GEOTECHNICAL
ENVIRONMENTAL SERVICES
LIMITED

KILKEEL INNER HARBOUR DREDGING PROGRAMME
KILKEEL
COUNTY DOWN

SEDIMENT SAMPLING AND LABORATORY ANALYSES

FACTUAL REPORT

REPORT No. 25184NI

JANUARY 2026

.

CLIENT: NIFHA

ENGINEER: DORAN CONSULTING

DOCUMENT CONTROL SHEET

CLIENT	NIFHA
PROJECT TITLE	KILKEEL INNER HARBOUR DREDGING PROGRAMME KILKEEL, COUNTY DOWN SEDIMENT SAMPLING AND LABORATORY ANALYSES
CONSULTING ENGINEER	DORAN CONSULTING
REPORT No.	25184NI

REV.	STATUS	AUTHOR(S)	REVIEWED & APPROVED BY	ISSUE DATE
0	FINAL	[redacted]		31/01/2026

CONTENTS

1.0 INTRODUCTION

On the instruction of Doran Consulting (the Engineer), acting on behalf of NIFHA (the Client), Geotechnical Environmental Services Limited (GES) was appointed to undertake sediment sampling and laboratory analyses in association with the Kilkeel Inner Harbour dredging programme, Kilkeel, County Down.

Site and exploratory hole location plans are included in Appendix 1.

The investigation comprised the following.

- 5 No. "grab" samples of the sea bed.
- 5 No. dual tube continuous sediment cores from sea bed level to 0.5m below sea bed level.
- Sub-sampling of the sediment cores at 0.5m intervals.
- Chemical and physical property laboratory testing of sediment samples.
- Factual reporting.

The Specification for the investigation was the UK Specification for Ground Investigation, 3rd Edition (2022).

Soil descriptions were undertaken in accordance with British Standard BS5930 2015+A1: 2020, Code of Practice for Site Investigation which incorporates guidance presented in BS EN ISO 14688-1:2002+A1:2013 and BS EN ISO 14688-2:2004+A1:2013.

The following provides additional clarification of the terminology that has been used:

- Silty CLAY/clayey SILT – used where it is considered that the secondary fraction is important and hence significantly modifies the appearance and/or behaviour of the principal.
- Fine grained (clays/silts) soils plotting on or just below the A-line on a plasticity chart are classified as clays.
- Fine grained soils with less than 35% sand and/or gravel sized particles are classified as slightly sandy and/or slightly gravelly.
- Fine grained soils with between 35% and 65% sand or gravel sized particles are classified as sandy or gravelly.
- Fine grained soils with greater than 65% sand or gravel sized particles are classified as very sandy or very gravelly.
- Coarse soils (sands/gravels) with less than 5% clay or silt and/or less than 5% sand or gravel are classified as slightly clayey or slightly silty and/or slightly sandy or slightly gravelly.
- Coarse soils with between 5% and 20% clay or silt and/or between 5% and 20% sand or gravel are classified as clayey or silty and/or sandy or gravelly.
- Coarse soils with greater than 20% clay or silt or greater than 20% sand or gravel are classified as very clayey or very silty and/or very sandy or very gravelly.

2.0 AIMS AND OBJECTIVES OF THE INVESTIGATION

The investigation was designed by the Engineer with the objective of obtaining the following information:

- The shallow sediment profile at the inner harbour.
- Tier 1 Physical Properties of the sea bed sediment in accordance with the OSPAR Guidelines for the Management of Dredged Material, Reference No. 2014/06, Technical Annex 1.
- Tier 2 Chemical Properties of the sea bed sediment (in accordance with the OSPAR Guidelines for the Management of Dredged Material, Reference No. 2014/06, Technical Annex 1.

This report provides a factual account of the site works undertaken and the laboratory test results obtained.

All comments made in this report are done so on the assumption that the findings of the investigation are representative of the site area as a whole.

3.0 SITE WORKS

3.1 Introduction

The site works were undertaken on 16th December 2025 under the supervision of a geo-environmental engineer from GES.

An exploratory hole location plan is included in Appendix 1.

3.2 Grab and Dual Tube Sampling

5 No. locations were specified, P01-P05.

At each sampling location an initial sample of the sea bed sediment was obtained using a cable operated Van Veen 2 litre capacity sediment sampler.

To obtain samples below sea bed level, a Geoprobe Macro Core sampler was used to recover continuous sediment cores. The cores were recovered in 1.0m long pvc liners of 38mm internal diameter (ID).

The sampling process was as follows:

Sampler tooling of 1.0m length and 54mm outside diameter (OD) was lowered, over the gunwale of the work boat, to sea bed level by means of manually handled light weight drill rods. Upon coming to rest on the sea bed the sampler was driven into the sediment by means of a jack hammer powered off a hydraulic power pack.

Upon driving the sampler to 1.0m below sea bed level, pulley ropes were attached to the drill rods to extract the sampler using a winch located on the work boat.

Photographs of the Van Veen grab and Macro Core sediment sampling procedure are included in Appendix 2.

Exploratory hole logs for each sampling location, plus photographs of the grab and macro core sample recovery are included in Appendix 3.

3.3 Sub-Sampling

Sub-samples of the grab samples and continuous sediment cores were obtained at sea bed level and from sea bed level to 0.4m below sea bed level.

The samples were placed in testing laboratory approved containers comprising the following;

- 500g capacity plastic tubs.
- 125g capacity glass jars.

4.0 LABORATORY TESTING

4.1 Chemical and Physical Property Laboratory Testing

Following completion of the sediment sampling, a set of samples was dispatched to the laboratory of SOCOTEC, Bretby Business Park, Burton upon Trent, England.

The laboratory participates in the Quality Assurance in Marine Environmental Monitoring in Europe (QUASIMEME) scheme.

The samples were tested for Tier 1 Physical Properties and Tier 2 Chemical Properties in accordance with the OSPAR Guidelines for the Management of Dredged Material, Reference No. 2014/06, Technical Annexes 1 and 2.

The results obtained are included in Appendix 4.

REFERENCES

1. Site Investigation Steering Group. 2022. UK Specification for Ground Investigation, 3rd Edition. ICE Publishing Limited.

2. British Standard BS5930:2015+A1:2020, Code of Practice for Site Investigations. British Standards Institution, London.

3. BS EN ISO 14688-1, 2002+A1:2013. Geotechnical Investigation and Testing - Identification and classification of soil. Part 1: Identification and description. British Standards Institution, London.

4. BS EN ISO 14688-2, 2004+A1:2013. Geotechnical Investigation and Testing - Identification and classification of soil. Part 2: Principles for a classification. British Standards Institution, London.

5. OSPAR Guidelines for the Management of Dredged Material at Sea. 2024. Agreement 2014/06. OSPAR Commission.

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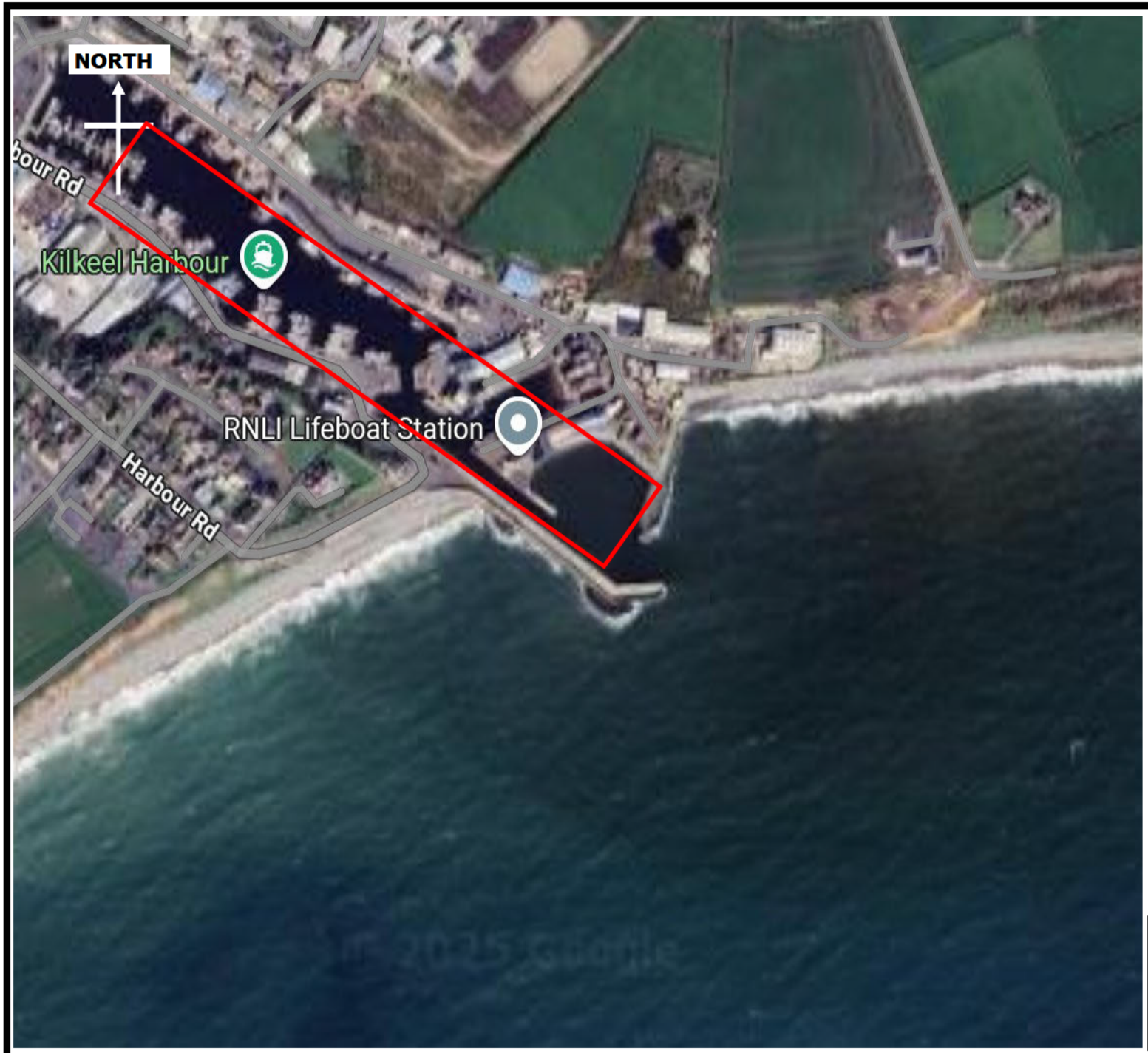
APPENDIX 1

SITE AND EXPLORATORY HOLE LOCATION PLANS



GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Title: Site Location Plan

Project Name: Kilkeel Inner Harbour
Kilkeel, County Down—Sediment Sampling and Laboratory Analyses

Figure No.1	Report No. 25081NI
Client: NIFHA	
Engineer: Doran Consulting	
Drawn by: [redacted]	Date: 03/07/2025
Reviewed by: [redacted]	Date: 03/07/2025

Key/Symbols:

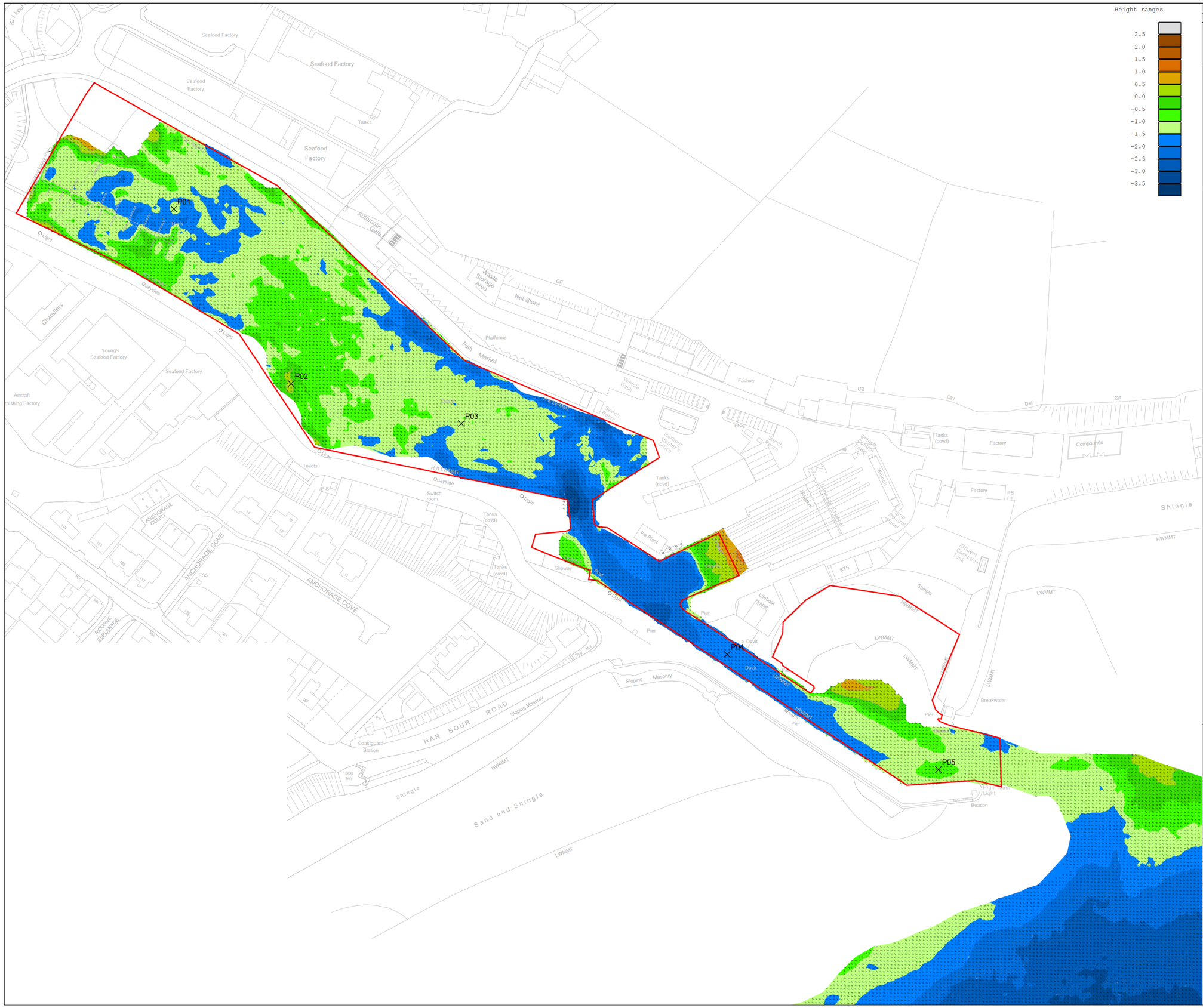
Approximate Site Boundary

Notes:

Geotechnical Environmental Services Limited

The Old Mill,
22A Kilmoyle Road,
Ballybogey,
Co Antrim.
BT53 6NR.

Tel: 0044 (0)28 2074 2066
Fax: 0044 (0)28 2074 2829
info@geospecialists.co.uk



Rev.	Date	By	Check	Details	Appr.
P01	03/12/25	GP	PMM	First Issue	CD

Inner Harbour

P01 Sample Depths:

Sample Location	CD Depth (m)
Surface	−1.176
−0.4m	−1.576

P04 Sample Depths:

Sample Location	CD Depth (m)
Surface	−1.888
−0.4m	−2.288

P02 Sample Depths:

Sample Location	CD Depth (m)
Surface	0.084
−0.4m	−0.316
−0.8	−0.716
−1.2	−1.116

P05 Sample Depths:

Sample Location	CD Depth (m)
Surface	−0.831
−0.4m	−1.231

P03 Sample Depths:

Sample Location	CD Depth (m)
Surface	−1.079
−0.4m	−1.479

Note:

Chart Datum = 1.06m

Kilkeel Chart Datum = 3.24m below Ordinance Datum

0629 Kilkeel is a Secondary Non-Harmonic port

The tide type is semi-diurnal

HAT	5.2 m
MHWS	4.7 m
MHWN	4.1 m
MSL	2.92 m
MLWN	1.5 m
MLWS	0.8 m
LAT	0.4 m

Point Data		
POINT NUMBER	EASTING	NORTHING
P01	331336.548	314243.948
P02	331402.522	314145.747
P03	331498.355	314123.255
P04	331647.875	313993.387
P05	331766.780	313928.470

Legend

Dredge Area

PRELIMINARY DRAWING

Project Title:

Kilkeel Dredging

Drawing Title:

Kilkeel Inner Harbour
Sediment Sample Locations

Client: NIFHA	Drawn by:	Date: November 2025	
Project Number: XXXX	Checked by:	Scales: 1:1000	
Doran Project Number: 251043	Approved by:	Sheet Size: A1	Uniclass: PM_40_40
Drawing Number: (Project-Orig-FB-SB-F-DISC-NUMBER) 251043-DCL-SI-ZZ-D-C-0001		Revision: P01	STATUS: S1

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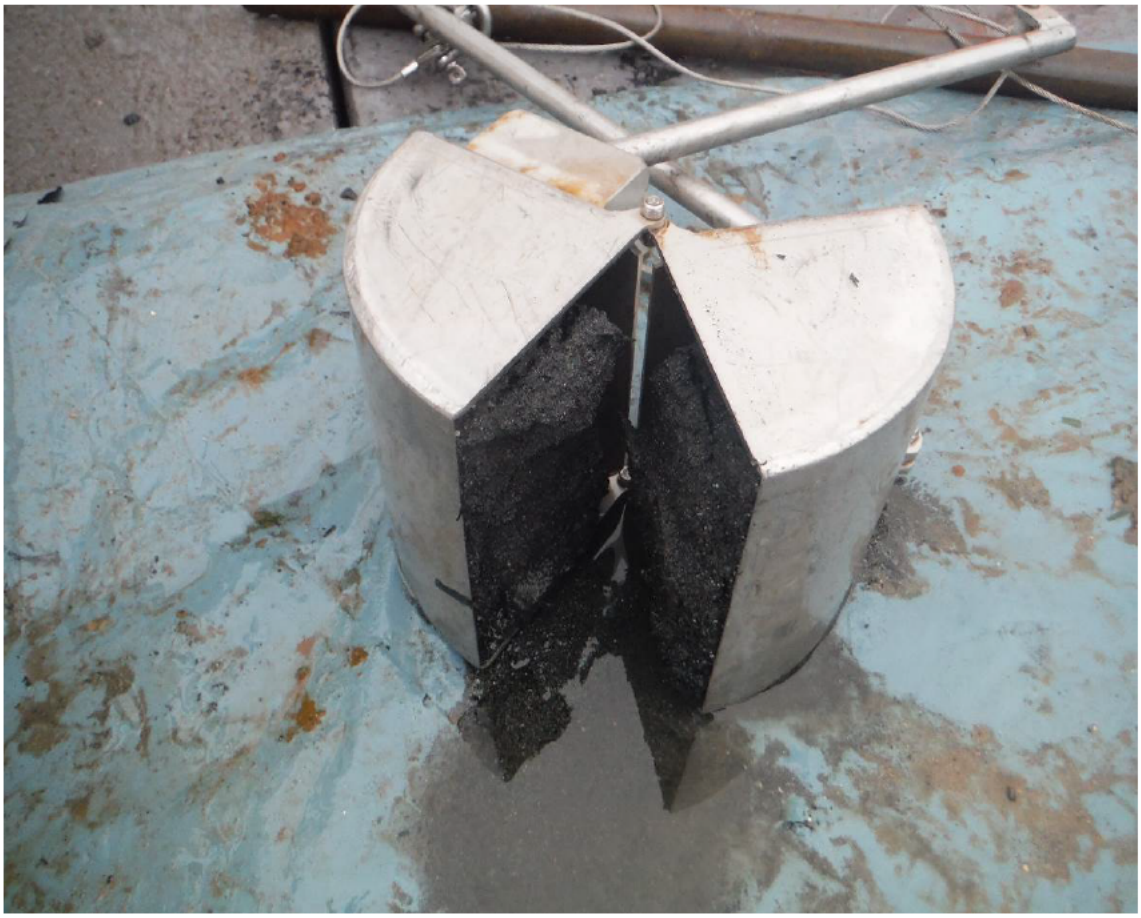
APPENDIX 2

PHOTOGRAPHS OF THE VAN VEEN GRAB AND MACRO CORE SEDIMENT SAMPLING PROCEDURE

Van Veen Sediment Sampler Ready to be Lowered to Sea Bed

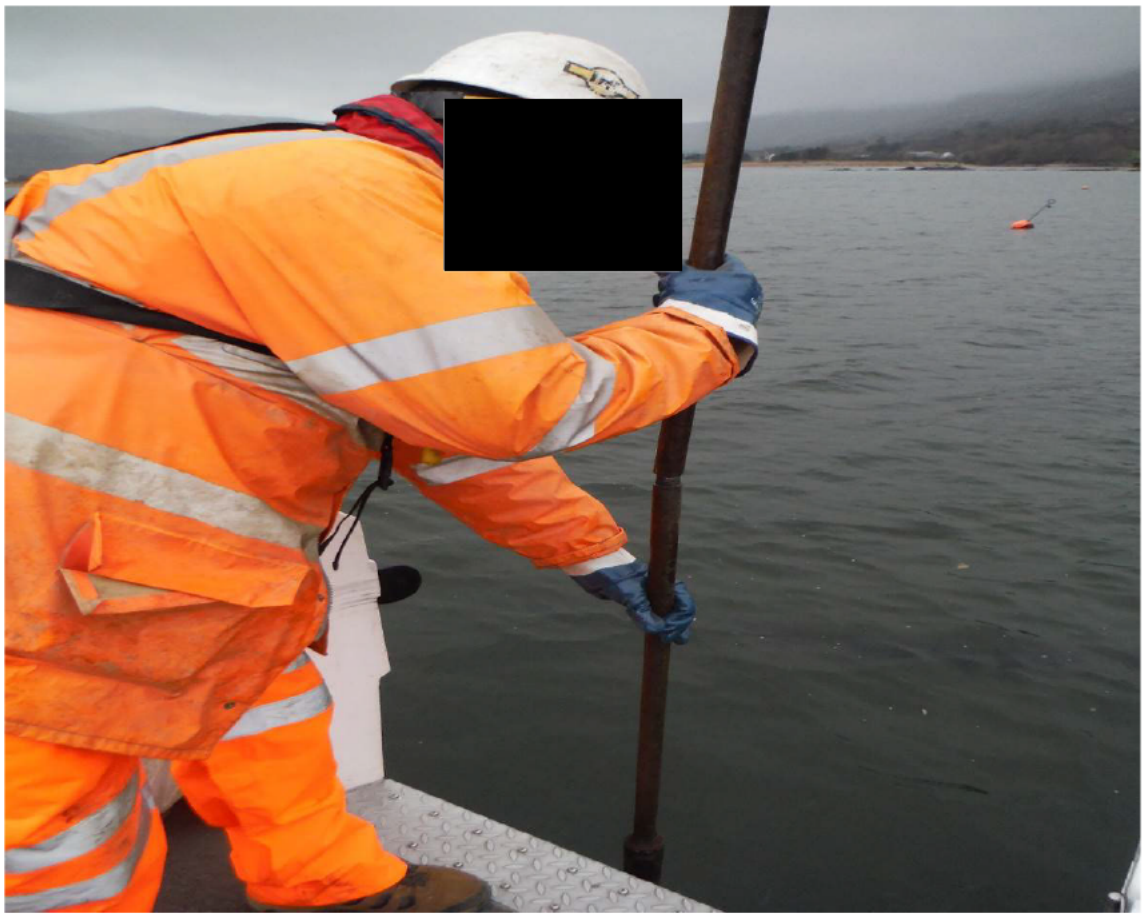
Recovery of Van Veen Sediment Sampler with Sample



Sea Bed Sediment Sample

Insertion of PVC Liner into Dual Tube Sampler

Dual Tube Sampler and Drill Rod



Dual Tube Sampler Lowered to Sea Bed. Additional Drill Rods Added as Required

Dual Tube Sampler Driven into Sea Bed

Recovery of Dual Tube Sampler Using Winch and Pulley System

Dual Tube Sample Recovery

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APPENDIX 3

BOREHOLE LOGS AND SEDIMENT SAMPLE PHOTOGRAPHS

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Kilkeel Inner Harbour Dredging Programme, Kilkeel, County Down - Sediment Sampling and Laboratory Analyses	P01

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler. Macro Core Sampler.	54mm cased to 0.40m		NIFHA	25184NI
	Location	**Dates** 16/12/2025	**Engineer** Doran	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00 0.00-0.40	ES1 ES2					(0.40)	Greyish brown and grey slightly sandy SILT containing decayed organic matter.		
				16/01/2025:		0.40	Complete at 0.40m		

Remarks
ES=Environmental sediment sample comprising 3x0.5kg capacity plastic tubs & 2x125g capacity amber glass jar.

Scale (approx)	Logged By
1:10	

Figure No. 25184NI.P01

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Kilkeel Inner Harbour Dredging Programme, Kilkeel, County Down - Sediment Sampling and Laboratory Analyses	P02

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler. Macro Core Sampler.	54mm cased to 0.50m		NIFHA	25184NI
Location	**Dates** 16/12/2025		**Engineer** Doran	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00 0.00-0.40	ES1 ES2					(0.40)	Greyish brown and grey slightly sandy SILT containing decayed organic matter.		
						0.40 (0.10)	Light greyish brown silty fine to medium SAND. Sampler refused at 0.5m depth.		
				16/12/2025:		0 50	Complete at 0.50m		

Remarks
ES=Environmental sediment sample comprising 3x0.5kg capacity plastic tubs & 2x125g capacity amber glass jar.

Scale (approx)	Logged By
1:10	

Figure No. 25184NI.P02

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Kilkeel Inner Harbour Dredging Programme, Kilkeel, County Down - Sediment Sampling and Laboratory Analyses	P03

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler. Macro Core Sampler.	54mm cased to 0.40m		NIFHA	25184NI
	Location	**Dates** 16/12/2025	**Engineer** Doran	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00 0.00-0.40	ES1 ES2			16/12/2025:		(0.40) 0.40	Greyish brown and dark grey slightly sandy SILT. Complete at 0.40m		

Remarks
ES=Environmental sediment sample comprising 3x0.5kg capacity plastic tubs & 2x125g capacity amber glass jar.

Scale (approx)	Logged By
1:10	

Figure No. 25184NI.P03

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Kilkeel Inner Harbour Dredging Programme, Kilkeel, County Down - Sediment Sampling and Laboratory Analyses	P04

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler. Macro Core Sampler.	54mm cased to 0.40m		NIFHA	25184NI
	Location	**Dates** 16/12/2025	**Engineer** Doran	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00 0.00-0.40	ES1 ES2			16/12/2025:		(0.40) 0.40	Greyish brown and grey slightly sandy SILT containing decayed organic matter. Complete at 0.40m		

Remarks
ES=Environmental sediment sample comprising 3x0.5kg capacity plastic tubs & 2x125g capacity amber glass jar.

Scale (approx)	Logged By
1:10	

Figure No. 25184NI.P04

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Kilkeel Inner Harbour Dredging Programme, Kilkeel, County Down - Sediment Sampling and Laboratory Analyses	P05

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler. Macro Core Sampler.	54mm cased to 0.40m		NIFHA	25184NI
	Location	**Dates** 16/12/2025	**Engineer** Doran	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00 0.00-0.40	ES1 ES2					(0.40)	Greyish brown silty fine SAND containing decayed organic matter.		
				16/12/2025:		0.40	Complete at 0.40m		

Remarks
ES=Environmental sediment sample comprising 3x0.5kg capacity plastic tubs & 2x125g capacity amber glass jar.

Scale (approx)	Logged By
1:10	

Figure No. 25184NI.P05

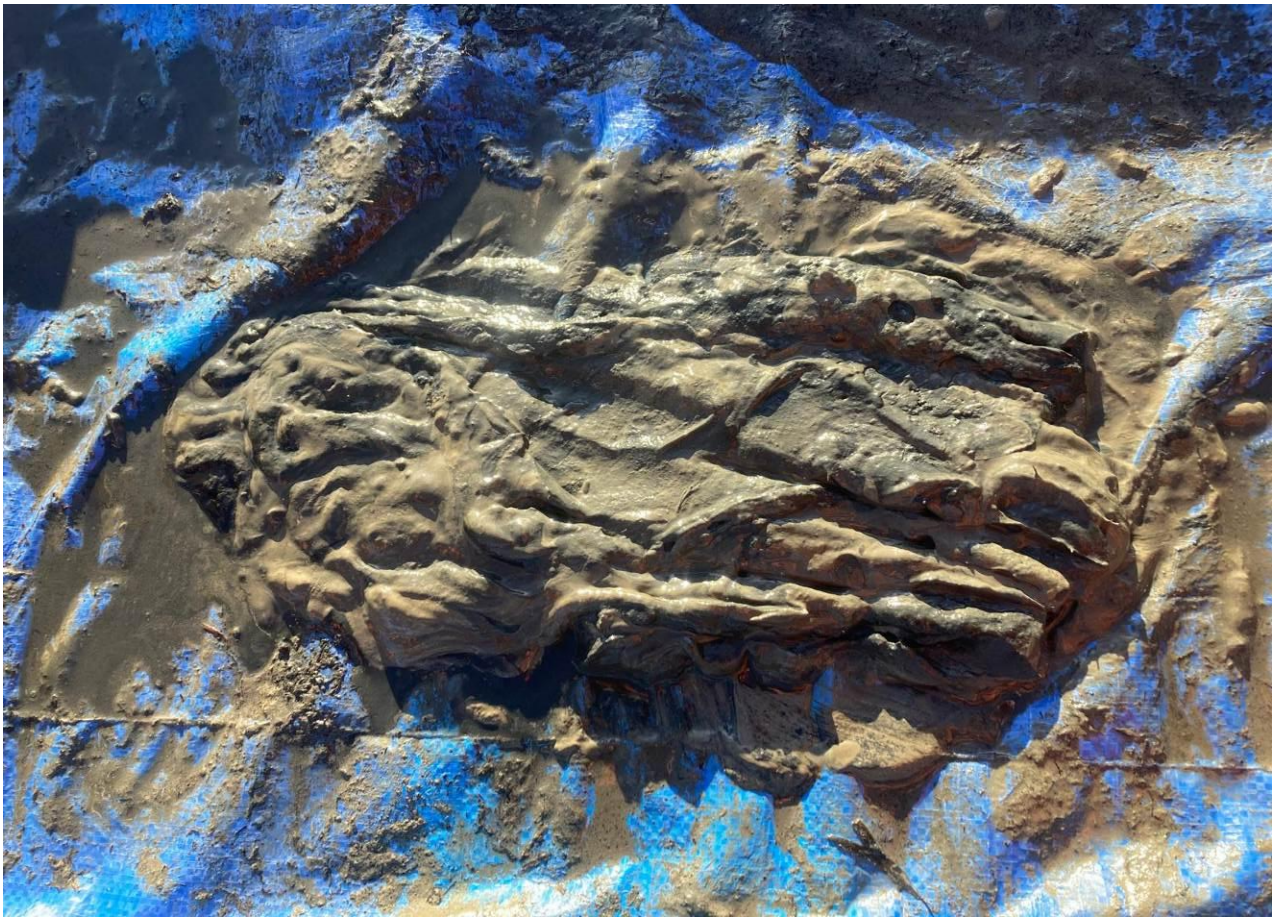
P01 Van Veen Sediment Sampler Recovery

P01 0m-1.0m Macro Core Sampler Recovery

P02 Van Veen Sediment Sampler Recovery

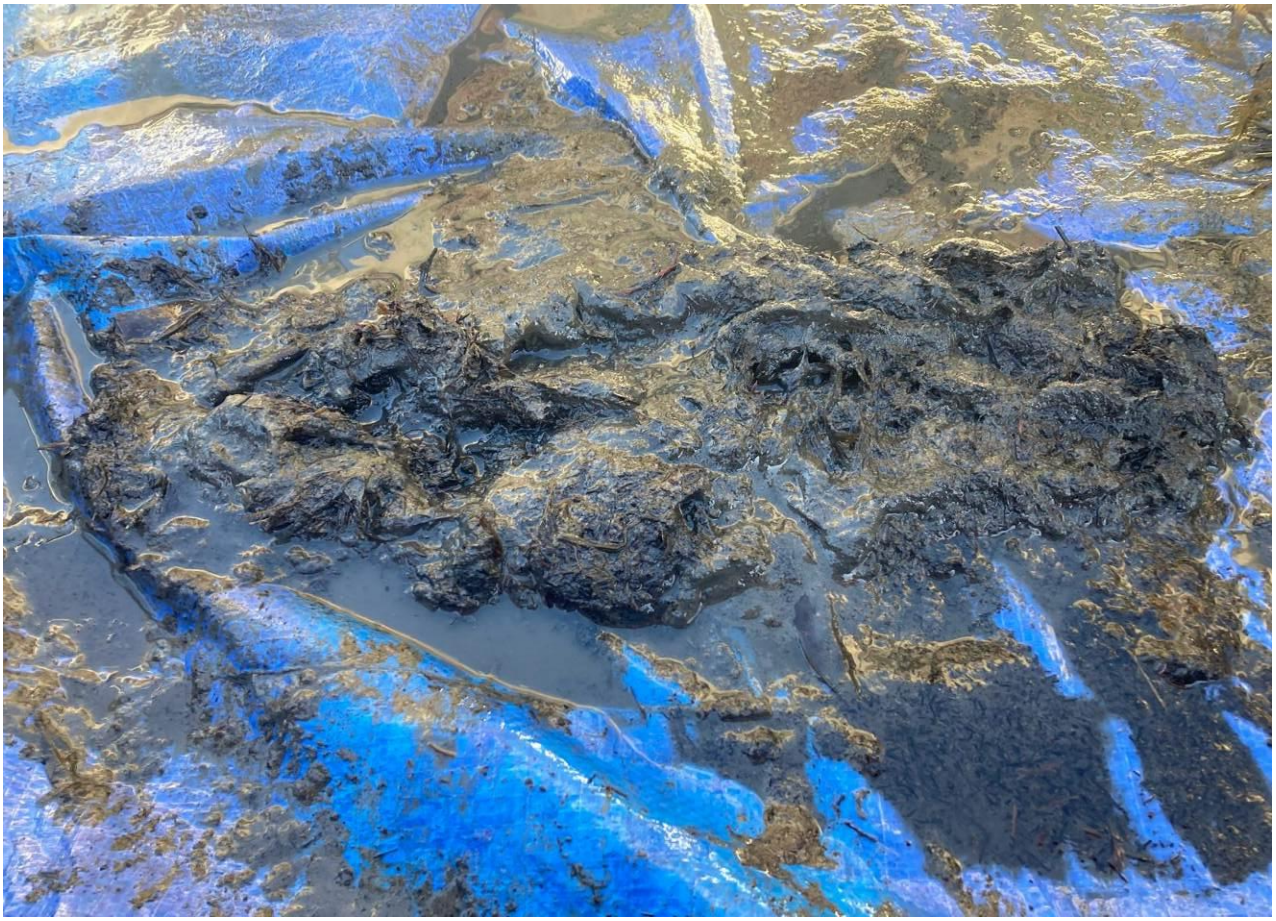
P02 0m-1.0m Macro Core Sampler Recovery

P03 Van Veen Sediment Sampler Recovery



P03 0m-1.0 m Macro Core Sampler Recovery

P04 Van Veen Sediment Sampler Recovery



P04 0m-1.0 m Macro Core Sampler Recovery

P05 Van Veen Sediment Sampler Recovery

P05 0m-1.0 m Macro Core Sampler Recovery

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APPENDIX 4

LABORATORY TEST RESULTS

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 MAR02924

Issue Version: 1

Customer: Geotechnical Environmental Services Limited, The Old Mill, 22A Kilmoyle Road, Ballybogey, County Antrim

Customer Reference: Kilkeel Inner Harbour

Date Sampled: 16-Dec-25

Date Samples Received: 22-Dec-25

Test Report Date: 28-Jan-26

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

Authorised by: [redacted]

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

SOCOTEC

Test Report ID	MAR02924
Issue Version	1
Customer Reference	Kilkeel Inner Harbour

		Units	%	%	%	%	%	Mg/m3
		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	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Particle Density**
P01 - 0 0m (Sea Bed Level)	MAR02924 001	Sediment	52 8	47 2	2 33	24 38	73 29	2 43
P01 - 0 0m - 0 4m	MAR02924 002	Sediment	63 9	36 1	2 46	57 06	40 48	2 51
P02 - 0 0m (Sea Bed Level)	MAR02924 003	Sediment	62 7	37 3	0 64	32 69	66 67	2 22
P02 - 0 0m - 0 4m	MAR02924 004	Sediment	68 5	31 5	1 55	28 94	69 51	2 13
P03 - 0 0m (Sea Bed Level)	MAR02924 005	Sediment	63 4	36 6	0 00	28 44	71 56	2 46
P03 - 0 0m-0 4m	MAR02924 006	Sediment	60 8	39 2	0 67	28 38	70 95	2 50
P04 - 0 0m (Sea Bed Level)	MAR02924 007	Sediment	65 6	34 4	2 81	57 09	40 10	2 06
P04 - 0 0m - 0 4m	MAR02924 008	Sediment	61 1	38 9	1 60	55 61	42 79	1 99
P05 - 0 0m (Sea Bed Level)	MAR02924 009	Sediment	29 2	70 8	0 21	84 49	15 29	2 44
P05 - 0 0m - 0 4m	MAR02924 010	Sediment	28 5	71 5	0 27	85 71	14 02	2 63
Reference Material (% Recovery)			NA	NA	NA	NA	NA	NA
QC Blank			NA	NA	NA	NA	NA	NA

*** 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

SOCOTEC

Test Report ID	MAR02924
Issue Version	1
Customer Reference	Kilkeel Inner Harbour

		Units	% m/m
		Method No	WSLM59*
		Limit of Detection	0 02
		Accreditation	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**TOC**
P01 - 0 0m (Sea Bed Level)	MAR02924 001	Sediment	2 57
P01 - 0 0m - 0 4m	MAR02924 002	Sediment	2 07
P02 - 0 0m (Sea Bed Level)	MAR02924 003	Sediment	3 50
P02 - 0 0m - 0 4m	MAR02924 004	Sediment	3 49
P03 - 0 0m (Sea Bed Level)	MAR02924 005	Sediment	2 37
P03 - 0 0m-0 4m	MAR02924 006	Sediment	2 41
P04 - 0 0m (Sea Bed Level)	MAR02924 007	Sediment	4 13
P04 - 0 0m - 0 4m	MAR02924 008	Sediment	5 57
P05 - 0 0m (Sea Bed Level)	MAR02924 009	Sediment	0 88
P05 - 0 0m - 0 4m	MAR02924 010	Sediment	0 23
		Reference Material (% Recovery)	102
		QC Blank	<0 02

* 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

SOCOTEC

Test Report ID	MAR02924
Issue Version	1
Customer Reference	Kilkeel Inner Harbour

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ICPMS-MWSED*	ICPMS-MWSED*	ICPMS-MWSED*	ICPMS-MWSED*	ICPMS-MWSED*	ICPMS-MWSED*	ICPMS-MWSED*	ICPMS-MWSED*
		Limit of Detection	0 14	0 03	1	0 7	0 6	0 01	0 4	3 5
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic as As**	**Cadmium as Cd**	**Chromium as Cr**	**Copper as Cu**	**Lead as Pb**	**Mercury as Hg**	**Nickel as Ni**	**Zinc as Zn**
P01 - 0 0m (Sea Bed Level)	MAR02924 001	Sediment	6 8	0 25	48 0	20 3	31 0	0 02	22 8	91 2
P01 - 0 0m - 0 4m	MAR02924 002	Sediment	6 5	0 26	46 8	21 0	31 2	<0 01	21 9	92 5
P02 - 0 0m (Sea Bed Level)	MAR02924 003	Sediment	7 3	0 32	53 4	40 5	26 5	0 01	23 9	145
P02 - 0 0m - 0 4m	MAR02924 004	Sediment	9 4	0 41	71 1	44 7	34 5	0 02	32 3	172
P03 - 0 0m (Sea Bed Level)	MAR02924 005	Sediment	8 1	0 19	58 2	20 2	24 9	<0 01	24 9	86 7
P03 - 0 0m-0 4m	MAR02924 006	Sediment	10 1	0 27	73 1	28 4	34 4	<0 01	32 7	112
P04 - 0 0m (Sea Bed Level)	MAR02924 007	Sediment	9 6	0 24	58 9	36 2	27 1	0 05	25 8	91 7
P04 - 0 0m - 0 4m	MAR02924 008	Sediment	9 2	0 22	49 8	30 3	23 2	<0 01	23 1	81 6
P05 - 0 0m (Sea Bed Level)	MAR02924 009	Sediment	4 9	0 09	30 9	8 4	17 0	<0 01	16 0	35 8
P05 - 0 0m - 0 4m	MAR02924 010	Sediment	3 4	0 06	21 4	6 2	12 6	<0 01	11 1	32 2
Certified Reference Material 2702 (% Recovery)			82	80	79	81	86	93	92	80
QC Blank			<0 14	<0 03	<1	<0 7	<0 6	<0 01	<0 4	<3 5

* 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

SOCOTEC

Test Report ID	MAR02924
Issue Version	1
Customer Reference	Kilkeel Inner Harbour

		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)
P01 - 0 0m (Sea Bed Level)	MAR02924 001	Sediment	<5	<5
P01 - 0 0m - 0 4m	MAR02924 002	Sediment	<5	19 2
P02 - 0 0m (Sea Bed Level)	MAR02924 003	Sediment	<5	25 8
P02 - 0 0m - 0 4m	MAR02924 004	Sediment	<5	49 8
P03 - 0 0m (Sea Bed Level)	MAR02924 005	Sediment	<5	19 1
P03 - 0 0m-0 4m	MAR02924 006	Sediment	<5	58 6
P04 - 0 0m (Sea Bed Level)	MAR02924 007	Sediment	25 6	127
P04 - 0 0m - 0 4m	MAR02924 008	Sediment	16 8	13 9
P05 - 0 0m (Sea Bed Level)	MAR02924 009	Sediment	<1	2 44
P05 - 0 0m - 0 4m	MAR02924 010	Sediment	<1	1 58
Certified Reference Material BCR-646 (% Recovery)			65	63
QC Blank			<1	<1

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 MAR02924
Issue Version 1
Customer Reference Kilkeel Inner Harbour

		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	N*	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
P01 - 0 0m (Sea Bed Level)	MAR02924 001	Sediment	7 38	7 46	21 2	126	158	146
P01 - 0 0m - 0 4m	MAR02924 002	Sediment	9 40	10 5	15 0	73 1	113	130
P02 - 0 0m (Sea Bed Level)	MAR02924 003	Sediment	13 4	7 68	24 7	93 8	130	149
P02 - 0 0m - 0 4m	MAR02924 004	Sediment	12 9	10 6	29 2	118	168	186
P03 - 0 0m (Sea Bed Level)	MAR02924 005	Sediment	9 83	6 62	17 7	61 0	82 3	101
P03 - 0 0m-0 4m	MAR02924 006	Sediment	8 65	7 68	15 8	69 9	95 7	106
P04 - 0 0m (Sea Bed Level)	MAR02924 007	Sediment	13 0	6 18	19 4	81 2	104	109
P04 - 0 0m - 0 4m	MAR02924 008	Sediment	9 17	5 84	23 7	101	133	134
P05 - 0 0m (Sea Bed Level)	MAR02924 009	Sediment	13 1	2 55	19 4	45 3	50 8	45 9
P05 - 0 0m - 0 4m	MAR02924 010	Sediment	1 60	<1	2 41	6 79	7 97	8 48
Certified Reference Material Quasimeme SED42 (% Recovery)			42	135	88	80	88	97
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

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SOCOTEC

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Issue Version 1
Customer Reference Kilkeel Inner Harbour

		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**
P01 - 0 0m (Sea Bed Level)	MAR02924 001	Sediment	114	139	147	19 5	239	14 5
P01 - 0 0m - 0 4m	MAR02924 002	Sediment	106	108	105	16 2	143	28 4
P02 - 0 0m (Sea Bed Level)	MAR02924 003	Sediment	119	120	120	18 6	188	26 0
P02 - 0 0m - 0 4m	MAR02924 004	Sediment	148	155	157	23 2	230	28 9
P03 - 0 0m (Sea Bed Level)	MAR02924 005	Sediment	83 3	87 3	81 7	15 2	124	18 6
P03 - 0 0m-0 4m	MAR02924 006	Sediment	90 0	94 4	89 6	15 2	140	17 8
P04 - 0 0m (Sea Bed Level)	MAR02924 007	Sediment	85 9	93 8	100	15 3	158	17 8
P04 - 0 0m - 0 4m	MAR02924 008	Sediment	108	117	120	21 3	184	15 1
P05 - 0 0m (Sea Bed Level)	MAR02924 009	Sediment	34 6	42 3	51 8	7 91	102	11 5
P05 - 0 0m - 0 4m	MAR02924 010	Sediment	6 57	7 78	8 19	<1	16 6	1 64
Certified Reference Material Quasimeme SED42 (% Recovery)			105	86	99	90	86	74
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
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SOCOTEC

Test Report ID MAR02924
Issue Version 1
Customer Reference Kilkeel Inner Harbour

		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	N*	N*	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
P01 - 0 0m (Sea Bed Level)	MAR02924 001	Sediment	122	19 0	72 7	219	278000
P01 - 0 0m - 0 4m	MAR02924 002	Sediment	97 9	32 2	73 1	141	644000
P02 - 0 0m (Sea Bed Level)	MAR02924 003	Sediment	119	24 8	88 4	172	562000
P02 - 0 0m - 0 4m	MAR02924 004	Sediment	144	25 6	116	214	673000
P03 - 0 0m (Sea Bed Level)	MAR02924 005	Sediment	86 6	30 2	78 4	109	234000
P03 - 0 0m-0 4m	MAR02924 006	Sediment	96 4	26 5	77 4	128	180000
P04 - 0 0m (Sea Bed Level)	MAR02924 007	Sediment	89 2	31 7	91 0	145	168000
P04 - 0 0m - 0 4m	MAR02924 008	Sediment	111	26 4	88 7	164	142000
P05 - 0 0m (Sea Bed Level)	MAR02924 009	Sediment	36 1	12 3	74 3	84 5	36600
P05 - 0 0m - 0 4m	MAR02924 010	Sediment	6 79	2 94	11 2	13 4	30800
Certified Reference Material Quasimeme SED42 (% Recovery)			91	101	78	90	81~
QC Blank			<1	<1	<1	<1	<100

For full analyte name see method summaries
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As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery
* See Report Notes

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SOCOTEC

Test Report ID	MAR02924
Issue Version	1
Customer Reference	Kilkeel Inner Harbour

		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**
P01 - 0 0m (Sea Bed Level)	MAR02924 001	Sediment	<0 08	0 30	0 82	0 77	0 56	0 58	0 12
P01 - 0 0m - 0 4m	MAR02924 002	Sediment	<0 08	0 16	0 36	0 46	0 53	0 35	<0 08
P02 - 0 0m (Sea Bed Level)	MAR02924 003	Sediment	0 12	0 23	0 56	0 70	0 63	0 51	0 18
P02 - 0 0m - 0 4m	MAR02924 004	Sediment	0 11	0 25	0 58	0 59	0 49	0 48	0 17
P03 - 0 0m (Sea Bed Level)	MAR02924 005	Sediment	0 10	0 10	0 15	0 28	0 16	0 22	<0 08
P03 - 0 0m-0 4m	MAR02924 006	Sediment	0 11	0 11	0 17	0 30	0 10	0 19	<0 08
P04 - 0 0m (Sea Bed Level)	MAR02924 007	Sediment	<0 08	<0 08	<0 08	0 13	0 11	0 11	<0 08
P04 - 0 0m - 0 4m	MAR02924 008	Sediment	<0 08	<0 08	0 08	0 10	0 12	0 14	0 09
P05 - 0 0m (Sea Bed Level)	MAR02924 009	Sediment	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08
P05 - 0 0m - 0 4m	MAR02924 010	Sediment	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08	<0 08
Certified Reference Material Quasimeme SED28 (% Recovery)			63	88	89	109	85	81	65
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

Test Report ID MAR02924
Issue Version 1
Customer Reference Kilkeel Inner Harbour

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR02924 001-010	Analysis was conducted by an internal SOCOTEC laboratory UKAS accredited analysis by this laboratory is under UKAS number 1252
ICPMS-MWSED*	MAR02924 001-010	Analysis was conducted by an internal SOCOTEC laboratory UKAS accredited analysis by this laboratory is under UKAS number 1252
ICPOES-MWSED*	MAR02924 001-010	Analysis was conducted by an internal SOCOTEC laboratory UKAS accredited analysis by this laboratory is under UKAS number 1252
SUB_01*	MAR02924 001-010	Analysis was conducted by an approved subcontracted laboratory
SUB_02*	MAR02924 001-010	Analysis was conducted by an approved subcontracted laboratory
ASC/SOP/301	MAR02924 001-006	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	MAR02924 001-010	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 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 (ANTHRACN, PHENANT, PYRENE) These circumstances should be taken into consideration when utilising the data
ASC/SOP/303/304	MAR02924 001-010	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	MAR02924 001-010	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

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SOCOTEC

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Issue Version	1
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Method	Sample and Fraction Size	Method Summary
Total Solids	Wet Sediment	Calculation (100%-Moisture Content) Moisture content determined by drying a portion of the sample at 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 seived to <2mm	Carbonate removal and sulphurous acid/combustion at 1600 C/NDIR
Metals	Air dried and seived to <2mm	Microwave assisted HF/Boric 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

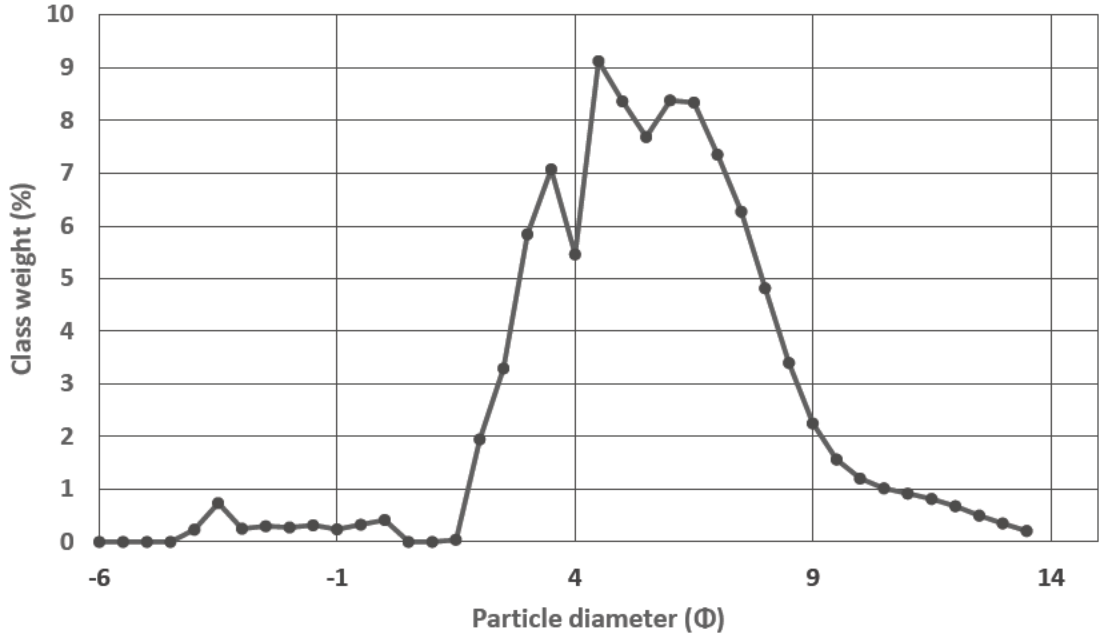
Analyte Definitions

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		

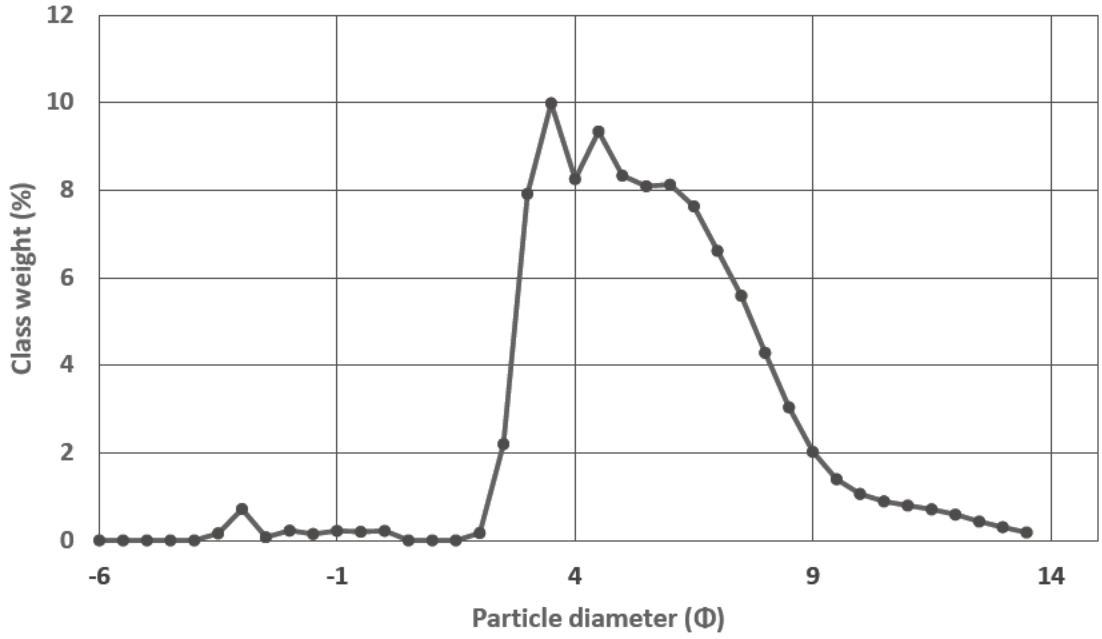
Aperture	MAR02924.001	MAR02924.002	MAR02924.003	MAR02924.004	MAR02924.005	MAR02924.006	MAR02924.007	MAR02924.008	MAR02924.009	MAR02924.010
63000.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45000.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31500.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22400.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16000.000	0.229	0.072	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11200.000	0.735	0.061	0.000	0.158	0.000	0.000	0.000	0.000	0.000	0.000
8000.000	0.245	0.415	0.163	0.721	0.000	0.004	0.149	0.012	0.023	0.000
5600.000	0.298	0.496	0.072	0.075	0.000	0.288	0.436	0.239	0.014	0.000
4000.000	0.274	0.374	0.100	0.229	0.000	0.064	0.673	0.239	0.036	0.070
2800.000	0.315	0.577	0.136	0.146	0.000	0.144	0.734	0.441	0.059	0.062
2000.000	0.233	0.470	0.171	0.221	0.000	0.168	0.822	0.667	0.082	0.136
1400.000	0.327	1.400	0.203	0.197	0.000	0.476	1.135	1.358	0.297	0.283
1000.000	0.413	2.249	0.255	0.217	0.000	0.548	1.648	1.719	0.488	0.422
707.000	0.000	5.920	0.000	0.000	0.000	0.000	7.621	6.629	4.979	3.562
500.000	0.000	9.818	0.000	0.000	0.000	0.000	9.609	8.855	8.592	7.996
353.600	0.040	9.616	0.001	0.000	0.000	0.000	7.218	7.385	13.595	14.277
250.000	1.943	6.279	0.875	0.171	0.309	0.239	5.004	4.084	17.034	18.746
176.800	3.291	5.843	5.188	2.202	3.718	3.635	5.191	4.760	16.658	17.844
125.000	5.840	5.748	8.107	7.918	7.633	7.294	6.147	6.166	11.742	11.731
88.390	7.068	5.568	9.467	9.985	8.868	8.121	6.444	7.266	6.834	6.721
62.500	5.459	4.616	8.590	8.252	7.910	8.067	7.071	7.390	4.272	4.132
44.190	9.121	4.719	8.606	9.338	9.269	9.023	6.179	6.691	2.797	2.482
31.250	8.362	4.604	8.469	8.328	8.155	8.375	4.728	5.415	1.774	1.666
22.097	7.683	4.567	7.949	8.090	7.932	7.622	3.722	4.265	1.375	1.245
15.625	8.382	4.896	8.105	8.126	8.255	7.876	4.044	4.414	1.436	1.237
11.049	8.337	4.773	7.590	7.632	7.953	7.796	4.426	4.601	1.502	1.369
7.813	7.350	4.144	6.413	6.609	7.067	6.936	4.125	4.194	1.394	1.326
5.524	6.267	3.474	5.309	5.590	6.080	5.951	3.584	3.651	1.232	1.188
3.906	4.814	2.613	3.981	4.287	4.678	4.584	2.740	2.826	0.983	0.950
2.762	3.395	1.796	2.749	3.038	3.266	3.231	1.874	1.963	0.729	0.701
1.953	2.249	1.164	1.793	2.022	2.114	2.141	1.174	1.246	0.503	0.477
1.381	1.561	0.802	1.236	1.397	1.429	1.496	0.768	0.816	0.351	0.326
0.977	1.200	0.621	0.948	1.061	1.086	1.171	0.570	0.595	0.266	0.239
0.691	1.017	0.527	0.802	0.892	0.930	1.016	0.481	0.486	0.219	0.192
0.488	0.914	0.469	0.716	0.798	0.853	0.931	0.436	0.428	0.187	0.161
0.345	0.814	0.412	0.633	0.710	0.773	0.844	0.391	0.377	0.159	0.135
0.244	0.678	0.338	0.520	0.591	0.647	0.714	0.324	0.311	0.132	0.111
0.173	0.499	0.245	0.376	0.435	0.472	0.534	0.235	0.225	0.103	0.086
0.122	0.350	0.170	0.258	0.305	0.327	0.381	0.162	0.156	0.078	0.065
0.086	0.208	0.100	0.151	0.181	0.191	0.230	0.095	0.092	0.050	0.042
	0.093	0.044	0.066	0.081	0.083	0.102	0.041	0.040	0.023	0.020

Station	Treatment	Textural Group Classification	Folk and Ward Description	Folk and Ward Sorting	Mean µm	Mean phi	Sorting Coefficient	Skewness	Kurtosis	Major Sediment Fractions		
										% Gravel	% Sand	% Mud
MAR02924.001	Sediment	(g)sM: Slightly Gravelly Sandy Mud	Coarse Silt	Very Poorly Sorted	23.722275	5.3976138	2.326391035	0.0736030	1.0383365	2.33%	24.38%	73.29%
MAR02924.002	Sediment	(g)mS: Slightly Gravelly Muddy Sand	Very Fine Sand	Very Poorly Sorted	91.033314	3.4574617	2.796866231	0.2221954	0.7935249	2.46%	57.06%	40.48%
MAR02924.003	Sediment	(g)sM: Slightly Gravelly Sandy Mud	Coarse Silt	Very Poorly Sorted	28.836248	5.1159727	2.133541199	0.1649923	0.9371385	0.64%	32.69%	66.67%
MAR02924.004	Sediment	(g)sM: Slightly Gravelly Sandy Mud	Coarse Silt	Very Poorly Sorted	26.075142	5.2611811	2.131674693	0.1830728	0.9355458	1.55%	28.94%	69.51%
MAR02924.005	Sediment	sM: Sandy Mud	Coarse Silt	Very Poorly Sorted	24.256950	5.3654580	2.162849796	0.1564045	0.9480426	0.00%	28.44%	71.56%
MAR02924.006	Sediment	(g)sM: Slightly Gravelly Sandy Mud	Coarse Silt	Very Poorly Sorted	24.369113	5.3588024	2.246058143	0.1659960	0.9782110	0.67%	28.38%	70.95%
MAR02924.007	Sediment	(g)mS: Slightly Gravelly Muddy Sand	Very Fine Sand	Very Poorly Sorted	87.447806	3.5154339	2.795487774	0.1566375	0.7986952	2.81%	57.09%	40.10%
MAR02924.008	Sediment	(g)mS: Slightly Gravelly Muddy Sand	Very Fine Sand	Very Poorly Sorted	79.749954	3.6483726	2.750935276	0.1202682	0.7961256	1.60%	55.61%	42.79%
MAR02924.009	Sediment	(g)mS: Slightly Gravelly Muddy Sand	Fine Sand	Poorly Sorted	193.268016	2.3713253	1.716891823	0.3552404	1.5746020	0.21%	84.49%	15.29%
MAR02924.010	Sediment	(g)mS: Slightly Gravelly Muddy Sand	Fine Sand	Poorly Sorted	198.147056	2.3353566	1.622507113	0.3688272	1.6716498	0.27%	85.71%	14.02%

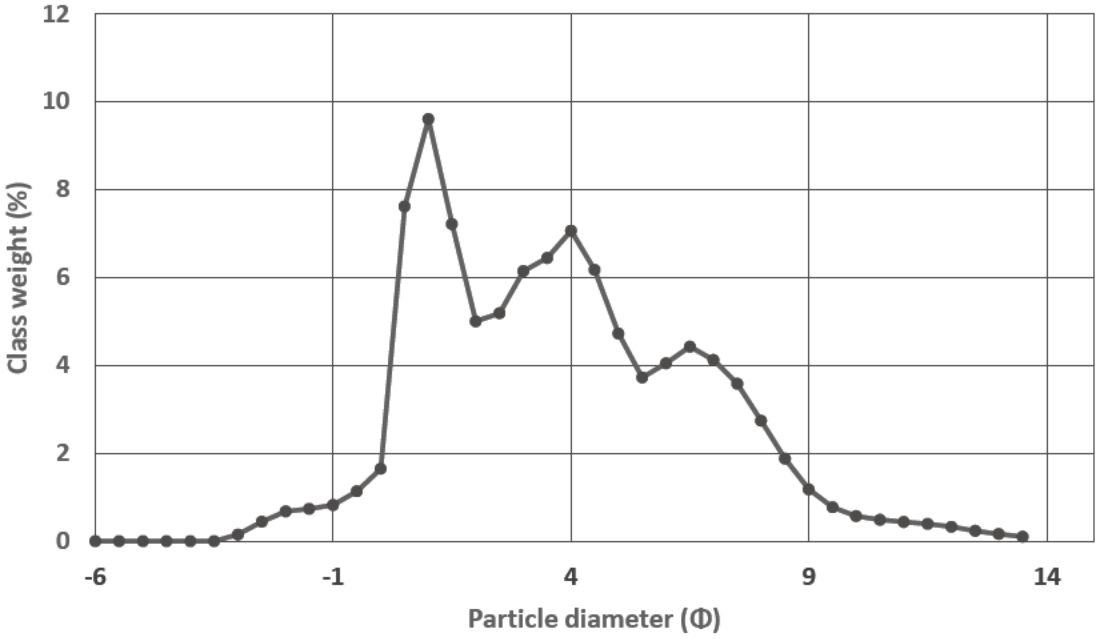
MAR02924.001



MAR02924.004



MAR02924.007



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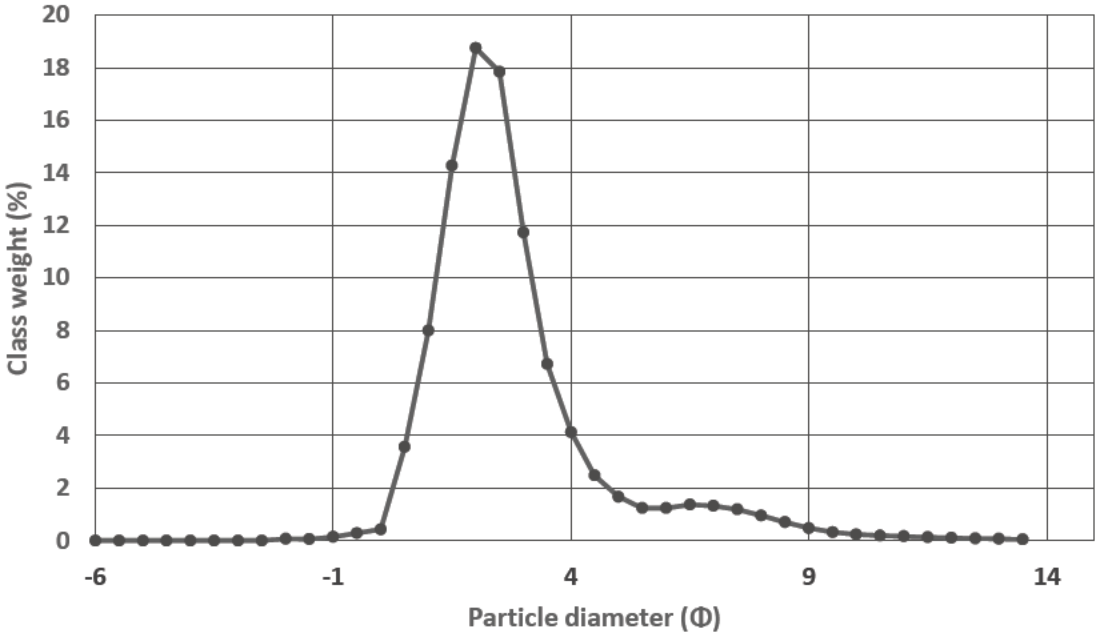

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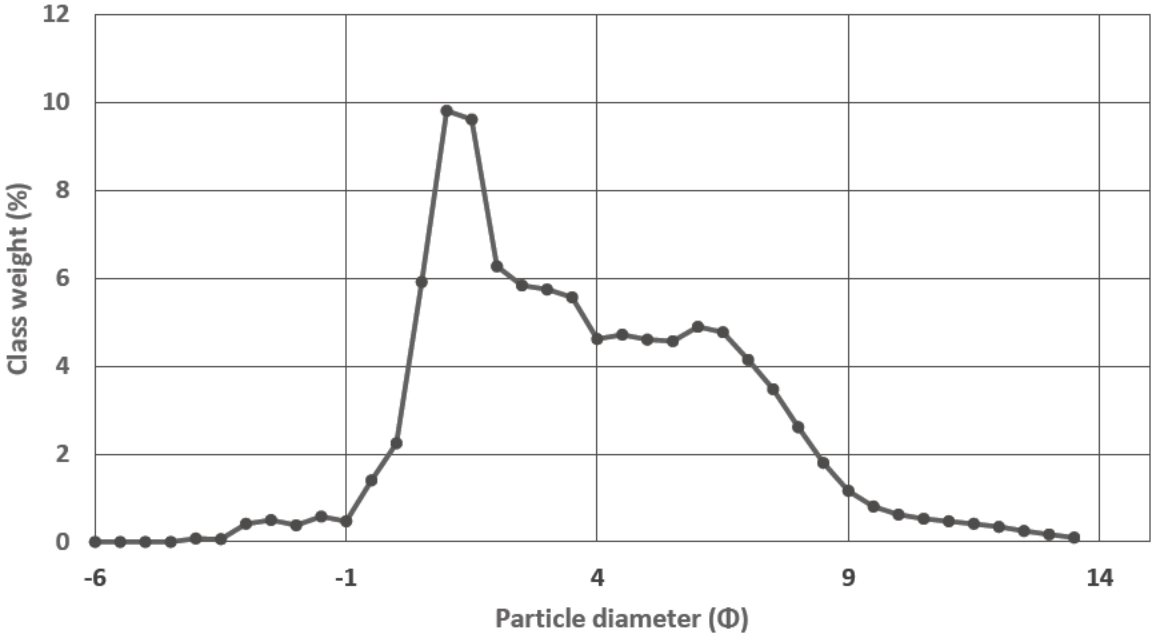

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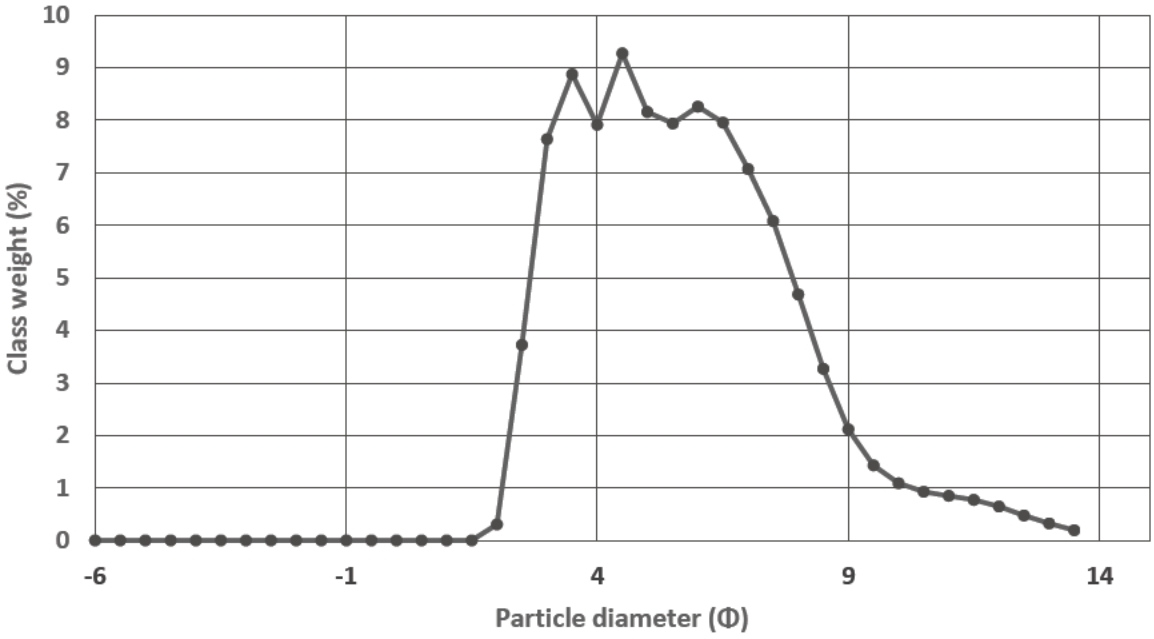

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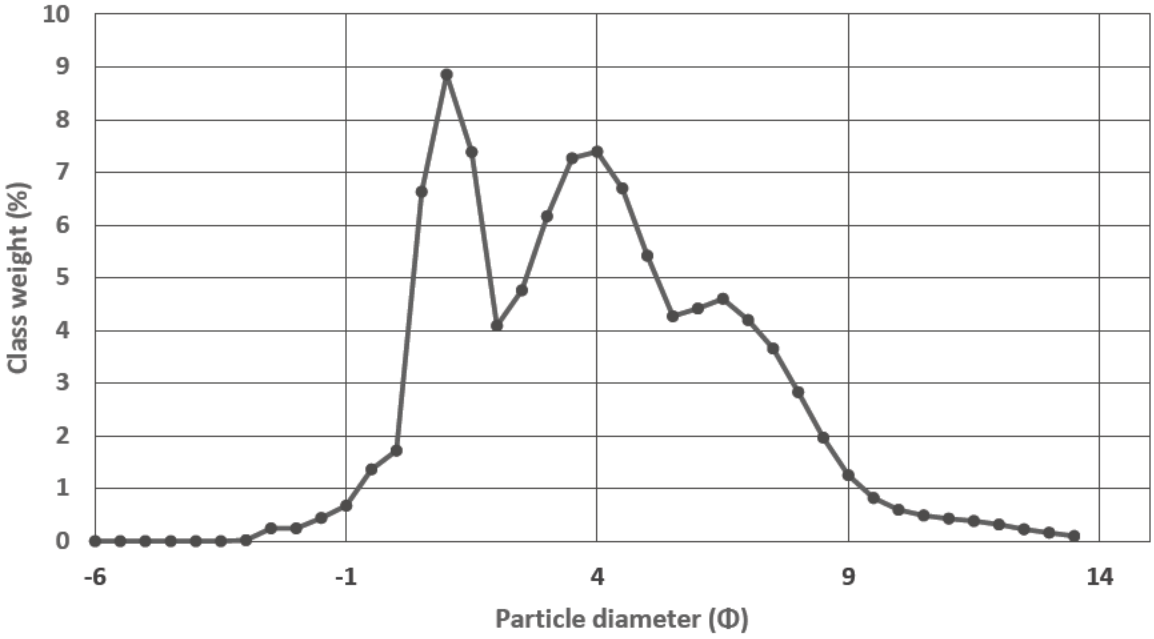

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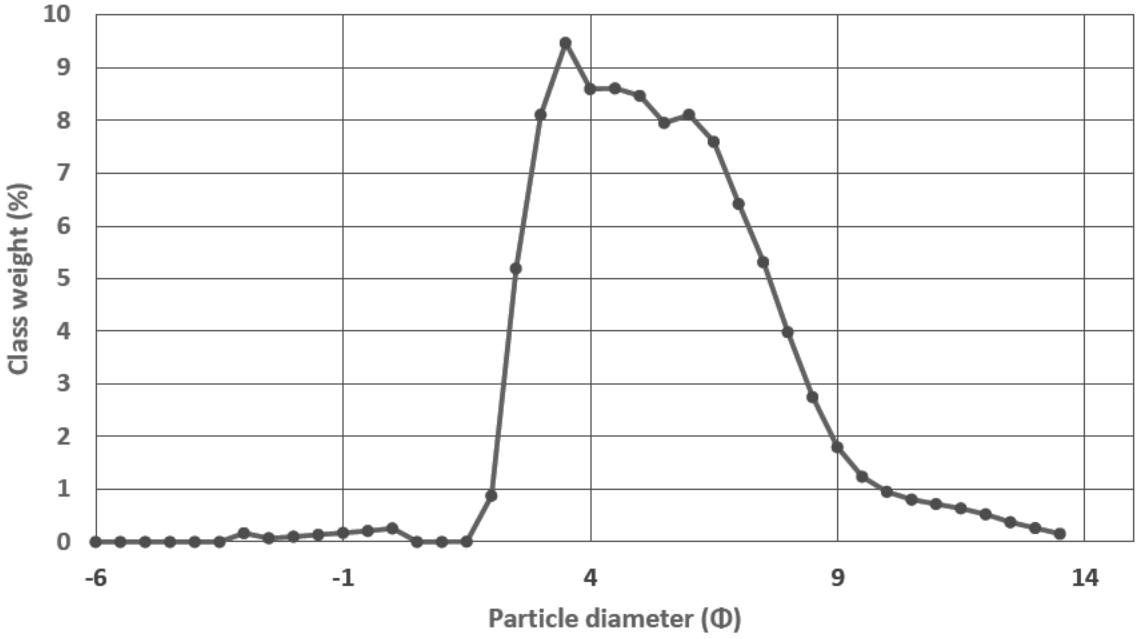

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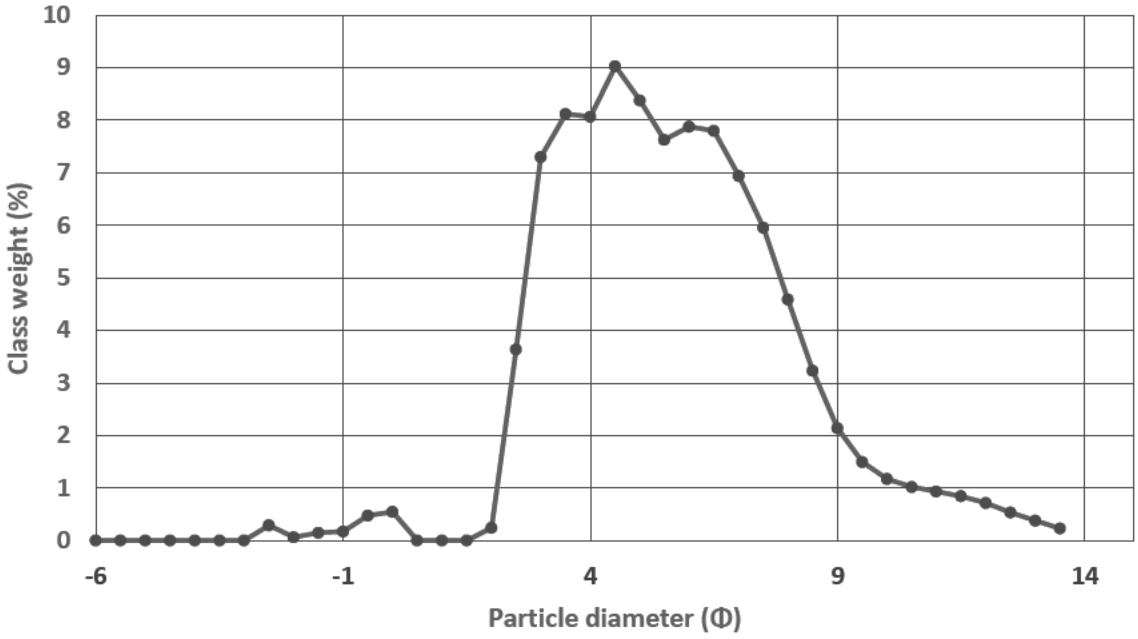

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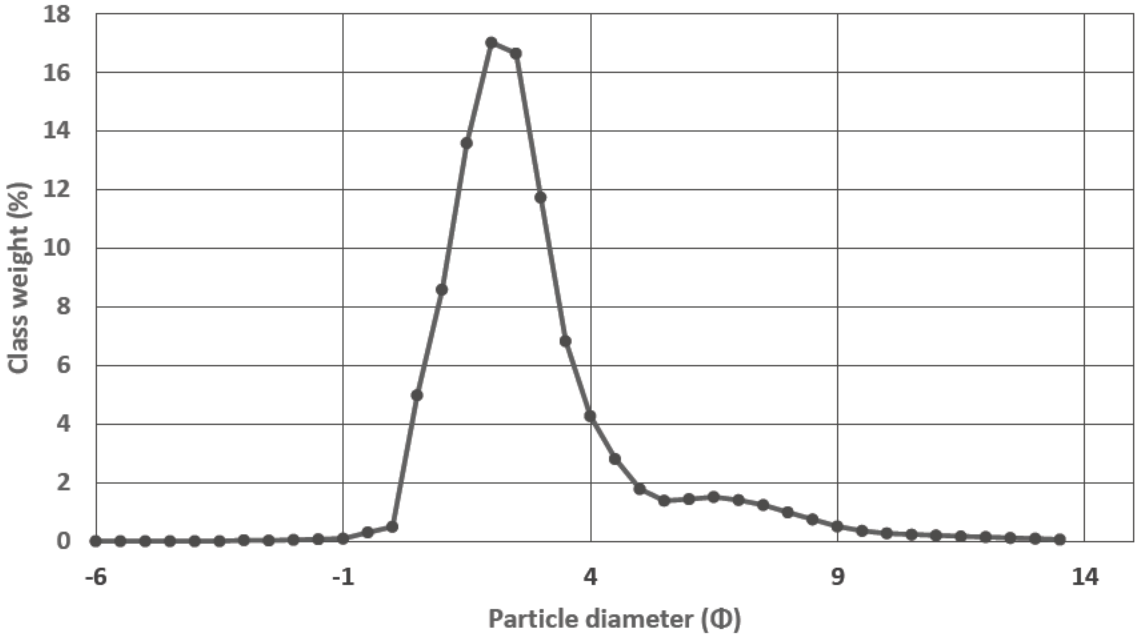

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