Sutherland Pier, Flotta
Dredging Best Practicable Environmental Option Report

September 2025

CONTROL SHEET

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VAT no. GB 348 6770 57.

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1 INTRODUCTION

EnviroCentre Ltd. has been appointed by Orkney Islands Council Harbour Authority (OICHA) to undertake a Best Practicable Environmental Options appraisal (BPEO) in support of the dredge licence for maintenance dredging to help maintain the navigable channel and approaches to Sutherland Pier, Flotta.

Dredging will be undertaken to a maximum depth of 1.0m or less from the existing bed level across the dredge areas to be licenced. The proposed dredging works will be undertaken to achieve a depth of -6.0m CD on the navigable channel on approach to Sutherland Pier. Approximately up to 5,500 m^3 of material is estimated to be dredged which includes a small contingency volume.

Dredge area and sampling locations are detailed in within Drawing No. 682009-GIS002 provided in Appendix A.

As part of the licensing process applicants are required to undertake a Best Practicable Environmental Option (BPEO) assessment for the disposal routes for the prospective dredge material in conjunction with the assessment of the chemical and physical properties of the same material to ensure that quality of the material is suitable for the identified disposal route(s).

1.1 Background Information

As outlined above, the proposed dredging requirements are throughout the navigable channel.

Sampling was undertaken in June 2025 which comprised collection of 3 grab samples from the dredge area as per the agreed sample plan. The samples were predominately gravel with variable sand and silt content.

1.2 Scope of Report

The purpose of this report is to review each of the available potential disposal options for the dredged materials. The options which are not considered to be practicable are rejected and the reasons for doing so are explained.

Those options which are practicable are examined in detail and assessed against the following considerations: -

- Environmental;
- Strategic; and
- Cost.

The report then compares the practicable disposal options and draws a conclusion on the BPEO.

1.3 Sediment Sampling and Nature of Marine Sediments on Site

Samples from the proposed dredge area were collected in June 2025 and submitted for analysis in line with the Marine Directorate's guidance and the agreed sampling plan. The sample logs are provided in Appendix B with Laboratory certificates in Appendix C.

1.3.1 Sample Results

No exceedances of Revised Action Level 1 (RAL1) were recorded for the samples with all contaminants of concern noted as being below detectable limits in all 3 samples.

No asbestos was recorded within the samples.

1.4 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 Limited.

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 Limited 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 DISCUSSION OF AVAILABLE DISPOSAL OPTIONS

The BPEO process is geared towards identifying a preferred overall strategy from the perspective of the environment as a whole, as opposed to detailed optimisation of any one selected scheme. It is a structured and systematic process to identify and compare strategic options in a transparent manner. Alternatives are evaluated in terms of their projected implications for the environment together with consideration of practicability, social and economic issues as well as within a wider strategic context.

The key stages of a BPEO are:

- Identification of options;
- Screening of options;
- Selection of assessment criteria;
- Analysis and evaluation of criteria; and
- Evaluation of BPEO.

Further details on methodology are provided within each section.

2.1 Identification and Screening of Available Disposal Options

A number of options are available for disposal of dredged sediments. The options considered are provided in Table 2-1 along with justification for screening out those options which have not been taken forward for further consideration.

Table 2-1: Initial Best Practicable Available Options

Location	Options	Screening Assessment	Carry forward?
Shore/Estuary/ Riverbank	Leave in situ	Not an option due to the project specific requirements to maintain access to the pier for the marine traffic/pier users.	No
	Infilling of an existing dry dock/harbour facility/development site (re-use)	There are currently no projects on Flotta which require this material.	No
	Beach Nourishment	Specific beach nourishment projects would require to be supported by Environmental Assessments as a minimum to inform how the project could affect the environment as a result of disturbance to the intertidal area, changes to the sediment levels, the variable composition and quality of the material and measures devised from the assessment outcomes to minimise impacts on the environment. The dredge material comprises a mixture of gravel, sand and silt. There are currently no known requirements for beach nourishment local to the source of material.	No
Land	Landfill Disposal	This is possible but it is unlikely that this option will offer long term solution due to lack of space at landfills. Landfill space is currently at a premium and does not offer a sustainable solution either financially or environmentally for the disposal of dredged arisings. Dredged material likely to require treatment first in a dewatering facility. Significant cost associated with set up of dewatering facility at the quayside plus transportation and additional costs associated with gaining the necessary planning and regulatory consents. OIC were previously contacted with regards to landfill capacity in the area. Bossack Waste Transfer and Landfill Facility near Kirkwall has a daily capacity of 225 tonnes of inert waste or 5,000 tonnes /year so would not be a viable option for disposal. Transporting to another landfill would require marine transport plus road transport.	No
	Land Incineration	The dredged material consists of non-combustible material (silts, sands, gravels, shells) with a low combustible component and very high-water content.	No

	Application to Agricultural Land	The dredged material would need to be treated to reduce salt concentrations to acceptable levels. Would require detailed chemical analysis and assessment as well as a Waste Management License Exemption. Would require special precautions during spreading in relation to the risk of odour and watercourses / aquifers. The availability of land for this option will be limited within a reasonable haulage distance of the dredge arisings. Large volumes each year are unlikely to be viable to dispose of in this manner and would potentially have a detrimental effect on existing terrestrial habitats.	No
	Recycling	Recycling of dredged material is theoretically possible, however, due to the varied lithology there would need to be either segregation during dredging works to minimise the entrainment of fine-grained material into the sands, or energy and water rich processing on land.	No
Sea	Aquatic disposal direct to seabed.	Relatively low cost, minimal transportation requirements compared to all other options and potential for low environmental risk. The proposed spoil grounds are at Stromness C (FIO45).	Yes

2.2 Summary of Identified BPEO Options

Following review of the available options within the screening process, due to the remote nature of the site, there are no other viable disposal routes available for consideration beyond the traditional sea disposal approach. The remote nature of the site and distance from the mainland, precludes the majority of the other options on the basis of not being practical options.

The chemical quality of the material is below RAL1 which is typically considered suitable for sea based disposal without additional assessment of data. Further consideration of the potential impacts associated with the disposal of dredged material are considered within Section 3.

3 FURTHER ASSESSMENT

3.1 Water Framework Directive Assessment

As outlined in the Water Framework Directive Assessment: estuarine and coastal waters, there are several key receptors which can be impacted upon including the following:

- Hydromorphology
- Biology – habitats
- Biology – fish
- Water quality
- Protected areas

Each of these points are considered in Table 3-1 below:

Table 3-1: Receptor Risk Assessment

Key Receptor[1]	Brief Summary of Potential Effects on Receptor	Further Consideration Required?	Comment
Hydromorphology (Source Area and Disposal Site)	Morphological conditions, for example depth variation, the seabed and intertidal zone structure tidal patterns, for example dominant currents, freshwater flow and wave exposure	No	The dredge sites are within the Scapa Flow which has an overall classification of "good" and hydromorphological classification of "High". The proposed Disposal site is at Stromness C (FI045) is located within the Tor Ness to Breck Ness Waterbody which has an overall classification of "High" and is not considered to be heavily modified. The classification of this water body takes into account the presence of the disposal site, so no further assessment is considered to be required.
Biology - habitats	Included to assess potential impacts to sensitive/high value habitats.	No	The dredge site has been previously dredged so not considered further as it is not a new dredge site. The proposed disposal site Stromness C (FI045) has previously been used for the disposal of suitable dredged material therefore not considered further in the assessment. This site was used for the last dredge campaign at Sutherland Pier approaches.
Biology – fish	Consideration of fish both within the estuary and also potential effects on migratory fish in transit through the estuary	No	The dredge sites and disposal sites are within coastal waters and not located within an estuary. The works are unlikely to have a significant or sustained effect on the migration of fish. No further assessment considered necessary.

[1] https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

Key Receptor[1]	Brief Summary of Potential Effects on Receptor	Further Consideration Required?	Comment
Water Quality	Consideration must be given to water quality when contaminants are present in exceedance of CEFAS RAL1.	No	No exceedances of RAL1 were recorded in the samples collected. According to SEPA, the Scapa Flow water body has “good” status for water quality in 2023.

Key Receptor[1]	Brief Summary of Potential Effects on Receptor	Further Consideration Required?	Comment
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	No	The dredge and disposal sites are within/within 2KM of the Scapa Flow SPA respectively and not within 2km of any SAC. The Scapa Flow SPA designation is for the following non-breeding birds Black-throated diver (*Gavia arctica*), Eider (*Somateria mollissima*), Great northern diver (*Gavia immer*) and Long-tailed duck (*Clangula hyemalis*), Red-breasted merganser (*Mergus serrator*), Shag (*Phalacrocorax aristotelis*), Slavonian grebe (*Podiceps auritus*) and breeding populations of Red-throated diver (*Gavia stellata*). The proposed dredging and disposal works are considered unlikely to have an impact on the qualifying features of the SPA, particularly that the dredge site is adjacent to an operational pier and that the disposal site is within an area of existing vessel movements. The dredge and disposal site is not located within 2km of any designated bathing waters, with all bathing waters noted to be on the Scottish Mainland. The dredge and disposal sites are not designated as shellfish water or within 2km of a designated shellfish water.

3.2 Potential Risk to Water Quality and Marine Life

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

Contaminant levels within the proposed dredge material for sea disposal are considered to be very low and not considered to represent a significant risk to the overall water quality either at the dredge site or proposed disposal site as they are below RAL1. The key risks to water quality are from the dredging exercise and also disposal where there may be periods of higher suspended solids which are likely to be both localised and temporary in nature. The larger grained material like gravel and sands will drop to the sea floor quickly, and any changes in suspended solids/turbidity will be driven by the finer grained material content, silts and clay sized particles. Where finer grained materials are cohesive, they will sink to the sea floor rapidly. The average content of various particle sizes is detailed below in Table 3-2.

Table 3-2: Summary of PSA Data

Dredge Area	Gravel (>2mm)	Sand (0.063mm<Sand<2mm)	Silt & Clay (<0.063mm)	Quantity to be dredged m^3
Flotta	56.4%	34.1%	9.5%	5,500
	310 m^3	1,877m^3	523m^3	

The dominant sediment type across the majority of the dredge area is gravel with up to 67.4% in sample SS03. Considering the dredge volume as a whole using averaged particle size analysis data, the dominant sediment type is gravel comprising 56.4% of the total and the remainder made up of 34% sand and 9.5% comprising silt sized fractions. The sediment profile is consistent with the relatively exposed nature of the dredge site as it is in a high energy environment in open water.

Given that an average of 90% of the sediment across all dredge areas comprises sand and gravel, it is considered that the majority of the deposited sediment will fall out of suspension quickly at the disposal site with limited lateral spread.

The remaining portion of the dredge 9.5 % or 523 m^3 of dredge material comprises silt/clay sized particles. This material is considered to have a longer suspension time than sand and gravel sized particles when in suspension. Any effects from the disposal of the material is considered to be both localised and temporary.

In summary, 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 change in status of the waterbodies in question at both the dredge and disposal sites.

3.3 Conclusions and Recommendations

The samples collected across the dredge site recorded concentrations of the key contaminants of concern below RAL1 and in many instances, below the relevant LOD. As a result, risks to the marine environment and water quality associated with the dredging and disposal are considered to be low, with the main risk being identified as the temporary and localised increases in suspended sediments as per any dredging exercise.

Based on the chemical quality of the sediment samples retrieved and tested from the dredge site, the sea disposal and re-use of the material is considered to have no significant long-term impact on the marine environment.

REFERENCES

Marine Scotland (2017). Pre-Dredge Sampling Guidance Version 2: Scottish Government.
Marine Scotland (2015). Guidance for Marine Licence Applicants Version 2: Scottish Government.

APPENDICES

A FIGURES

334500

334600

994900

994800

N

SS01

SS02

SS03

Contains OS data © Crown Copyright and database right 2022, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

- Proposed Sediment Sample Stations
- Proposed Flotta Dredge Area
- Special Protection Areas

Do not scale this map

Client
Orkney Islands Council Harbour Authority

Project
Flotta, Orkney

Title
Proposed Sediment Sample Stations Plan

Status
DRAFT FOR COMMENT

Drawing No.	Revision	Date
682009-GIS002	-	09 May 2025
Drawn	**Checked**	**Approved**
MMF	CCAS	CCAS

Scale
1:750 @A3
0 3.75 7.5 15 22.5 Metres

Rev	Date	Amendment	Initials
-	-	-	-

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B SAMPLE LOGS

envirocentre	Project Name	Stromness and Flotta Dredge Samples	Location ID
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	Project No.	682009	FP (SS)01
	Client	Orkney Islands Council Harbour Authority	

GRAB SAMPLE LOG

Date/Time	17/06/2025	**Latitude**	58.836574
Dredge Area	Flotta Pier	**Longitude**	-3.1358156
Method	0.045m^2 Van Veen Grab Sampler	**Sampled/logged by**	AK

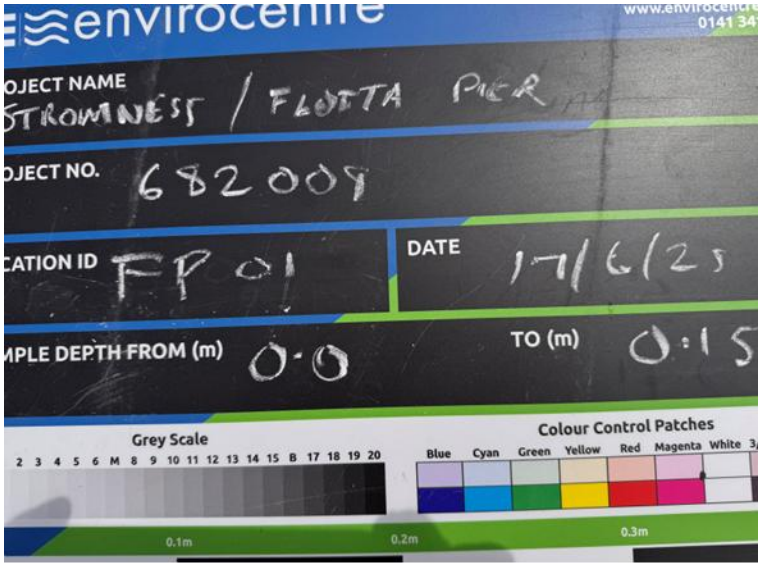
Remarks: **0.00 – 0.15m** Gravelly coarse sand with mixed shell content, including some large fragments.

Biota: Shell fragments and large scallop shell.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes:



envirocentre	Project Name	Stromness and Flotta Dredge Samples	Location ID
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	Project No.	682009	FP(SS)02
	Client	Orkney Islands Council Harbour Authority	

GRAB SAMPLE LOG

Date/Time	17/06/2025	**Latitude**	58.836418
Dredge Area	Flotta Pier	**Longitude**	-3.1351125
Method	0.045m^2 Van Veen Grab Sampler	**Sampled/logged by**	AK

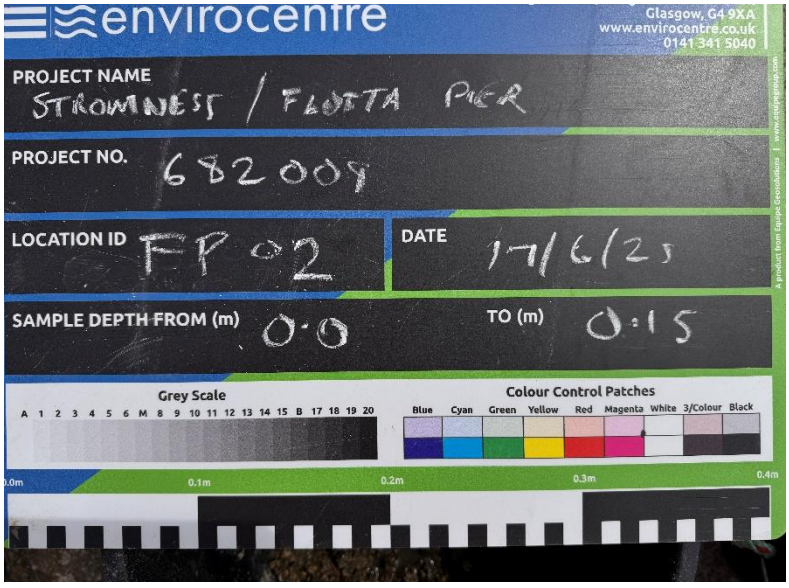
Remarks: **0.00 – 0.15m** Coarse shelly sand with some shell fragments.

Biota: Intact razor clam and clam shells.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes:



envirocentre 8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA	**Project Name**	Stromness and Flotta Dredge Samples	**Location ID**
	Project No.	682009	**FP(SS)03**
	Client	Orkney Islands Council Harbour Authority	

GRAB SAMPLE LOG

Date/Time	17/06/2025	**Latitude**	58.836105
Dredge Area	Flotta Pier	**Longitude**	-3.1356758
Method	0.045m^2 Van Veen Grab Sampler	**Sampled/logged by**	AK

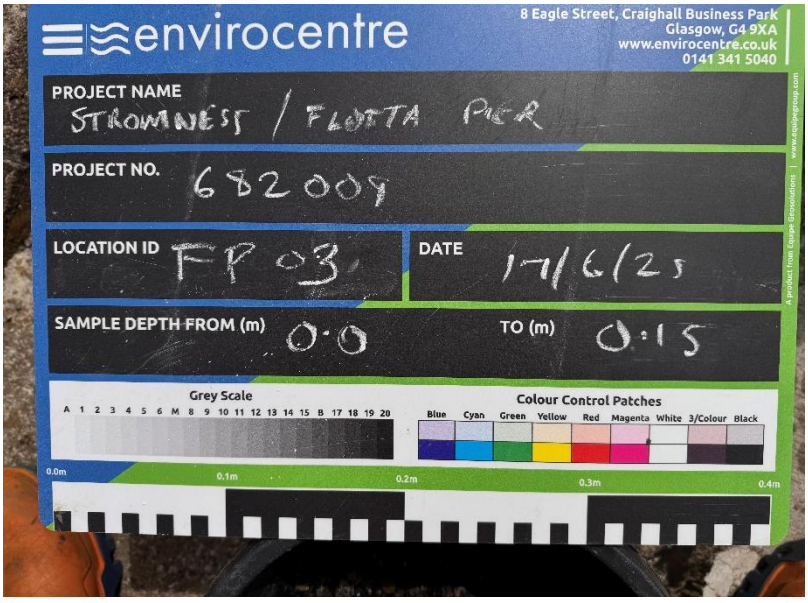
Remarks: **0.00 – 0.15m** Gravel with large shell fragments, occasional cobbles.

Biota: Shell fragments and seaweed fronds.

Odours: None noted.

Anthropogenic Inputs: None noted.

Notes:



C DATA SUMMARY TABLES AND LAB CERTIFICATES

Certificate of Analysis

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

SOCOTEC

Test Report ID MAR02706

Issue Version: 1

Customer: EnviroCentre Ltd, Craighall Business Park, 8 Eagle Street, Glasgow, G4 9XA

Customer Reference: 682009 - Flotta

Date Sampled: 17-Jun-25

Date Samples Received: 27-Jun-25

Test Report Date: 25-Jul-25

Condition of samples: Cold Satisfactory

Opinions and Interpretations expressed herein are outside the scope of our UKAS accreditation
The results reported relate only to the sample tested
The results apply to the sample as received

[Redacted]

Authorised by: Jane Colbourne

Position: Customer Service Specialist

UKAS TESTING
1252

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Test Report ID	MAR02706
Issue Version	1
Customer Reference	682009 - Flotta

		Units	%	%	%	%	%	N/A
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SUB_02*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Asbestos**
SS01 (0.0 - 0.15)	MAR02706.001	Sediment	21.7	78.3	41.72	46.50	11.78	NAIIS
SS02 (0.0 - 0.15)	MAR02706.002	Sediment	25.7	74.3	60.08	31.96	7.96	NAIIS
SS03 (0.0 - 0.15)	MAR02706.003	Sediment	37.8	62.2	67.35	23.77	8.88	NAIIS
		Reference Material (% Recovery)	N/A	N/A	N/A	N/A	N/A	N/A
		QC Blank	N/A	N/A	N/A	N/A	N/A	N/A

* See Report Notes

NAIIS - No Asbestos Identified In Sample

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Test Report ID	MAR02706
Issue Version	1
Customer Reference	682009 - Flotta

		Units	% M/M
		Method No	WSLM59*
		Limit of Detection	0.02
		Accreditation	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**TOC**
SS01 (0.0 - 0.15)	MAR02706.001	Sediment	0.42
SS02 (0.0 - 0.15)	MAR02706.002	Sediment	0.51
SS03 (0.0 - 0.15)	MAR02706.003	Sediment	0.57
		Reference Material (% Recovery)	99
		QC Blank	<0.02

* See Report Notes

NAIIS - No Asbestos Identified In Sample

Certificate of Analysis

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Test Report ID	MAR02706
Issue Version	1
Customer Reference	682009 - Flotta

		Units	mg/Kg (Dry Weight)							
		Method No	ICPMSS*							
		Limit of Detection	0.5	0.04	0.5	0.5	0.01	0.5	0.5	2
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Mercury**	**Nickel**	**Lead**	**Zinc**
SS01 (0.0 - 0.15)	MAR02706.001	Sediment	5.9	0.08	18.7	8.5	<0.01	13.6	24.4	30.2
SS02 (0.0 - 0.15)	MAR02706.002	Sediment	12.2	0.07	20.4	5.4	<0.01	14.6	13.4	32.3
SS03 (0.0 - 0.15)	MAR02706.003	Sediment	12.4	0.12	14.9	7.3	<0.01	13.6	8.6	36.2
Certified Reference Material SETOC 768 (% Recovery)			92	97	91	95	91	93	86	97
QC Blank			<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

* See Report Notes

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Test Report ID	MAR02706
Issue Version	1
Customer Reference	682009 - Flotta

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
SS01 (0.0 - 0.15)	MAR02706.001	Sediment	<1	<1
SS02 (0.0 - 0.15)	MAR02706.002	Sediment	<5	<5
SS03 (0.0 - 0.15)	MAR02706.003	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			103	108
QC Blank			<1	<1

* See Report Notes

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Test Report ID MAR02706
Issue Version 1
Customer Reference 682009 - Flotta

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
SS01 (0.0 - 0.15)	MAR02706.001	Sediment	1.66	<1	1.53	4.66	6.30	7.77
SS02 (0.0 - 0.15)	MAR02706.002	Sediment	8.32	<5	<5	6.82	7.29	9.72
SS03 (0.0 - 0.15)	MAR02706.003	Sediment	<5	<5	<5	<5	<5	10.6
Certified Reference Material Nist 1941b (% Recovery)			64	101	67	68	65	92
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.
*See report notes

Certificate of Analysis

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Test Report ID MAR02706
Issue Version 1
Customer Reference 682009 - Flotta

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		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF***	**CHRYSENE ***	**DBENZAH**	**FLUORANT**	**FLUORENE**
SS01 (0.0 - 0.15)	MAR02706.001	Sediment	4.82	5.85	7.18	<1	13.0	1.51
SS02 (0.0 - 0.15)	MAR02706.002	Sediment	<5	7.54	9.80	<5	19.0	<5
SS03 (0.0 - 0.15)	MAR02706.003	Sediment	<5	8.92	10.6	<5	19.3	<5
Certified Reference Material Nist 1941b (% Recovery)			80	79	92	118	81	48
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.
*See report notes

Certificate of Analysis

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Test Report ID MAR02706
Issue Version 1
Customer Reference 682009 - Flotta

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
SS01 (0.0 - 0.15)	MAR02706.001	Sediment	5.28	2.64	6.03	12.8	29500
SS02 (0.0 - 0.15)	MAR02706.002	Sediment	<5	<5	12.7	17.2	59700
SS03 (0.0 - 0.15)	MAR02706.003	Sediment	<5	<5	11.2	25.0	52400
Certified Reference Material Nist 1941b (% Recovery)			81	61	79	71	78~
QC Blank			<1	<1	<1	<1	<100

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.
*See report notes

Certificate of Analysis

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

Test Report ID MAR02706
Issue Version 1
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		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
SS01 (0.0 - 0.15)	MAR02706.001	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SS02 (0.0 - 0.15)	MAR02706.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
SS03 (0.0 - 0.15)	MAR02706.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Nist 1941b (% Recovery)			71	90	85	105	83	99	99
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

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

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Test Report ID MAR02706
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REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR02706.001-003	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR02706.001-003	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR02706.001-003	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR02706.001-003	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR02706.002-003	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/303/304	MAR02706.002-003	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/303/304	MAR02706.001-003	Benzo[k]fluoranthene is known to coelute with Benzo[j]fluoranthene and these peaks can not be resolved. It is believed Benzo[j]fluoranthene is present in these samples therefore it is suggested that the Benzo[k]fluoranthene results should be taken as a Benzo[k]fluoranthene (inc. Benzo[j]fluoranthene). Benzo[j]fluoranthene is not UKAS accredited. This should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR02706.001-003	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. It is believed Triphenylene is present in these samples therefore it is suggested that the Chrysene results should be taken as a Chrysene (inc. Triphenylene).This should be taken into consideration when utilising the data.

DEVIATING SAMPLE STATEMENT

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

Certificate of Analysis

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Test Report ID	MAR02706
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Method	Sample and Fraction Size	Method Summary
Total Solids	Wet Sediment	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried and seived to <63µm	Aqua-regia extraction followed by ICP analysis.
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Solvent extraction and clean up followed by GC-FID analysis.
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions

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