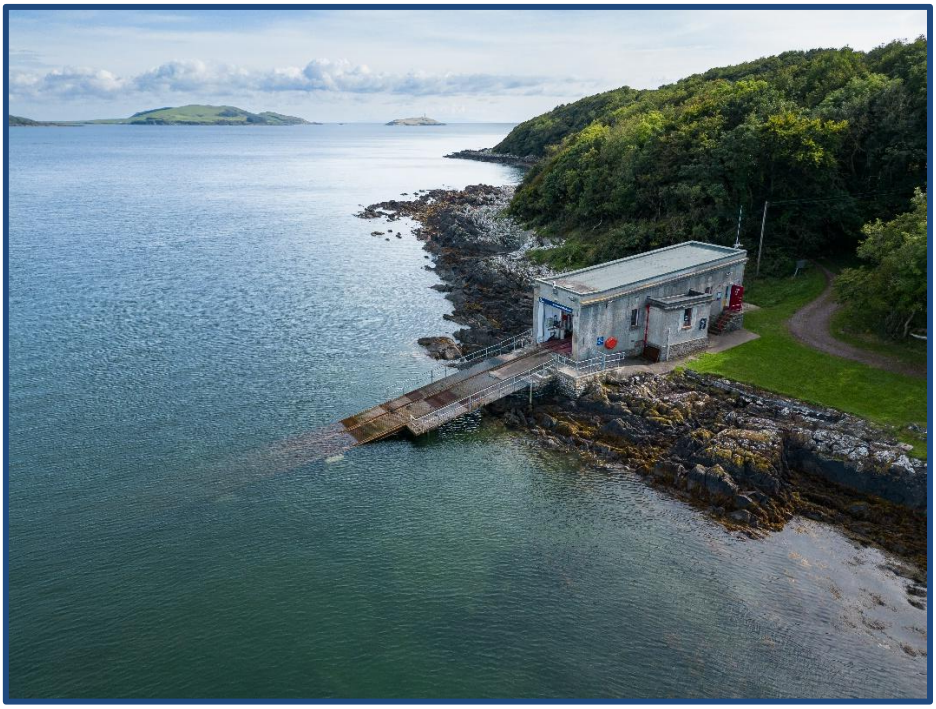
ROYAL NATIONAL LIFEBOAT INSTITUTION

RNLI KIRKUDBRIGHT MAINTENANCE DREDGE



BEST PRACTICABLE ENVIRONMENTAL OPTION REPORT

Royal National Lifeboat Institution
West Quay Road
Poole
Dorset
BH15 1HZ

Tel: 01202 663 249
Fax: 01202 664 333

Wallace Stone
Suite 21
Templeton House
62 Templeton Street
Glasgow
G40 1DA

Tel: 0141 554 8233
Fax: 0141 554 4727

November 2025

Doc Ref – 2631-WS-XX-XX-T-C-9001 P01

Member of the Association
for Consultancy and Engineering

This document was prepared as follows:-

	Name	Signature	Date
Prepared By	Calum Stout	[Redacted]	05/12/2025
Checked By	Jamie McNicol	[Redacted]	17/12/2025
Approved By	Gordon Brown	[Redacted]	17/12/2025

and revised as follows:

REVISION STATUS INDICATOR

Page No	Date	Revision	Description of Change	Initial

This document has been reviewed for compliance with project requirements in accordance with Wallace Stone LLP Quality Management System.

ROYAL NATIONAL LIFEBOAT INSTITUTION
RNLI KIRKUDBRIGHT MAINTENANCE DREDGE

BEST PRACTICABLE ENVIRONMENTAL OPTION REPORT

CONTENTS

		Page
1.	INTRODUCTION	1
2.	SEDIMENT SAMPLING AND TESTING	3
3.	BPEO ASSESSMENT METHOD	7
4.	PRELIMINARY OPTIONS APPRAISAL	9
5.	ASSESSMENT OF FEASIBLE OPTIONS	10
6.	CONCLUSION	14
7.	GLOSSARY	15

APPENDICES

APPENDIX A – SEDIMENT SAMPLING AND LABORATORY ANALYSIS REPORT	16
APPENDIX B – ATTRIBUTES, DEFINITION & SCORING SYSTEM	17
APPENDIX C – SCORING OF SHORTLISTED OPTIONS	18

ROYAL NATIONAL LIFEBOAT INSTITUTION
RNLI KIRKUDBRIGHT MAINTENANCE DREDGE

BEST PRACTICABLE ENVIRONMENTAL OPTION REPORT

1. INTRODUCTION

This Best Practicable Environmental Option (BPEO) assessment supports the dredge and disposal marine licence application, required under the Marine (Scotland) Act 2010, Part 4, for the proposed Royal National Lifeboat Institution (RNLI) Kirkcudbright Slipway Maintenance Dredge.

1.1 Background to Application

Wallace Stone (WS) has been commissioned by the Royal National Lifeboat Institution (RNLI) to prepare a Best Practicable Environmental Option (BPEO) Assessment to submit in support of the marine licence application for the maintenance dredging and disposal works required at Royal National Lifeboat Institution (RNLI) Kirkcudbright Slipway. The works in question are maintenance dredging operations, focused on the clearance of accumulated seabed material at the base of the station's slipway.

1.2 Scope of Report

This report evaluates all re-use / disposal options available for the dredge material arising from the proposed maintenance dredge at RNLI Kirkcudbright Slipway. and identifies those deemed feasible. These options are then assessed in relation to strategic, environmental, and cost factors. A comparison of the options follows, leading to the identification of the Best Practicable Environmental Option (BPEO).

The following sections of the report cover the following items:

- Provide an overview of the required dredging works including the proposed dredge area and the estimated quantities of dredge materials.
- Overview of sampling undertaken and review of testing results
- Outline the BPEO methodology used to carry out the assessment.
- Identify all available measures for the dredged material and evaluate in order to determine the BPEO.

1.3 Dredging Requirement

Kirkcudbright Lifeboat Station is located 3.5 miles south of the town of Kirkcudbright, at the mouth of the River Dee. The slipway is sited on the banks of the river which results in siltation build up annually around the sides, beneath, and above the toe of the slipway. The accumulation of material restricts the effective launch of the lifeboat at certain tide levels and limits the RNLI's ability to provide a safe and reliable 24-hour life-saving rescue service.

To prevent this, a maintenance dredge is carried out each year to remove deposited material and maintain clear access at the slipway toe. This application seeks consent for annual dredging works over the next three years, ensuring the lifeboat can launch at any state of tide and continue its uninterrupted lifesaving service.

1.4 Dredge Areas and Volumes

The proposed dredge area is shown in Drawing 2631-WS-XX-XX-D-C-1002 P02.

The dredge extents shown on this drawing encompass an area of approximately 160m^2 and the dredge depth is known to not exceeded a depth greater than 1m. As such, the yearly recovered volume of material will be a maximum of 160m^3, which will reach 480m^3 over the 3-year license period.

2. SEDIMENT SAMPLING AND TESTING

This section provides an overview of the sediment grab samples and analysis carried out for the BPEO assessment. The full dataset is contained within the accompanying file RNLI Kirkcudbright Pre-Disposal Sampling Results (2025), which has been submitted alongside the dredge licence application.

2.1 Sampling

Aspect Land & Hydrographic Surveys Ltd have carried out sediment sampling in September 2025 in accordance with Marine Scotland Guidance notes on Pre-Disposal Sampling (Marine Scotland, 2017).

For a dredge volume of less than 25,000m^3, Marine Scotland Guidance requires a minimum of 3 No. dredge samples for the application.

As the anticipated dredge depth is less than 1m from the surface, guidance states that surface grab samples are sufficient and therefore no mechanical retrieval system (i.e. vibrocores) were required.

Table 2.1 below shows the locations of the grab samples that were taken on site.

Sample Station	Easting (N)	Northing (W)
GS1	54˚ 47.699’	4˚ 03.772’
GS2	54˚ 47.700’	4˚ 03.773’
GS3	54˚ 47.699’	4˚ 03.777’

Table 2-1: Coordinates of Sampling Locations

2.2 Chemical Analysis

SOCOTEC UK (ISO17025 accredited) conducted laboratory analysis of the grab samples. The samples were tested for various chemical parameters, and these were compared against the allowable Action Levels (AL) in the Marine Scotland Pre-Disposal Sampling Guidance (Marine Scotland, 2017).

2.3 Results

2.3.1 Particle Density

As part of the analysis, particle density was determined to be 2.66 Mg/m^3 for all three samples.

Therefore, therefore the total anticipated mass of the dredge material over the three-year period amounts to 1,277 tonnes.

2.3.2 Particle Size Distribution

Analysis of the sediment samples identified the following composition, on average across the three samples:

	Total Solids	**Gravel (>2mm)**	**Sand (63-2000µm)**	**Silt (<63µm)**
Average Composition	74.9%	9.62%	59.12%	31.26%

Table 2.2 – Average Particle Size Distribution

These values demonstrate a predominance of sand and silt, with only a minor gravel component.

2.4 Trace Metals and Organotins

Concentrations of metals from the three samples are presented in Table 2.3. Levels above Marine Scotland Action Level 1 are highlighted in blue. No concentrations above Action Level 2 were recorded.

	mg/kg dry weight							
Sample No.	**(As)**	**(Cd)**	**(Cr)**	**(Cu)**	**(Hg)**	**(Ni)**	**(Pb)**	**(Zn)**
1	26.9	0.24	29.5	17.9	0.06	40	28.7	165
2	12.5	0.23	33	12.4	0.09	29.5	28.3	120
3	12.4	0.18	29.3	8.7	0.05	25.1	22.4	105

Table 2.3 – Analysis of metal contaminants from 2025 sediment sampling

Overall, the majority of trace metal results were below of Action Level 1 (AL1). The following results were above AL1:

- Arsenic (As):
    - Sample 1 – 26.9 mg/kg (above AL1 of 20 mg/kg; well below AL2 of 70 mg/kg)
    - Average Concentration across the total dredge area (Dry Weight) – 13.7mg/kg

- Nickel (Ni):
    - Sample 1 – 40 mg/kg (above AL1 of 30mg/kg; well below AL2 of 150 mg/kg)
    - Average Concentration across the total dredge area (Dry Weight) – 25mg/kg

- Zinc (Zn):
    - Sample 1 – 165mg/kg (above AL1 of 130mg/kg; well below AL2 of 600mg/kg)
    - Average Concentration across the total dredge area (Dry Weight) – 103mg/kg

The elevated presence of As and Ni is likely to derive from historic upstream activity rather than localised sources adjacent to the Lifeboat Station, as no active sources of metal contamination are present in the immediate vicinity. Historical mapping of Kirkcudbright (circa 1841) identifies a tannery discharging directly into the River Dee. Nickel (Ni), Arsenic (As), and Cadmium (Cd) are commonly associated with tannery effluent.

Zn, again, is likely to be attributed to upstream activities such as dock-yard processes and lead-based anticorrosive paints and primers used to protect vessels.

Contaminants released historically may migrate downstream at differing rates, which can account for temporal variation in concentrations observed.
For example, arsenic levels were higher in 2021 compared to 2017, but are now lower in 2025. Nickel levels have slightly increased over time between 2017 and 2025, while Cadmium concentrations have decreased over time.

2.5 Polyaromatic Hydrocarbons (PAHs)

A summary of Results for PAHs is listed below:

- Sample 1:
    - No exceedances of AL1 for any compounds

- Sample 2:
    - Minor AL1 exceedances for the following compounds:
        - Diben(ah)anthracene (DBENZAH)
        - Fluoranthene (FLUORANT)
        - Phenanthrene (PHENANT)
        - Pyrene (PYRENE)
    - Total Hydrocarbon Content (THC): Does not exceed AL1.
    - Average Concentration across the total dredge area (Dry Weight) No exceedances of AL1 were recorded.
- Sample 3
    - Minor AL1 exceedances for the following compounds:
        - Acenapthylene (ACENAPHY)
    - Total Hydrocarbon Content (THC): Does not exceed AL1.
    - Average Concentration across the total dredge area (Dry Weight) No exceedances of AL1 were recorded.

3. BPEO ASSESSMENT METHOD

3.1 Methodology

To establish the most environmentally appropriate means of managing material from the proposed dredging campaign, a structured appraisal process was undertaken. The key stages of this process were:

1. Determination of feasible dredge disposal options.
2. Initial screening to remove approaches that were technically impractical or otherwise unsuitable.
3. Appraisal of the remaining short-listed disposal options through a multi-attribute scoring system.
4. Comparison of the remaining options to determine the Best Practicable Environmental Option (BPEO).

3.2 Identification of Options

Wallace Stone determined a range of disposal options following discussion with the RNLI and with consideration of typical practices deployed in similar marine dredging projects, including previous maintenance dredges carried out at Kirkcudbright.

The potential disposal routes considered, covered both marine and land-based solutions. As is standard in BPEO studies, a "no action" scenario was also included as a baseline comparator.

Options identified included:

- No Dredge (e.g. "do nothing")
- Landfill disposal
- Application to agricultural land
- Re-use in construction
- Plough dredging
- Dispersion of material within the River Dee channel
- Deposit at the existing Drummore disposal site (IS285)

3.3 Preliminary Appraisal

Before subjecting options to an in-depth assessment, each was checked against a set of essential baseline requirements for them to be feasible at the site at Kirkcudbright.

Only those options satisfying all of the following criteria progressed further:

- Compatibility with the physical and chemical characteristics of the dredged sediment;
- Technical achievability using available methods;
- No interference with the ongoing use and operational needs of the Kirkcudbright Lifeboat Station.

3.4 Assessment of Options

The remaining short-list of options were then examined using a multi-criteria evaluation framework. This approach ensured consistent and transparent comparison by considering the following attributes:

- Cost
- Technical Feasibility
- Environmental Effects
- Impact on Lifeboat Operations
- Legislative Complexity

Each attribute was assigned a performance score on a five-point scale (1 = least favourable; 5 = most favourable). To aid interpretation, the scores were colour-coded and collated in summary tables

Refer to Appendix 2 for list of attributes, their definitions and the scoring scale.

3.5 Option Comparison and Selection of BPEO

Following scoring, a review was undertaken to compare the relative strengths and weaknesses of each option. This enabled the identification of the Best Practicable Environmental Option for the proposed dredging and disposal activities.

4. PRELIMINARY OPTIONS APPRAISAL

Each available option was assessed against minimum criteria, as highlighted in Section 3.3. This screening process resulted in the elimination of five of the seven options.

The options that were deemed unsuitable and the reasons why are summarised in table 4.1 shown below:

Option	Reason for Rejection	Key Issues
Do Nothing	Incompatible with sustainable RNLI operations.	Accumulation of siltation would block vessel launch at lower levels of the tide, therefore inhibiting emergency lifeboat launch and thus impeding response time for life saving rescues
Landfill Disposal	No non-hazardous landfill capacity in Dumfries & Galloway (SEPA Landfill Sites and Capacity Map, 2025).	Disposal route not available locally.
Agricultural Spreading	Material salinity unsuitable for farmland.	Salinity impairs crop productivity.
Re-use in Construction	High silt fraction limits suitability as aggregate.	Material unsuitable from a geotechnical perspective.
Plough Dredging	Method cannot operate beneath slipway.	Physical constraints imposed by the slipway structure make this approach unworkable.

Table 4.1 – Summary of rejected options following primary appraisal with reasons for rejections

The assessment of the short-listed options taken forward for further consideration is presented in Section 4.

5. ASSESSMENT OF FEASIBLE OPTIONS

The options that passed the screening process and are considered potential options are:

- Dispersion Dredging; and
- Deposit at the Existing Drummore Deposit Site (IS285).

Each option has been evaluated against the attributes outlined in Appendix 2. The summary of scoring of these options is presented in Appendix 3.

5.1 Dispersion Dredging within River Dee

Dispersion dredging will be undertaken using a land-based long-reach excavator which will be positioned on the northern side of the slipway. Access to the lower end of the slipway will be achieved at Mean Low Water Springs (MLWS) via the existing access track (see Drawing KDLA-WS2320-XX-XX-DR-C-1001-P01). The excavated dredged material would be deposited approximately 20 metres from the dredging location, over the main channel of the River Dee, where it will be dispersed by the increased river current and subsequently settle downstream. Dredging operations will occur during low spring tides within an approximate two-hour working window. Each annual dredging campaign will span approximately three to four days.

Technical Feasibility:
This is a proven method which has been successfully carried out in previous maintenance campaigns, however, works need to be undertaken at low spring tides to allow access to the lower end of the dredge area by the land-based excavator.

Score: 4 out of 5

Cost: Costs incurred are minimal which are incurred solely for the hire of a suitable long reach excavator and fuel; Costs for this option are anticipated to be below £10,000.

Score: 5 out of 5

Environmental Considerations:
The dispersion method has the potential to cause temporary turbidity which may impact water quality; however, these effects are reversible, and their occurrence will be confined to the dredging window. It is likely that the natural concentration of the trace metals (As, Ni, Zn), found in the dredge samples, will also be present across wider areas of the River Dee, as these are linked to discharges from the historic

tannery located upstream. Therefore, the dispersal of dredging spoil would not result in any significant change to the downstream bed composition.

A designated Site of Specific Scientific Interest (SSSI), the Torrs to Mason's Walk, stretches approximately 9km along the coast approximately 5km south of Kirkcudbright. The northern boundary edge of the SSSI lies adjacent to the Lifeboat Station and Slipway. During the proposed dredging activities, the long reach excavator will be positioned to the north-east of the slipway, at the end of the existing access track, which will avoid encroachment into the nearby Site of Special Scientific Interest (SSSI). The removal of sediment build up is not anticipated to affect the natural features that constitute the SSSI.

Score: 4 out of 5

Operational Impact:
As described above, the excavator will be sited to the north-east of the slipway which means it can be repositioned quickly if an emergency lifeboat launch is required, therefore the works will cause minimal disruption to RNLI operations.

If a marine licence is approved and in place prior to the next main set of low spring tides then the next annual maintenance dredge can be carried out, which will avoid any impact on the Lifeboat Station.

Score: 5 out of 5

Legislative Complexity:
This option is permitted under a dredging marine license without the need for further permits.

Score: 5 out of 5

Total Scoring: High overall score – 23 out of 25.

5.2 Deposit at Existing Drummore Sea Spoil Deposit Site (IS285)

The closest open dredge and disposal site within Scottish Waters is the Drummore Spoil Deposit Site (IS285) which is ~50 km from the slipway at RNLI Kirkcudbright Lifeboat Station. Due to shallow waters and close-proximity to the toe of the slipway structure, dredging would need to be carried out by land-based plant. Dredge arisings would then require to be loading into a hopper barge before being transported to the disposal site.

Technical Feasibility:
The depositing of dredged material as a designated disposal site is a well proven practices and is technically achievable. However, to enable the loading of material into the hopper, there requires significant preparation of the foreshore to accommodate the berthing of the barge.

Score: 2 out of 5

Cost:
The mobilisation of a hopper barge, requirement or foreshore works, and additional licensing will elevate the costs for this option substantially.

Given that the expected quantity of dredged material each year is expected to be significantly lower than a typical hopper barge's capacity, the additional costs associated with deploying such a vessel is not considered reasonably practicable

Score: 1 out of 5

Environmental considerations:
Due to high silt fractions, the effects on water quality at the disposal site will be short term and reversible, similar to dispersion dredging.

The additional profiling working of the foreshore will have a greater impact of the surrounding environment.

Score: 3 out of 5

Operational impact:
The barge movements in and around the slipway have potential to disrupt the lifeboat launching operations during dredge activities as the barge is notably less manoeuvrable, which could hinder a timely repositioning in the event of an emergency callout

Score: 3 out of 5

Legislative Complexity:
Despite the sea disposal of dredge material being covered under dredging marine license, the additional foreshore works required to accommodate the hopper barge would create added terrestrial and marine impacts requiring a separate license

Score: 3 out of 5

Total Scoring: Low 12 out of 25.

5.3 Comparison of Options

When assessed side by side, dispersion dredging clearly emerges as the more practical solution, due to the following considerations:

- Technical feasibility: Proven on site vs. complicated and impractical logistics at IS285.
- Cost: <£10,000 vs. significantly higher.
- Licensing: Marine licence only vs. multiple consents required.
- Operational impacts: Minimal vs. higher risk of disruption to RNLI activities.
- Environmental effects: Localised, short-term and reversible vs. increased impact due to wider footprint from additional foreshore works.

6. CONCLUSION

The option appraisal drew on sediment chemistry and particle size analysis to confirm suitability of the dredged material for both dispersion and sea deposit.

Various approaches were initially considered but were eliminated at an early stage as they were deemed to be impractical, leaving two options for full evaluation.

Of these, dispersion dredging using a land-based excavator at low spring tide is judged to represent the Best Practicable Environmental Option. It is cost-effective, operationally compatible with RNLI requirements, requires no supplementary permissions, and is associated with only limited and reversible environmental effects.

Deposition at IS285, while technically possible, carries significantly higher costs, added licensing burdens, and greater operational and environmental disruption, making it unsuitable for the small-scale, routine dredging required at Kirkcudbright Lifeboat Station.

7. GLOSSARY

Acronym	Definition
AL	Action Levels
ACENAPHY	Acenaphthylene
As	Arsenic
BAP	Benzo(a)pyrene
BBF	Benzo(b)fluoranthene
BENZGHIP	Benzo(ghi)perylene
BPEO	Best Practicable Environmental Option
CD	Chart Datum
Cd	Cadmium
DBENZAH	Diben(ah)anthracene
FLUORANT	Fluoranthene
km	Kilometres
MLWS	Mean Low Water Springs
MPA	Marine Protected Area
Ni	Nickel
PAHs	Polyaromatic Hydrocarbons
PHENANT	Phenanthrene
PSD	Particulate Size Distribution
PYRENE	Pyrene
RNLI	Royal National Lifeboat Institution
SEPA	Scottish Environmental Protection Agency
SSSI	Site of Special Scientific Interest
THC	Total Hydrocarbon Content
Zn	Zinc

APPENDIX A – SEDIMENT SAMPLING AND LABORATORY ANALYSIS REPORT

Aspect
Land + Hydrographic Surveys
CHARTERED SURVEYORS
A SOCOTEC COMPANY

TEL: 01294 313 399 • WEB: WWW.ASPECTSURVEYS.COM

SEDIMENT SAMPLING & LABORATORY ANALYSIS

RNLI SLIPWAY, KIRKCUDBRIGHT

SEPTEMBER 2025

PROJECT REF: A9704

REV: 00

Client:

Royal National Lifeboat Institution
Kirkcudbright Lifeboat Station
Dee Road
Kirkcudbright
DG6 4HQ

Lifeboats

ices Approved Development Partner

Achilles UVDB QUALIFIED

QAS International ISO 45001:2018 REGISTERED COMPANY

QAS International ISO 14001:2015 REGISTERED COMPANY

QAS International ISO 9001:2015 REGISTERED COMPANY

TABLE OF CONTENTS

1. INTRODUCTION 3
2. GEODESY & DATUM 3
3. CONDUCT OF SAMPLING 4
4. FIELD NOTES / OBSERVATIONS 7
5. SURVEY PERSONNEL 8
6. DRAWING REGISTER 8
7. SOCOTEC LABORATORY ANALYSIS 9
8. QUALITY STATEMENT 9

TABLE OF FIGURES

FIGURE 1 - GRAB SAMPLE LOCATIONS: RNLI KIRKCUDBRIGHT, DUMFRIESSHIRE 3
FIGURE 2 - GRAB SAMPLE LOCATIONS (GS1 LEFT & GS2 RIGHT) 5
FIGURE 3 - GRAB SAMPLE LOCATION (GS3) 5
FIGURE 4 - MARINE SCOTLAND SEDIMENT ANALYSIS SUITE 6
FIGURE 5 - QUALITY ASSURANCE / QUALITY CONTROL STATEMENT 9

ANNEX A - LABORATORY ANALYSIS DATA SHEETS

DOCUMENT ISSUE RECORD

DATE	REVISON	COMPILED	CHECKED	NOTES
20.10.2025	00	SB	CKS	FIRST ISSUE

1. INTRODUCTION

On the instruction of the Royal National Lifeboat Institution, Aspect Land & Hydrographic Surveys Ltd (herein ALHS) were commissioned to undertake a seabed sediment sampling survey within the intertidal area adjacent the RNLI Station at Kirkcudbright, Dumfriesshire.

A total of 3 No. samples are required within the area, to a depth of less than 1m below the current bed level, and thereafter the material will be analysed to determine the chemical and physical properties. The location of the dredge box is highlighted **RED** in Figure 1.

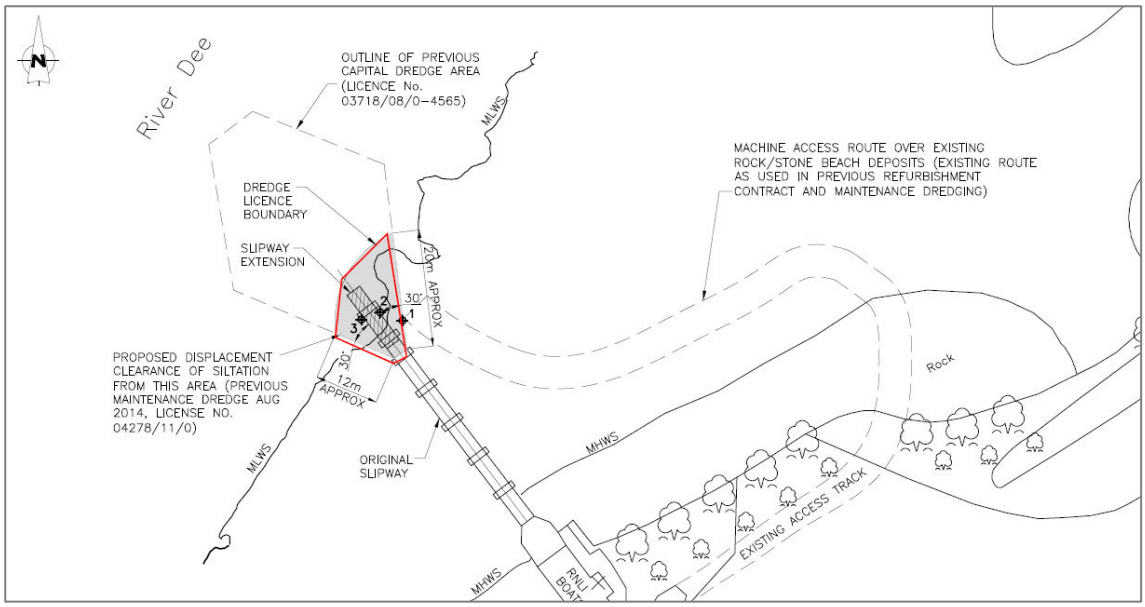


FIGURE 1 - GRAB SAMPLE LOCATIONS: RNLI KIRKCUDBRIGHT, DUMFRIESSHIRE

2. GEODESY & DATUM

The horizontal datum used throughout the data gathering phase of the survey was OSGB36 (OSTN15). Data has been rendered in OSGB36 Datum, British National Grid.

The vertical datum for all data is Ordnance Datum. At Kirkcudbright Bay is 3.70m below OD. OSTN15 defines OSGB36 National Grid in conjunction with the National GPS Network.

In this regard OSTN15 can be considered error free (not including any GPS positional errors). The agreement between OSTN15 and the old triangulation network stations (down to 3rd order) is 0.1m rms.

National Grid coordinates were established using Trimble RTK GPS VRS Active Network. Chart Datum at Kirkcudbright Bay is 3.70m below OD.

3. CONDUCT OF SAMPLING

Marine Directorate guidelines determine both the sampling methodology and number of samples required in relation to the volume of material to be removed and the anticipated depth of dredge.

On the basis that three cores are required, <=25,000m³ of material will be removed as part of the dredge process, as outlined in the Marine Directorate documentation "Pre-disposal Sampling Guidance Version 2 - November 2017". See Table 1 below.

PROPOSED DREDGE VOLUME [m³]	NO. SAMPLE STATIONS REQUIRED
<=25,000	3
32,000	4
50,000	5
75,000	6

TABLE 1 - MINIMUM SAMPLE STATIONS REQUIRED BY DREDGE VOLUME

On the basis that dredge depths are anticipated to be less than 1m from the surface, Marine Directorate guidelines state that surface grab samples are sufficient and therefore no mechanical retrieval system (i.e. vibrocore) was required.

Samples were collected on 11.09.2025 with Low Water recorded at 08:46 with a predicted height of 0.5m. The locations of the samples, detailed in the table below, were taken as close to the proposed locations as was safely possible.

The samples were collected during a low water tidal state and stored in suitable receptacles prior to being transported to ALHS offices, where they were sub-sampled into jars and containers provided by Socotec UK Ltd,.

During recovery, the location of each sample was recorded using RTK GPS instrumentation aligned to OSTN15 positioning and Ordnance Datum level. All laboratory analysis was completed in accordance with Marine Directorate guidelines.

Sample	Easting	Northing	Level OD	Level CD	Time (BST)
GS1	267472.759	546406.001	-1.954	1.746	08:26
GS2	267471.785	546408.233	-2.055	1.645	08:29
GS3	267466.706	546406.047	-2.941	0.759	08:32

TABLE 2 - SAMPLE LOCATION DETAILS

FIGURE 2 - GRAB SAMPLE LOCATIONS (GS1 LEFT & GS2 RIGHT)

FIGURE 3 - GRAB SAMPLE LOCATION (GS3)

Upon receipt of the sediment samples, Socotec UK Ltd completed sample analysis in accordance with requirements outlined in the Marine Directorate Pre-disposal Sampling Guidance Version 2 - November 2017.

Figure 4, overleaf, details the full suite of analysis that the laboratory offer, in respect of Marine Directorate analysis with those undertaken as part of the Kirkcudbright Bay works highlighted GREEN, as agreed with Wallace Stone LLP.

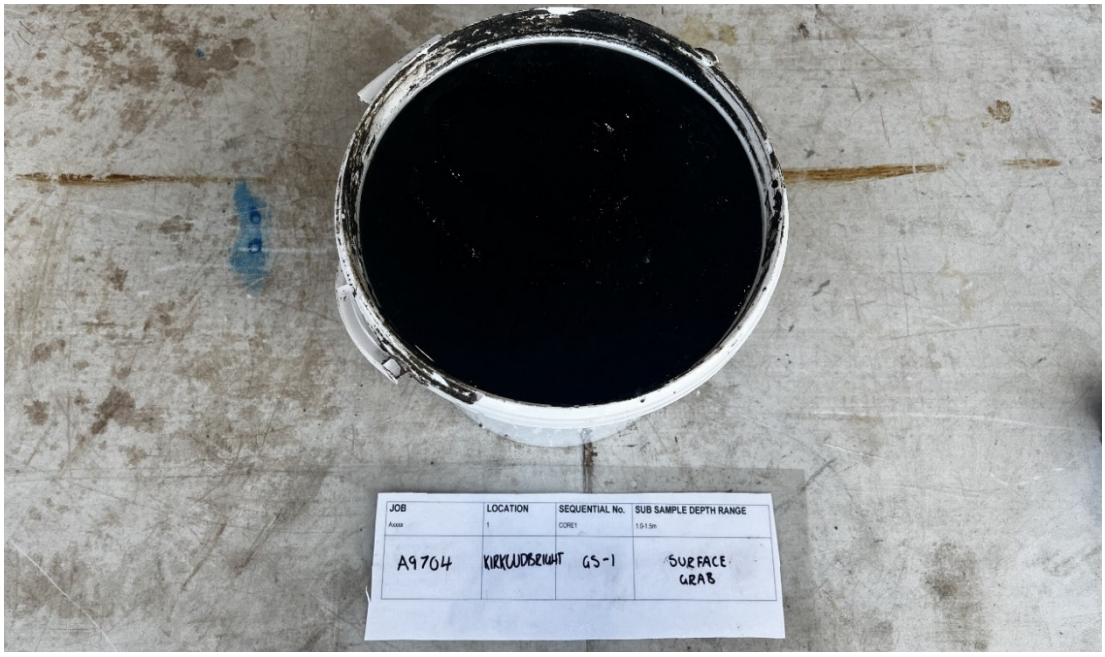
The samples have been analysed against the Action Levels quoted by Marine Directorate and where detected levels were above Action Levels, they have been highlighted in the summary reports.

MATRIX	DETERMINAND	LOD	METHOD / INSTRUMENT	TURNAROUND [WORKING DAYS	QUALITY MANAGEMENT SYSTEM	SOP
SEDIMENTS	CRM / In-House Reference Material to be run with each batch and data included in report					
	Moisture Content	0.2%	Oven drying @ 120°C	15	UKAS 17025	ASC/SOP/303
	Total Organic Carbon (TOC)	0.02%	Carbonate removal and sulphurous acid / combustion at 1600°C/NDIR	15	UKAS 17025	SOCOTEC Environmental Chemistry*
	Particle Size Analysis	%	Distribution by wet & dry sieving and laser diffraction	15	NMBAQC	SUB
	Density	N/A	Density	15	Not Accredited	SOCOTEC Doncaster*
	Metals Suite, Sieving <63µm, inc. low level Hg at 0.01mg/kg (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn)	0.01 - 2mg/kg	Aqua-regia extraction & ICP-MS	15	UKAS 17025	SOCOTEC Environmental Chemistry*
	Organotins (DBT, TBT)	1µg/kg	Acid digest and solvent extraction GC-MS	15	UKAS 17025	ASC/SOP/301
	PAHs (DTI 2-6 ring aromatics + EPA 16) *For full list of compounds see table over page*	1µg/kg	Solvent extraction & GC-MS	15	UKAS 17025	ASC/SOP/304
	PAHs (EPA 16 only) *For full list of compounds see table over page*	1µg/kg	Solvent extraction & GC-MS	15	UKAS 17025	ASC/SOP/304
	PCBs (ICES 7) *For full list of compounds see table over page*	0.08µg/kg	Solvent extraction & GC Triple Quad	15	UKAS 17025	ASC/SOP/302
	PCBs (25 congeners inc. ICES 7) *For full list of compounds see table over page*	0.08µg/kg	Solvent extraction & GC Triple Quad	15	UKAS 17025	ASC/SOP/302
	Total Hydrocarbon Content	100µg/kg	Solvent extraction & GC-FID	15	Not Accredited	ASC/SOP/306
	Organochlorine Pesticides *For full list of compounds see table over page*	0.1µg/kg	Solvent extraction & GC Triple Quad	15	UKAS 17025	ASC/SOP/302
	Asbestos Identification	N/A	Presence or absence	15	UKAS 17025	SOCOTEC Asbestos*
	PBDEs	0.1µg/kg	SUB	15	Not Accredited	SUB

FIGURE 4 - MARINE SCOTLAND SEDIMENT ANALYSIS SUITE

4. FIELD NOTES / OBSERVATIONS

CORE LOCATION	SAMPLE NUMBER	FOLK & WARD DESCRIPTION	TEXTURAL GROUP CLASSIFICATION
GS-01	-	FINE SAND	GRAVELLY MUDDY SAND



CORE LOCATION	SAMPLE NUMBER	FOLK & WARD DESCRIPTION	TEXTURAL GROUP CLASSIFICATION
GS-02	-	FINE SAND	GRAVELLY MUDDY SAND

CORE LOCATION	SAMPLE NUMBER	FOLK & WARD DESCRIPTION	TEXTURAL GROUP CLASSIFICATION
GS-03	-	VERY FINE SAND	SLIGHTLY GRAVELLY MUDDY SAND

5. SURVEY PERSONNEL

The following personnel were involved during the survey and data processing phases of the project:

NAME	POSITION
A. McCormick	Surveyor / Sampling
J. Hunter	Surveyor / Sampling
C. Stephenson	QA Assurance & Data Release

6. DRAWING REGISTER

The following drawing files and documents are issued in conjunction with this project:

TITLE	DESCRIPTION
A9704_RNLI Kirkcudbright_Sample Locations.dwg	Sample Plan - 2D
A9704_RNLI Kirkcudbright_Sample Locations.pdf	Sample Plan - 2D
A9704_RNLI Kirkcudbright_Survey Report.pdf	Survey Report & Lab Analysis

7. SOCOTEC LABORATORY ANALYSIS

On completion of the agreed laboratory analysis, the physical and chemical properties of the sediment samples recovered at Kirkcudbright Bay can be viewed within the summary report "*MAR02816.pdf*".

Further detailed analysis can be viewed with the accompanying Excel files;

- OEL_SOC9900925_PSD_V01 - MAR02816.xlsx
- MAR02816.xls
- Pre-disposal+sediment+sampling+analysis+results+form MAR02816.xlsx

8. QUALITY STATEMENT

Aspect Land & Hydrographic Surveys Ltd is an ISO PAS 99 accredited company offering a full range of topographic, hydrographic, geophysical, oceanographic, and marine environmental survey services, with expertise in combining multiple disciplines into single projects.

Surveys are conducted to a high quality, certified by accreditation to the Royal Institute of Chartered Surveyors, the Chartered Institute of Civil Engineering Surveyors and The Scottish Hydrographic Society.

Administrative procedures are fully audited to ISO9001:2015 standards and maintained via in-house quality control procedures, ensuring continued accreditation to Achilles UVDB (Category B1) and Constructionline Gold including SSIP Acclaim.

FIGURE 5 - QUALITY ASSURANCE / QUALITY CONTROL STATEMENT

All survey data is acquired in line with internal procedures for data acquisition with equipment operated and adjusted in real-time to achieve a balance of quality and coverage and to ensure adherence to the client's specifications.

Data and deliverables are reviewed in line with documented procedures, using a two-phase review process whereby the data processor's work is reviewed for compliance against the client's specification and in-house quality assurance protocols, including visual analysis and statistical analysis to review data outliers.

All processed data is reviewed by a secondary processor experienced with the software, and with an awareness of the project specifications, to inspect all the previously mentioned quality assurance checks.

Once data is approved by the Survey Manager, deliverable generation commences and final outputs checked using a two-step review process, undergoing review by the creator and secondary review by a quality assurance processor.

The two-step review process applies to all deliverables, covering visual checks for use of correct datum and coordinate system where applicable, ensuring all files were readable, the correct naming convention has been used, files are compressed where possible and that the compressed files are not corrupt.

The results in this report are based on observations and interpretations of the data obtained during the survey. It should be considered that there is a natural limitation in the accuracy of interpretation.

Annex A
Laboratory Analysis Data Sheets
A9704

- SOCOTEC Certificate of Analysis
- Test Report ID: MAR02816 [Marine]

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 MAR02816

Issue Version: 1

Customer: Aspect Land & Hydrographic Surveys Ltd, Thornhouse Business Centre, 30 Ballot Road, Irvine, North Ayrshire, KA12 0HW

Customer Reference: RNLI Kirkcudbright

Date Sampled: 11-Sep-25

Date Samples Received: 19-Sep-25

Test Report Date: 17-Oct-25

Condition of samples: Ambient 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

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	MAR02816
Issue Version	1
Customer Reference	RNLI Kirkcudbright

		Units	%	%	%	%	%	Mg/m3
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SUB_03*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Particle Density**
A9704 - GS01 (RNLI Kirkcudbright)	MAR02816.001	Sediment	23.3	76.7	9.90	62.36	27.74	2.66
A9704 - GS02 (RNLI Kirkcudbright)	MAR02816.002	Sediment	31.9	68.1	14.84	50.41	34.75	2.66
A9704 - GS03 (RNLI Kirkcudbright)	MAR02816.003	Sediment	20.1	79.9	4.12	64.59	31.29	2.66
		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

NAD - No Asbestos Detected

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	MAR02816
Issue Version	1
Customer Reference	RNLI Kirkcudbright

		Units	N/A	% M/M
		Method No	SUB_02*	WSLM59*
		Limit of Detection	N/A	0.02
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Asbestos**	**TOC**
A9704 - GS01 (RNLI Kirkcudbright)	MAR02816.001	Sediment	NAD	0.60
A9704 - GS02 (RNLI Kirkcudbright)	MAR02816.002	Sediment	NAD	0.83
A9704 - GS03 (RNLI Kirkcudbright)	MAR02816.003	Sediment	NAD	0.47
		Reference Material (% Recovery)	N/A	102
		QC Blank	N/A	<0.02

* See Report Notes

NAD - No Asbestos Detected

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	MAR02816
Issue Version	1
Customer Reference	RNLI Kirkcudbright

		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**
A9704 - GS01 (RNLI Kirkcudbright)	MAR02816.001	Sediment	26.9	0.24	29.5	17.9	0.06	40.0	28.7	165
A9704 - GS02 (RNLI Kirkcudbright)	MAR02816.002	Sediment	12.5	0.23	33.0	12.4	0.09	29.5	28.3	120
A9704 - GS03 (RNLI Kirkcudbright)	MAR02816.003	Sediment	12.4	0.18	29.3	8.7	0.05	25.1	22.4	105
Certified Reference Material SETOC 768 (% Recovery)			103	94	93	86	111	91	108	100
QC Blank			<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

* See Report Notes

Certificate of Analysis

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

Test Report ID	MAR02816
Issue Version	1
Customer Reference	RNLI Kirkcudbright

		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)**
A9704 - GS01 (RNLI Kirkcudbright)	MAR02816.001	Sediment	<5	<5
A9704 - GS02 (RNLI Kirkcudbright)	MAR02816.002	Sediment	<5	<5
A9704 - GS03 (RNLI Kirkcudbright)	MAR02816.003	Sediment	<1	<1
Certified Reference Material BCR-646 (% Recovery)			91	100
QC Blank			<1	<1

* 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 MAR02816
Issue Version 1
Customer Reference RNLI Kirkcudbright

		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**
A9704 - GS01 (RNLI Kirkcudbright)	MAR02816.001	Sediment	6.63	4.32	15.0	44.2	47.5	48.1
A9704 - GS02 (RNLI Kirkcudbright)	MAR02816.002	Sediment	11.0	8.08	20.0	60.8	62.8	62.1
A9704 - GS03 (RNLI Kirkcudbright)	MAR02816.003	Sediment	1.43	<1	2.85	11.2	13.1	14.4
Certified Reference Material Quasimeme SED42 (% Recovery)			40	132	88	87	87	95
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

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

Test Report ID MAR02816
Issue Version 1
Customer Reference RNLI Kirkcudbright

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF***	**CHRYSENE ***	**DBENZAH**	**FLUORANT**	**FLUORENE**
A9704 - GS01 (RNLI Kirkcudbright)	MAR02816.001	Sediment	31.3	45.3	52.3	8.21	98.7	13.3
A9704 - GS02 (RNLI Kirkcudbright)	MAR02816.002	Sediment	47.5	59.8	71.5	10.6	137	20.9
A9704 - GS03 (RNLI Kirkcudbright)	MAR02816.003	Sediment	11.0	12.8	14.0	2.39	20.8	3.18
Certified Reference Material Quasimeme SED42 (% Recovery)			94	84	104	102	93	72
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

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

Test Report ID MAR02816
Issue Version 1
Customer Reference RNLI Kirkcudbright

		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**
A9704 - GS01 (RNLI Kirkcudbright)	MAR02816.001	Sediment	37.3	23.4	73.6	87.3	25000
A9704 - GS02 (RNLI Kirkcudbright)	MAR02816.002	Sediment	46.3	30.7	109	120	35100
A9704 - GS03 (RNLI Kirkcudbright)	MAR02816.003	Sediment	11.1	6.28	16.7	18.2	10800
Certified Reference Material Quasimeme SED42 (% Recovery)			104	105	82	96	90~
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	MAR02816
Issue Version	1
Customer Reference	RNLI Kirkcudbright

		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**
A9704 - GS01 (RNLI Kirkcudbright)	MAR02816.001	Sediment	<0.08	<0.08	<0.08	<0.08	0.08	<0.08	<0.08
A9704 - GS02 (RNLI Kirkcudbright)	MAR02816.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
A9704 - GS03 (RNLI Kirkcudbright)	MAR02816.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Quasimeme SED28 (% Recovery)			80	107	110	95	97	102	107
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.

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 MAR02816
Issue Version 1
Customer Reference RNLI Kirkcudbright

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
A9704 - GS01 (RNLI Kirkcudbright)	MAR02816.001	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.25
A9704 - GS02 (RNLI Kirkcudbright)	MAR02816.002	Sediment	<0.1	<0.1	<0.1	0.15	<0.1	<0.1	<0.1	0.29
A9704 - GS03 (RNLI Kirkcudbright)	MAR02816.003	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Certified Reference Material Quasimeme SED28 (% Recovery)			104~	77~	88~	122	86	86	63	106
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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

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 MAR02816
Issue Version 1
Customer Reference RNLI Kirkcudbright

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR02816.001-003	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR02816.001-003	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR02816.001-003	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR02816.001-003	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR02816.001-002	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	MAR02816.001-003	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	MAR02816.001-003	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. Triphenylene may be 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

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

Test Report ID	MAR02816
Issue Version	1
Customer Reference	RNLI Kirkcudbright

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.
Organochlorine Pesticides (OCPs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions					
Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	C2N	C2-naphthalenes	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	C3N	C3-naphthalenes	AHCH	alpha-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		

APPENDIX B – ATTRIBUTES, DEFINITION & SCORING SYSTEM

Attribute	Description	1	2	3	4	5
Cost	Financial Cost of the Option	>£ 75,000	£50,000-75,000	£35,000- 50,000	£10,000 – 35,000	<£10,000
Technical Feasibility	Is the option within the capabilities of RNLI to carry out?	Technology not proven.	Complex requirements, but proven technology.	Simple proven technology available.	Practicable with basic management.	Proven simple practicable technology
Environmental Effects	Potential environmental effects associated with implementing the option.	Very Significant	Significant	Minimal	Trivial	None
Impacts on Lifeboat station	Level of interference with normal boat launching activities.	Very Significant – unable to operate lifeboat	Significant – Longer / operational impact	Minimal – short term / tidal constraints	Trivial - Impact during dredging	None
Legislative Complexity	How complex are the regulator requirements and what risks are posed.	Significant risk additional permits, licences or consents will not be granted.	Requires significant additional permits, licences or consents.	Requires additional permits, licences or consents.	Minor management required to comply with legislation	Complies with all relevant legislation.

APPENDIX C – SCORING OF SHORTLISTED OPTIONS

Attribute	Dispersion Dredging within River Dee	Deposit at Drummore Sea Spoil Deposit Site
Cost	5	1
Technically Feasibility	4	2
Environmental Effects	4	3
Impacts on Lifeboat Station	5	3
Legislative Complexity	5	3
Total	**23**	**12**