.

There is currently no requirement for protected species licensing for the development to proceed.

5.2 Mitigation

The following mitigation measures are recommended to minimise the effects on otters:

- Potential otter holts and shelters should be checked prior to works commencing by a qualified ecologist;
- The removal of boulders and concrete with the potential to shelter otter must be supervised by a qualified ecologist;
- All site contractors should be made aware of the potential presence of otter in the locale, and in the event that otter is discovered on site, all work in that area must stop immediately and a suitably qualified ecologist contacted;
- The development design seeks to retain or create new otter sheltering habitat wherever possible;
- Works and related site mobilisations will commence no earlier than one hour after dawn and will cease no later than one hour before sunset to avoid times where otter are likely to be active;
- Temporary lights used during construction must be fitted with shades to prevent light spillage outside the working area. Temporary lights must not illuminate scrub and scattered trees as lighting can affect commuting and foraging success of otter and other species;
- Any trenches or pits made during construction must be covered when unattended or a shallow angled plank inserted to allow animals to escape, should they become trapped inside them. The ends of any pipeline must be capped when unattended, or at the end of each working day to prevent animal access;
- Scottish Environment Protection Agency (SEPA) Guidance for Pollution Prevention (GPPs) would be followed; and
- In the event that any protected species is discovered all work in that area must stop immediately and a suitably qualified Ecologist contacted. Details of the SNH Area Officer and Scottish Society for the Prevention of Cruelty to Animals (SSPCA) relevant Officer could be held in site emergency procedure documents.

Assuming mitigation is applied, no loss of resting site, or permanent loss of important foraging and/or commuting habitat is anticipated to occur that could significantly affect the local population and distribution of otter.

REFERENCES

Bassett, S., & Wynn, J. (2010). Otters in Scotland: How Vulnerable Are They to Disturbance? *CIEEM In Practice*, (70), 19–22. Retrieved from file:///M:/Library/_By%20author/CIEEM/In-Practice-IP70_Dec_2010.pdf

Chanin, P. (2003). *Ecology of the European Otter. Conserving Natura 2000 Rivers Ecology* (No. 10). Peterborough: EN, CCW, EA, SEPA, SNH & SNIFFER.

CIEEM. (2013). Competencies for Species Survey: Eurasian Otter.

City of Edinburgh Council. (2016). Edinburgh Biodiversity Action Plan 2016-2018. Edinburgh Biodiversity Partnership.

City of Edinburgh Council. (2016). Edinburgh Local Development Plan, November 2016.

City of Edinburgh Council. (2011). River Almond Walkway Management Plan 2011-2020. City of Edinburgh Council, Countryside Ranger Service.

Howieson, F. (2011). The River Almond 5-year Fisheries Management Plan Version 1.6. Cramond Angling Club & Forth District Salmon Fishery Board, December 2011.

JNCC (n.d.). The UK Biodiversity Action Plan. Joint Nature Conservation Committee. Retrieved from http://jncc.defra.gov.uk/ukbap

Scottish Government (2013, April). Scottish Biodiversity List. http://www.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL.

SNH (n.d.). SiteLink. Retrieved from http://gateway.snh.gov.uk/sitelink/

The Mammal Society (2012). *UK BAP Mammals: Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation.* (W. J. Cresswell, J. D. S. Birks, M. Dean, M. Pacheco, J. W. Trewhella, D. Wells, & S. Wray, Eds.). Southampton: The Mammal Society.

APPENDICES

A OTTER SURVEY RESULTS

Legend

- Site Boundary
- Survey Buffer
- Feeding signs
- Potential lay-up
- Spraint - dry intact
- Spraint - not fully dry

Do not scale this map

Client: Edinburgh Marina Granton Harbour Ltd

Project: Granton Harbour

Title: Otter Survey Results

Status: FINAL

Drawing No.	Revision
770288-001	

Scale		Date
1:5,000	A3	17 August 2018

Drawn	Checked	Approved
JEP	LW	IB

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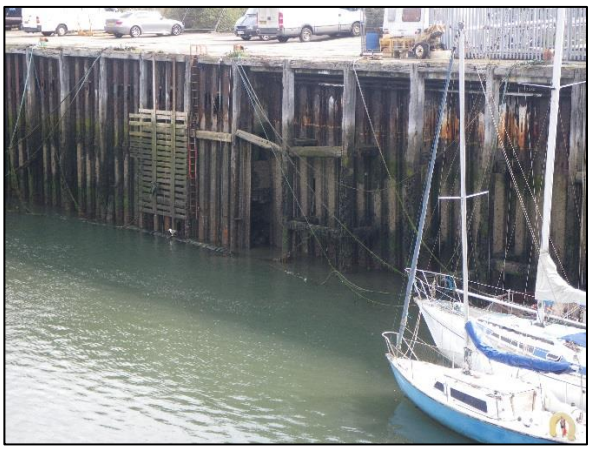
B SITE PHOTOGRAPHS

Photograph 1: Waste ground to south of site.

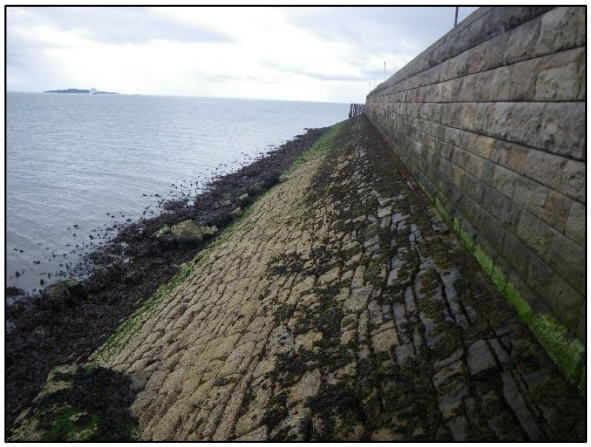


Photograph 2: East harbour wall (internal).

Photograph 3: South harbour wall (internal).

Photograph 4: West harbour (internal).

Photograph 5: North harbour wall (internal).



Photograph 6: North Harbour wall (external).