Ballintoy Harbour
Best Practicable Environmental Option (BPEO) Report

April 2024

CONTROL SHEET

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1 INTRODUCTION

1.1 Background

Doran Consulting, acting on behalf of the Causeway Coast & Glens Borough Council (CCGBC), have appointed EnviroCentre Ltd. to complete a Marine Licence application for dredging at Ballintoy Harbour on the north coast of County Antrim. As part of the application, a Best Practicable Environmental Option (BPEO) assessment requires to be undertaken. This has been informed using sediment quality results from sampling undertaken in August 2023.

This assessment has been undertaken in line with the *Northern Ireland Guidance on Marine Licensing: Dredging, Disposal and Aggregate Dredging, under Part 4 of the Marine and Coastal Access Act 2009* (DAERA, May 2016).

The approximate volume of material to be dredged at Ballintoy Harbour is 2,232 m^3, to a depth of -2.0m below Chart Datum (bCD). The proposed dredge area is shown on Doran Consulting Drawing No. 221053-DC-GA-C-003-C, included in Appendix A.

The purpose of the sediment sample analysis is to provide supporting information to the Marine and Fisheries Division of the Department of Agriculture, Environment and Rural Affairs (DAERA) during the licensing process on sediment quality within the proposed dredge area to assess the suitability for sea-based disposal, should that be identified as a viable option. The dredging and disposal activities are regulated by DAERA under the Marine and Coastal Access Act 2009 (MCAA) Part 4. The licensing conditions require representative samples to be collected and the nature (i.e. physical composition), quality and contamination status to be determined.

The results of the 2023 sediment analysis will then be used to determine whether or not sea disposal is acceptable and whether there any suitable alternatives to disposal can be established (i.e. beneficial re-use).

1.2 Scope of Report

The following report summarises the results of laboratory analysis and provides a summary of the sediment quality present within the proposed dredge areas.

The report will then use the available sediment analysis results to compare the best practicable environmental options (BPEO) for 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 Action Levels – AL1 vs AL2

Two action levels are currently used to assess the suitability of sea-based disposal of dredged sediment material in Northern Ireland: Existing Action Level 1 (EAL1) and Existing Action Level 2 (EAL2).

Sediment with contaminant concentrations below EAL1 is generally considered not to have contaminant levels of concern and unlikely to affect the licensing decision.

For samples with concentrations between EAL1 and EAL2, additional consideration and possibly further sampling and testing will be required before a licensing decision is made.

Material with concentrations above EAL2 is generally considered to be unsuitable for disposal to sea, with sediment from the specific area most likely to be subject to an alternative disposal route (e.g. landfill).

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.

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

2 SAMPLING LOCATIONS AND METHODOLOGY

2.1 Sample Locations & Collection

Sediment sampling was undertaken in August 2023 by Geotechnical Environmental Services Ltd.. Three sample stations were progressed within the proposed dredge area at Ballintoy Harbour (BN01 to BN03). Sample stations BN01 and BN02 were progressed as dual tube sediment cores and BN03 was sampled using a Van-Veen grab sampler only. A total of 12 sediment samples were submitted for analysis.

Factual information, including methodology and sediment logs are given in Geotechnical Environmental Services report no. 23103NI, included in Appendix B.

2.2 Analysis Requirements

The laboratory analysis undertaken to inform the marine licence application was as follows:

- Moisture Content
- Particle Density
- Total Organic Carbon (TOC)
- Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, Aluminium;
- Organotins - Tributyl Tin & Dibutyl Tin (TBT/DBT);
- Polycyclic Aromatic Hydrocarbons (PAH USEPA 16); and
- Polychlorinated Biphenyls (PCB ICES 7).

Samples were dispatched to Socotec's Marine Laboratory for analysis.

Additional laboratory analysis was undertaken by Eurofins Chemtest. These results are included in the GES factual report included in Appendix B, but are not given consideration in this assessment as they are considered surplus to requirements in the context of marine licensing.

3 CHEMICAL ANALYSIS RESULTS

Results of the August 2023 sediment analysis are summarised in the following section.

3.1 Chemical Analysis Assessment Criteria

All chemical analytical results were assessed against Existing Action Levels (EAL) criteria as adopted by the DAERA Marine & Fisheries Division.

3.2 Chemical Analysis Results

A summary of chemical analysis, screened against the EALs, is given Table 3-1.

Laboratory certificates are included in Appendix C.

Table 3-1: Exceedances of Existing Action Levels

Contaminant	No. of Exceedances (of 12 samples)	
	EAL 1	EAL 2
Arsenic	0	0
Cadmium	0	0
Chromium	0	0
Copper	0	0
Mercury	0	0
Nickel	0	0
Lead	0	0
Zinc	0	0
PCBs	0	0
TBT	0	0

All samples recorded concentrations below EAL1 (and therefore EAL2), where values are available for comparison.

4 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.

4.1 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 4-1 along with justification for screening out those options which have not been taken forward for further consideration.

Table 4-1: Initial Best Practicable Available Options

Location	Options	Screening Assessment	Carry forward?
Coastline	Leave in situ	Not an option due to the requirements to maintain depth to allow vessels to access the harbour.	No
	Infilling of an existing dry dock/harbour facility (re-use)	No current or proposed dock/harbour infilling projects are known within a reasonable distance of the dredge site. In addition, given the relatively small volume of sediment to be dredged (~2,232 m^3), it is most likely that this would not be a sufficient amount of material to complete any infilling project and would provide only part of the total amount of sediment that would be required. Further geotechnical and chemical testing would likely be required before it is permitted for use on any such development.	No
	Beach Nourishment	The client (CCGBC) has expressed an interest in the possibility of using the dredged material for a beach nourishment project on a beach south west of Ballintoy Harbour. According to sediment sample logs, the material to be dredged predominantly comprises sand, which is likely to be considered suitable for beach nourishment. The proposed beach is close to the harbour, therefore the mileage of any vehicle movements would be minimised. In addition, re-use of sediment in this way is considered preferable in the context of the waste hierarchy (Re-use > Recycle > Other Recovery > Disposal (last resort)). However, a beach nourishment project may require to be supported by additional environmental assessments to inform how the project could affect the environment as a result of disturbance to the intertidal area, changes to the sediment levels, the quality of the material and measures devised from the assessment outcomes to minimise impacts on the environment. This would ultimately be determined by DAERA.	Yes
Land	Landfill Disposal	This is possible but it is unlikely that this option will offer a long-term solution due to lack of space at landfills, with other waste types likely to be prioritised. 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 is 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. Landfilling is typically regarded as a last resort and given that there are no contaminant concentrations in excess of EAL2, it is likely that other options would be preferable.	No

	Land Incineration	The dredged material consists of non-combustible material (predominantly) with a low combustible component.	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 and may require a Waste Management authorisation from the Northern Ireland Environment Agency (NIEA). Would require special precautions during spreading in relation to the risk of odour and watercourses / aquifers. Disposal of sediments in this manner would potentially have a detrimental effect on existing terrestrial habitats.	No
	Recycling	Material to be dredged predominantly comprises sand, which would be ideal for recycling. However, EnviroCentre have not been made aware by the harbour authority of an established disposal and reuse route in County Antrim at present. In addition, given the relatively small volume of sediment, and the logistics involved, this unlikely to be a cost-effective option compared to the costs associated with establishing a processing plant.	No
Sea	Aquatic disposal direct to seabed.	Overall disposal costs associated with sea disposal are generally lower than land-based disposal, with low environmental risk due to appropriate sediment quality screening measures applied during the licensing process. Results of chemical analysis suggests that the sediment would be suitable for sea disposal. A receiving disposal site would be identified by DAERA but disposal sites “Ballycastle B” (~8.5km east) and “Portstewart Bay B” (~19.5 km north-west) were approved for previous dredge campaigns in the local area. All works are undertaken on marine-based plant and may be seen as preferable from a strategic/practical point of view. However, sea disposal is generally least preferable in the context of the waste hierarchy (Re-use > Recycle > Other Recovery > Disposal (last resort)).	Yes

4.2 Summary of Identified BPEO Options

Following review of the available options, two options were identified for further detailed BPEO assessment which are as follows:

- Beach Nourishment; and
- Sea Disposal.

A brief summary of the necessary works or methodology for each option being taken forward for detailed BPEO assessment is provided below.

4.2.1 Beach Nourishment

This method would likely involve the following material handling stages:

- Dredging;
- Temporary stockpiling of material on land;
- Transfer of sediment on to wagon/dumper;
- Placement of sediment on beach; and
- Distribution/profiling of sediment by excavator.

It is assumed that dredging will be undertaken using a long-arm excavator on land. The material will then be temporarily stockpiled before being transferred into a suitable wagon for transport to the beach site before it is then suitably distributed and profiled. CCGBC have identified a beach 25 metres south-west of Ballintoy Harbour as a potential receiving site. This is likely to require the temporary/partial closure of the harbour car park.

The proposed area for beach nourishment is shown on Doran Consulting Drawing No. 221053-DC-GA-C-003-C, included in Appendix A.

4.2.2 Sea Disposal

A specialist dredging vessel would undertake dredging works, storing dredged material on board before travelling to the designated disposal site.

Sea disposal is the traditionally accepted sediment disposal method when no other options exist and generally has a low cost and low environmental impact. Disposal to sea directly from the dredging vessel also means that there would be no double handling of material.

5 FURTHER CONSIDERATION OF REMAINING DISPOSAL OPTIONS

5.1 Detailed BPEO Assessment

Each of the identified options was assessed against the criteria detailed in Table 5-1 below.

Table 5-1: BPEO Detailed Assessment Criteria

Primary Criteria	Description and Attributes
Strategic	• Operational aspects, including handling, transport etc. • Availability of suitable sites/facilities • General Public/local acceptability • Legislative Implications • Summary of the outcome of consultation with third parties
Environmental	• Safety Implications • Public Health Implications • Pollution/ Contamination Implications • General Ecological Implications • Interference with other legitimate activities *e.g.* fishing • Amenity/Aesthetic Implications
Costs	• Operating costs *e.g*. labour, site operations, environmental monitoring • Capital *e.g*. Transport, equipment hire

5.1.1 BPEO Strategic Assessment

Table 5-2 below provides details of the strategic assessment for each option taken forward for the detailed BPEO assessment:

Table 5-2: BPEO Strategic Assessment

Criteria	Beach Nourishment	Sea Disposal
Operational Aspects (inc. handling and transport)	This method would involve road transport by HGV or dumper truck through the harbour car park. The distance between the harbour and the receiving beach is very short (~25 metres). There may be a need for additional environmental assessments would put pressure on the project timescales if they are required.	There would be no double handling of the dredged material. Transportation to the disposal site would be by dredger or barge(s) depending on methodology.
Availability of suitable sites/facilities	CCGBC have identified a beach adjacent to the harbour as a possible site, approximately 25m south-west of the proposed dredge area.	Marine disposal sites nearby have been designed to accommodate the quantities of material typically generated by dredging operations. The total dredge volume for this project is considered to be relatively low. The chemical analysis of the sediments from the proposed dredge site would indicate that the material is likely to be acceptable for disposal via this route.
General Public /Local acceptability	The beach nourishment project is likely to be generally welcomed by the public, as it will be seen as a way of bolstering and protecting the beach from erosion. However, the vehicle movements required may not be looked upon favourably, though these will be temporary. No residential properties are present in the immediate vicinity (bar a holiday rental cottage overlooking the receiving beach).	Traditionally accepted disposal route for dredged material with limited public impact.
Legislative Implications	This re-use route would require prior agreement with the Marine & Fisheries Division of DAERA. Will also require agreement of all other key stakeholders including the landowner and the relevant department of CCGBC.	This is an accepted disposal route as long as a Marine Licence is obtained.

5.1.2 BPEO Environmental Assessment

Table 5-3 details the environmental assessment for each option taken forward for detailed BPEO assessment.

Table 5-3: BPEO Environmental Assessment

Criteria	Beach Nourishment	Sea Disposal
Safety Implications	Vehicle movements between the harbour and beach nourishment site increase potential for accidents to occur. It is assumed that the working area will be closed to the public during works. Work would be undertaken in accordance with H&S legislation.	Low amount of material handling required as it is directly placed at the disposal site with no land-based works required. Work would be undertaken in accordance with H&S legislation.
Public Health	Limited potential for human contact assuming that the public are excluded from the active work area. Some potential for dust release during beach profiling works (only if the sediment dries out). Contaminant concentrations are noted be below EAL1.	Low potential for human contact during dredging and disposal operations. Once deposited at disposal site pathways for human contact greatly reduced.
Pollution/ contamination	Vehicles transporting material to the beach site would have implication on carbon footprint and potential for local impact on air quality. Potential also for temporary noise impacts and dust release during profiling works (if sediment dries out).	Pollutant concentrations in dredged material to be disposed are limited to acceptable levels through regulatory licensing processes. Transport by sea to disposal site would likely increase the project carbon footprint.
General Ecological Implications	Significant ecological implications are unlikely as a result of deposition of additional sand on the beach. According to the NIEA Natural Environment Web Viewer, there are no designated ecological protected areas in the vicinity of the dredge or re-use sites. It is noted that the general vicinity is part of the Causeway Coast Area of Outstanding Natural Beauty, which is unlikely to be negatively impacted by the placement of additional sand on the beach.	Only a licensed disposal site would be used for dredged material, as advised by DAERA.

Criteria	Beach Nourishment	Sea Disposal
Interference with other legitimate activities	Significant interference or disruption with other operations would not be anticipated. Recreational beach users would require to be excluded from the beach while works are undertaken. The adjacent car park will also require to be temporarily closed, either in full or in part.	Sediment would be disposed at a licenced disposal site, as advised by DAERA. It is likely that interference with other activities (such as commercial vessels or fishing) will have been considered as part of the licencing process. Therefore, the likelihood of significant disruption is considered to be low.
Amenity / Aesthetic Implications	Temporary visual impacts during sediment placement and beach profiling works but no long-term impacts. Some potential for odour emissions and noise impact although these impacts will be short term. A holiday rental cottage is adjacent to the beach. Amenity of beach likely to be improved once beach nourishment project is completed.	Some potential for temporary visual / odour / noise effects while marine plant is in the harbour. However, no significant additional visual/ odour/noise effects following disposal as this occurs at sea.

5.1.3 BPEO Cost Assessment

Costs were assessed for each of the options taken forward for detailed BPEO assessment. The BPEO assessment considered the typical costs associated with dredging, transportation to the disposal site, construction of treatment facilities (where applicable) and methods employed to protect the environment for each of the identified options. As costs are generally "commercially sensitive" the rates are based on best estimates and experience within industry, as opposed to formal quotations.

Table 5-4 provides details on the cost assessment for each option taken forward for detailed BPEO assessment:

Table 5-4: BPEO Estimated Cost Analysis

Activity	Beach Nourishment (£)	Sea Disposal to Ballycastle B (£)
Dredging	£2 – 4 /m^3	£2 – 4 /m^3
Transport by vessel to disposal site	-	£7 – 9 m^3
Transportation Cost to Beach	£1.50 – 2.50 / m^3	-
Beach profiling works	£1.50 – 2.50 / m^3	-
Total	**£5 – 9 / m^3**	**£9 – 13 / m^3**

Note that the above cost estimates do not take into account the cost of additional environmental assessments, or cost associated with gaining planning or licensing consents or potentially to purchase land (where applicable). They also do not take account of the influence volumes will have on costs (economies of scale).

5.1.4 BPEO Assessment Discussion

For each of the above assessment criteria, the options were qualitatively and semi-quantitatively (for costs) assessed against feasibility/preference and awarded a ranking ranging from 1 to 4; 1 being the most acceptable and 4 being the least acceptable option. The assignment of rank was on the basis of professional judgement.

The individual assessment criteria rankings for each option were added up to give an overall hierarchy of preference. Table 5-5 provides a summary of the BPEO assessment.

Table 5-5: BPEO Summary

Criteria	Beach Nourishment	Sea Disposal
Environment	1	2
Strategic	3	2
Costs	1	3
TOTAL SCORE	**5**	**7**

Deposition of the dredged material at a licensed marine disposal site has traditionally been deemed acceptable. A sea disposal site will be determined by DAERA if this disposal route is to be progressed. Licenced disposal sites are typically designed to allow easy access as well as being capable of accommodating the quantities of material typically generated by dredging activities. Material handling is limited to transportation thereby reducing the risk for pollution incidences occurring. Pollutant

concentrations within sediments are also limited to acceptable levels through regulatory requirements. This is option is considered to be more expensive than the beach nourishment option.

CCGBC have identified a beach adjacent to the harbour as a possible disposal location for the sediment as part of a beach nourishment project. Temporary closure of the harbour car park area would likely to be required to accommodate plant and sediment stockpiling. However, the use of locally dredged materials to supply a beach nourishment is preferable than importing sand from further afield. This route has been assessed as the preferred re-use method. However, it may be subject to additional environmental assessments, approval by local regulators and landowner agreements.

It is considered that beach nourishment is the preferred option for dredging disposal. The main reason for this is that use of dredged sediment on the beach is considered to be more in keeping with the spirit of ‘beneficial re-use’ of dredgings, as opposed to disposing sediment either at sea. The preference of beneficial re-use of dredged materials over disposal where possible is also stated in the OSPAR dredging guidelines. However, disposal at sea should be retained as a secondary potential option should the beach nourishment option not materialise for whatever reason.

5.2 Conclusion

The Best Practicable Environmental Option for disposal of the Ballintoy Harbour dredged material has therefore been assessed as re-use of sediment to facilitate a beach nourishment project at the adjacent beach. However, disposal at sea should be retained as a secondary potential option should the beach nourishment option not materialise.

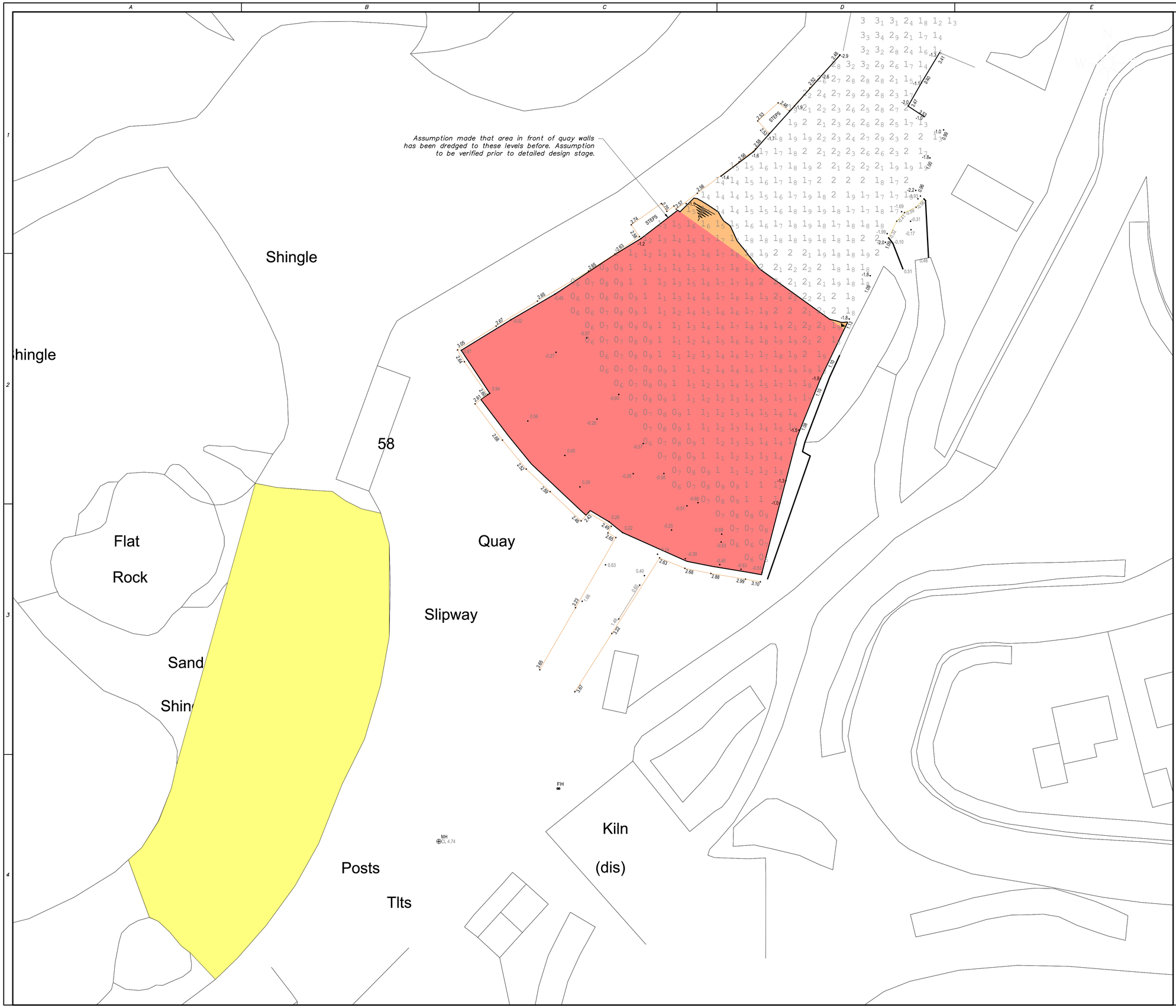
REFERENCES

Department of Agriculture, Environment and Rural Affairs (DAERA) *Northern Ireland Guidance on Marine Licensing: Dredging, Disposal and Aggregate Dredging, under Part 4 of the Marine and Coastal Access Act 2009*, May 2016)

Geotechnical Environmental Services Ltd., *Portrush, Ballycastle & Ballintoy Harbours Dredging Programme – Sediment Sampling and Laboratory Analyses – Factual Report*, Report No. 23103NI, August 2023.

APPENDICES

A FIGURES



Rev.	Date	By	Check	Details	Appr.
A	27/10/22	LG	GGN	Dredge layout amended.	CD
B	02/11/22	GNC	GGN	Dredge layout amended.	CD
C	11/11/22	GNC	GGN	Dredge layout amended.	CD

General:

1. All levels are relative to Ordnance Datum.
2. Mapping and Levels based on SixWest Ltd CP221013 Bathymetric and Topographical Survey which was completed on 13/10/2022.

Legend:

- Proposed Dredge Level=−2.0mOD
- Proposed Dredge at 1:5
- Beach Replenishment Area

Status	Date:	By:	Check:	Drawing Status Details:	Appr:

PRELIMINARY DRAWING

Project Title:

Portrush, Ballycastle & Ballintoy Dredging 2022

Drawing Title:

Ballintoy
Dredging General Arrangement

Client/Architect:	Causeway Coast & Glens Borough Council		
Drawn by:	LG	Date:	Oct 2022
Checked by:	DWC	Scales:	1:250
Approved by:	CD	Sheet Size:	A1

Drawing Number:

Project Number:	Orig.	Zone.	Level.	Type.	Disc.	Number.	Revision:
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B SEDIMENT SAMPLING FACTUAL REPORT, AUGUST 2023

GEOTECHNICAL
ENVIRONMENTAL SERVICES
LIMITED

PORTRUSH, BALLYCASTLE & BALLINTOY HARBOURS DREDGING PROGRAMME
COUNTY ANTRIM

SEDIMENT SAMPLING AND LABORATORY ANALYSES

FACTUAL REPORT

REPORT No. 23103NI

AUGUST 2023

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CLIENT: CAUSEWAY COAST AND GLENS BOROUGH COUNCIL

ENGINEER: DORAN CONSULTING

DOCUMENT CONTROL SHEET

CLIENT	CAUSEWAY COAST AND GLENS BOROUGH COUNCIL
PROJECT TITLE	PORTRUSH, BALLYCASTLE & BALLINTOY HARBOURS COUNTY ANTRIM SEDIMENT SAMPLING AND LABORATORY ANALYSES
CONSULTING ENGINEER	DORAN CONSULTING
REPORT No.	23103NI

REV.	STATUS	AUTHOR(S)	REVIEWED & APPROVED BY	ISSUE DATE
0	FINAL	[redacted] MSc, C. Eng, C. Geol, FGS, MIMMM	MSc, C. Eng, C. Geol, FGS, MIMMM	31/08/2023

CONTENTS

1.0 INTRODUCTION

On the instruction of Doran Consulting (the Engineer), acting on behalf of Causeway Coast and Glens Borough Council (the Client), Geotechnical Environmental Services Limited (GES) was appointed to undertake sediment sampling and associated laboratory analyses in association with the Portrush, Ballycastle and Ballintoy Harbours dredging programme, County Antrim.

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

The investigation comprised the following.

- 9 No. "grab" samples of the sea bed.
- 8 No. dual tube continuous sediment cores from sea bed level to a maximum of 3.0m 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 and rock descriptions were undertaken in accordance with British Standard BS5930:2015, Code of Practice for Site Investigation which incorporates guidance presented in BS EN ISO 14688-1:2002+A1:2013, BS EN ISO 14688-2:2004+A1:2013 and BS EN ISO 14689:2018.

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 sediment profile within the harbours.
- Tier 1 Physical Properties of the sea bed sediment in accordance with the OSPAR Guidelines for the Management of Dredged Material, Reference No. 2009/4, Technical Annex 1.
- Tier 2 Chemical Properties of the sea bed sediment (potential presence and concentrations of tributyl and dibutyl tin (TBT and DBT)), in accordance with the OSPAR Guidelines for the Management of Dredged Material, Reference No. 2009/4, Technical Annex 1.
- Chemical properties of the sea bed sediment in relation to waste acceptance criteria (WAC) and disposal to landfill.

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 intrusive components of the site works were undertaken during the period 28th July-4th August 2023 under the supervision of a geo-environmental engineer from GES.

An exploratory hole location plan for each harbour is included in Appendix 1.

3.2 Grab and Dual Tube Sampling

3 No. locations were specified at each harbour.

Portrush – PR01-PR03.

Ballycastle – BC01-BC03.

Ballintoy – BN01-BN03 (grab sample only specified at location BN03).

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 1.2m long pvc liners of 38mm internal diameter (ID).

The sampling process was as follows:

Sampler tooling of 1.2m 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 1.2m below sea bed level, or refusal if this occurred at shallower penetration depth, pulley ropes were attached to the drill rods to extract the sampler using a winch located on the work boat.

To sample the sediment present between 1.2m and 2.4m depth a closed piston method was used, i.e. the sampler is equipped with a stop pin and piston rod system to prevent collapsed soil entering the sampler as it is being advanced to the start of the next sampling interval. On reaching the required depth the stop pin and piston rod are removed to release the closed piston assembly. The sampler is then driven to collect a soil sample over the next 1.2m sampling interval or to refusal if this occurred at shallower penetration depth.

Example photographs of the Van Venn grab and Macro Core sediment sampling processes are included in Appendix 2.

Exploratory hole logs for each sampling location at Portrush, Ballycastle and Ballintoy are included in Appendices 3, 4 and 5 respectively.

3.3 Sub-Sampling

Sub-samples of the grab samples and continuous sediment cores were obtained at sea bed level and at 0.5m intervals to a maximum depth of 3.0m below sea bed level.

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

- 500g capacity foil lined and hexane washed aluminium pots.
- 500g capacity acid washed plastic pots.

The samples were returned to the GES offices each evening for freezer storage.

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. 2009/4, Technical Annex 1.

The results obtained for all samples from each sampling location at Portrush, Ballycastle and Ballintoy are included in Appendices 3, 4 and 5 respectively.

4.2 Waste Acceptance Criteria Laboratory Testing

Following completion of the sediment sampling, a set of samples was dispatched to the laboratory of Chemtest Limited, Newmarket, England.

The samples were tested for WM3 and WAC suites to assess the potential for disposal of the dredged sediment to landfill.

The results obtained for selected samples from each sampling location at Portrush, Ballycastle and Ballintoy are included in Appendices 3, 4 and 5 respectively.

REFERENCES

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

2. British Standard BS5930:2015, 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. BS EN ISO 14689-1, 2018. Geotechnical Investigation and Testing – Identification and classification of rock. Part 1: Identification and description. British Standards Institution, London.

GEOTECHNICAL
ENVIRONMENTAL SERVICES
LIMITED

APPENDIX 1

SITE AND EXPLORATORY HOLE LOCATION PLANS

Rev.	Date	By	Check	Details	Appr.
–	–	–	–	–	–

General:

1. All levels are relative to Chart Datum Portrush (mCD) which is 1.24m below Ordnance Datum (mOD).
2. Mapping and levels based on Six West Ltd CP220711 Bathymetric Survey which was completed on 11/07/2022.

PR01 Sample Depths:

Sample Location	CD Depth (m)
Surface	−2.216
−0.5m	−2.716
−1m	−3.216
−1.5m	−3.716
−1.75m	−3.966

PR02 Sample Depths:

Sample Location	CD Depth (m)
Surface	−0.962
−0.5m	−1.462
−1m	−1.962
−1.5m	−2.462
−2.0m	−2.962
−2.5m	−3.462
−3.0m	−3.962

PR03 Sample Depths:

Sample Location	CD Depth (m)
Surface	−2.191
−0.5m	−2.691
−1m	−3.191
−1.5m	−3.691
−1.8m	−3.991

Status	Date:	By:	Check:	Drawing Status Details:	Appr:

PRELIMINARY DRAWING

Project Title:

Portrush, Ballycastle & Ballintoy Dredging 2022

Drawing Title:

Portrush
Sediment Sample Locations

POINT DATA		
POINT NUMBER	EASTING	NORTHING
PR01	285392.437	440600.603
PR02	285422.174	440632.117
PR03	285415.004	440684.381

Height ranges

2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10

Client/Architect:	Causeway Coast & Glens Borough Council						
Drawn by:	GNC			Date:	Oct 2022		
Checked by:	DWC			Scales:	1:500		
Approved by:	CD			Sheet Size:	A1		
Drawing Number:							
Project Number:	Orig.	Zone.	Level.	Type.	Disc.	Number.	Revision:
221053	DC	–	–	SI	C	003	–

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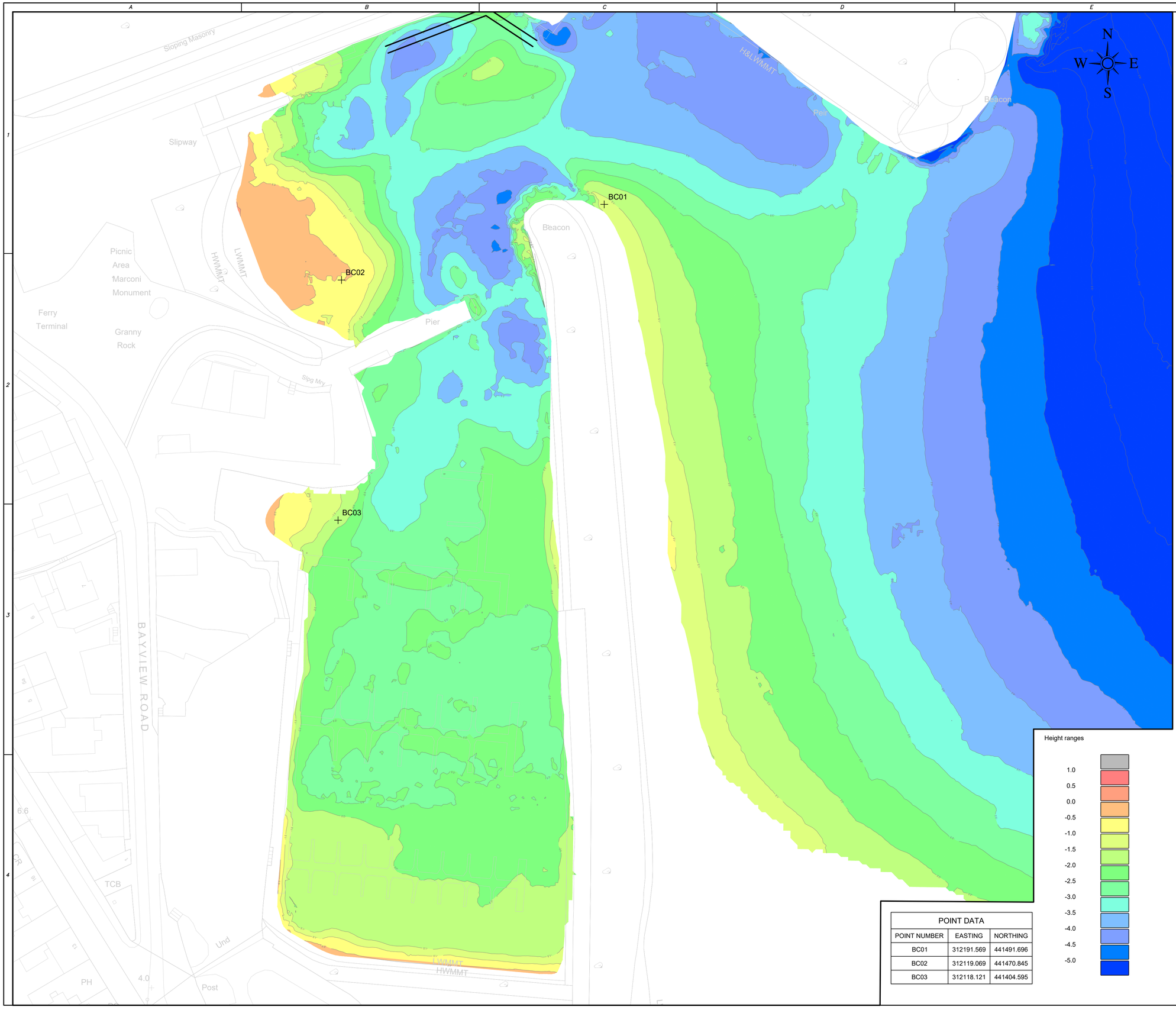
W www.doran.co.uk



Rev.	Date	By	Check	Details	Appr.
A	–	–	–	–	–

General:

1. All levels are relative to Chart Datum Ballycastle (mCD) which is 0.82m below Ordnance Datum (mOD).
2. Mapping and levels based on Six West Ltd 220120 Bathymetric Survey which was completed on the 20/01/2022.

BC01 Sample Depths:

Sample Location	CD Depth (m)
Surface	-1.797
-0.5m	-2.297
-1m	-2.797
-1.5m	-3.297
-1.8m	-3.597

BC02 Sample Depths:

Sample Location	CD Depth (m)
Surface	-0.511
-0.5m	-1.011
-1m	-1.511
-1.5m	-2.011
-2.0m	-2.511
-2.5m	-3.011
-3.0m	-3.511

BC03 Sample Depths:

Sample Location	CD Depth (m)
Surface	-1.384
-0.5m	-1.884
-1m	-2.384
-1.5m	-2.884
-2.0m	-3.384
-2.5m	-3.884
-3.0m	-4.384
-3.5m	-4.884

Height ranges

1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0

POINT DATA		
POINT NUMBER	EASTING	NORTHING
BC01	312191.569	441491.696
BC02	312119.069	441470.845
BC03	312118.121	441404.595

Status	Date:	By:	Check:	Drawing Status Details:	Appr:

PRELIMINARY DRAWING

Project Title:

Portrush, Ballycastle & Ballintoy Dredging 2022

Drawing Title:

Ballycastle
Sediment Sample Locations

Client/Architect:	Causeway Coast & Glens Borough Council		
Drawn by:	LG	Date:	Oct 2022
Checked by:	DWC	Scales:	1:500
Approved by:	CD	Sheet Size:	A1

Drawing Number:

Project Number:	Orig.	Zone.	Level.	Type.	Disc.	Number.	Revision:
221053	DC	–	–	SI	C	001	–

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W www.doran.co.uk

Rev.	Date	By	Check	Details	Appr.
–	–	–	–		–

Assumption made that area in front of quay walls has been dredged to these levels before. Assumption to be verified prior to detailed design stage.

BN01

BN02

BN03

STEPS

STEPS

Shingle

hingle

58

Flat

Rock

Quay

Slipway

Sand & Shingle

Kiln

(dis)

Posts

Tlts

FH

MH

General:

1. All levels are relative to Ordnance Datum.
2. Mapping and Levels based on SixWest Ltd 221013 Bathymetric and Topographical Survey which was completed on 13/10/2022.

BN01 Sample Depths:

Sample Location	OD Depth (m)	CD Depth (m)
Surface	0.716	1.956
–0.5m	0.216	1.456
–1m	–0.284	0.956
–1.5m	–0.784	0.456
–2.0m	–1.284	–0,044
–2.5m	–1.784	–0.544
–2.75m	–2.034	–0.794

BN02 Sample Depths:

Sample Location	OD Depth (m)	CD Depth (m)
Surface	–0.778	0.462
–0.5m	–1.278	–0.038
–1.0m	–1.778	–0.538
–1.25m	–2.028	–0.788

BN03 Sample Depths:

Sample Location	OD Depth (m)	CD Depth (m)
Surface	–1.904	–0.664

POINT DATA		
POINT NUMBER	EASTING	NORTHING
BN01	303764.233	445365.773
BN02	303783.224	445367.655
BN03	303811.780	445371.262

Height ranges

1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0

Status	Date:	By:	Check:	Drawing Status Details:	Appr:

PRELIMINARY DRAWING

Project Title:

Portrush, Ballycastle & Ballintoy Dredging 2022

Drawing Title:

Ballintoy
Sediment Sample Location

Client/Architect:	Causeway Coast & Glens Borough Council		
Drawn by:	LG	Date:	Oct 2022
Checked by:	DWC	Scales:	1:250
Approved by:	CD	Sheet Size:	A1

Drawing Number:

Project Number:	Orig.	Zone.	Level.	Type.	Disc.	Number.	Revision:
221053	DC	–	–	SI	C	002	–

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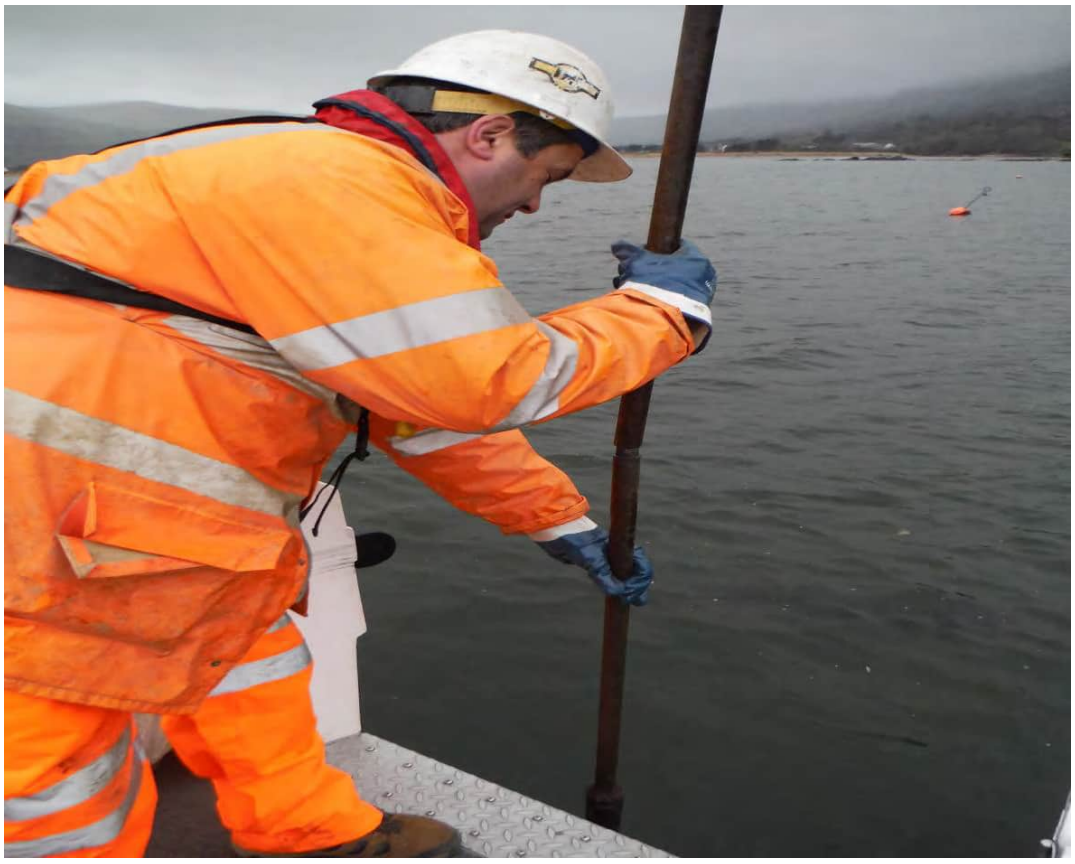
Van Veen Sediment Sampler Ready to be Lowered to Sea Bed

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

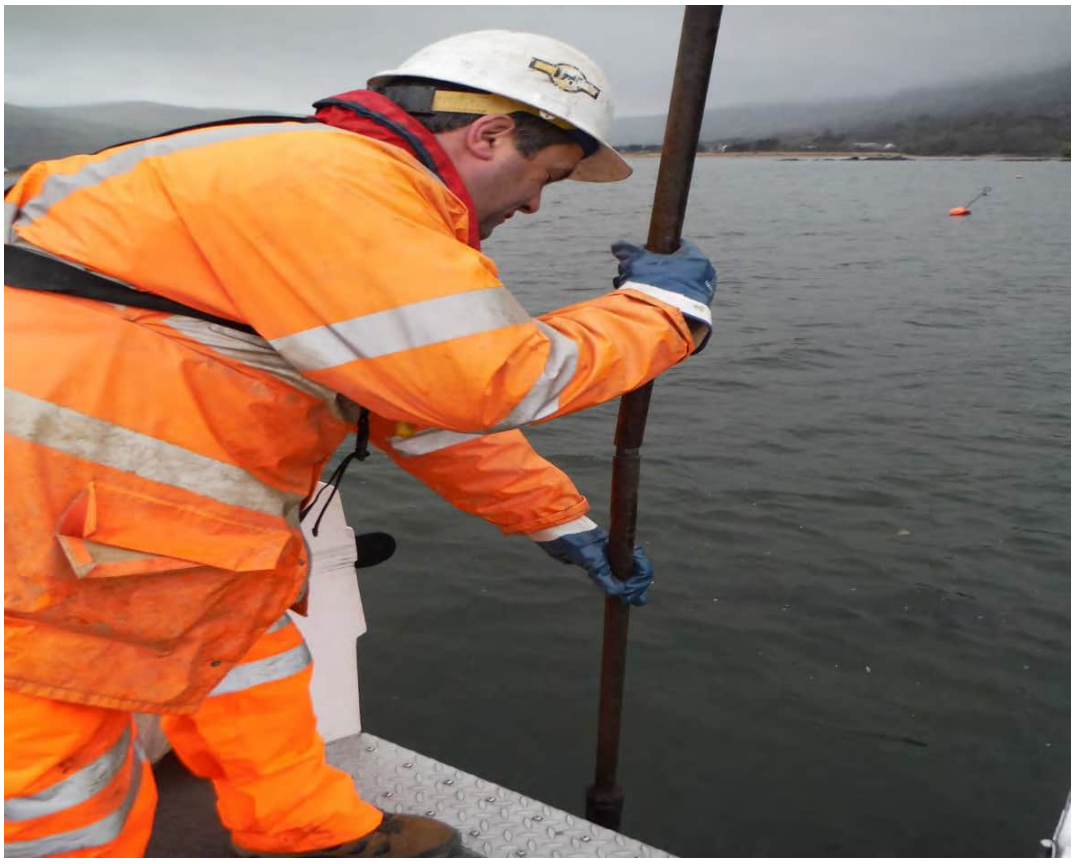
Van Veen Sediment Sampler Ready to be Lowered to Sea Bed

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

GEOTECHNICAL
ENVIRONMENTAL SERVICES
LIMITED

APPENDIX 3

PORTRUSH HARBOUR
BOREHOLE LOGS AND SEDIMENT SAMPLE PHOTOGRAPHS;
LABORATORY TEST RESULTS

GEOTECHNICAL
ENVIRONMENTAL SERVICES
LIMITED

Site	Borehole Number
Portrush, Ballycastle and Ballintoy Harbours Dredging Programme	PR01

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler and Geoprobe Macro Core Sampler.	54mm cased to 2.00m	-3.75	Causeway Coast and Glens Borough Council	23103NI
	Location (Handheld GPS) 285393 E 440602 N	**Dates** 28/07/2023	**Engineer** Doran Consulting	**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 0.00-0.50	ES1 ES2						Light greyish brown fine to medium SAND.		
0.50-1.00	ES3								
1.00-1.50	ES4					(2.00)			
1.50-2.00	ES5								
				Borehole terminated at specified depth. 28/07/2023:	-5.75	2.00	Complete at 2.00m		

Remarks

Scale (approx)	Logged By
1:20	RB

Figure No. 23103NI.PR01

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Portrush, Ballycastle and Ballintoy Harbours Dredging Programme	PR02

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler and Geoprobe Macro Core Sampler.	54mm cased to 2.20m	-2.14	Causeway Coast and Glens Borough Council	23103NI
	Location (Handheld GPS) 285420 E 440633 N	**Dates** 28/07/2023	**Engineer** Doran Consulting	**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	ES1						Light greyish brown finr to medium SAND.		
0.00-0.50	ES2								
0.50-1.00	ES3								
1.00-1.50	ES4					(2.20)			
1.50-2.00	ES5								
				Unable to progress sampler below 2.2m depth. 28/07/2023:	-4.34	2.20	Complete at 2.20m		

Remarks

Scale (approx)	Logged By
1:20	RB

Figure No. 23103NI.PR02

GEOTECHNICAL
ENVIRONMENTAL SERVICES
LIMITED

Site	Borehole Number
Portrush, Ballycastle and Ballintoy Harbours Dredging Programme	PR03

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler and Geoprobe Macro Core Sampler.	54mm cased to 2.00m	-3.57	Causeway Coast and Glens Borough Council	23103NI
	Location (Handheld GPS) 285415 E 440683 N	**Dates** 28/07/2023	**Engineer** Doran Consulting	**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	ES1						Light greyish brown finr to medium SAND.		
0.00-0.50	ES2								
							Dark greyish brown in colour 0.35m-0.5m depth.		
0.50-1.00	ES3								
1.00-1.50	ES4					(2.00)			
1.50-2.00	ES5								
				Borehole terminated at specified depth. 28/07/2023:	-5.57	2.00	Complete at 2.00m		

Remarks

Scale (approx)	Logged By
1:20	RB

Figure No. 23103NI.PR03

PR01 Van Veen Sediment Sampler Recovery

PR01 0m-2.0m Macro Core Sampler Recovery

PR02 0m-2.2m Macro Core Sampler Recovery

PR03 Van Veen Sediment Sampler Recovery

PR03 0m-2.0m Macro Core Sampler Recovery

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 MAR01990

Issue Version: 1

Customer: Geotechnical Environmental Services Ltd, The Old Mill, 22A Kilmoyle Road, Ballybogey, Country Antrim, BT53 6NR

Customer Reference: County Antrim Harbours Marine Sediment Analysis

Date Sampled: 28-Jul-23

Date Samples Received: 03-Aug-23

Test Report Date: 24-Aug-23

Condition of samples: Ambient Satisfactory

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

[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

Test Report ID MAR01990
Issue Version 1
Customer Reference County Antrim Harbours Marine Sediment Analysis

		Units	%	%	Mg/m3	% M/M
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	WSLM59*
		Limit of Detection	0.2	0.2	N/A	0.02
		Accreditation	UKAS	UKAS	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Particle Density**	**TOC**
PR01 - 0.0m	MAR01990.001	Sediment	20.2	79.8	2.67	0.19
PR01 - 0.0-0.5m	MAR01990.002	Sediment	23.4	76.6	2.68	0.20
PR01 - 0.5-1.0m	MAR01990.003	Sediment	24.5	75.5	2.69	0.19
PR01 - 1.0-1.5m	MAR01990.004	Sediment	25.4	74.6	2.67	0.20
PR01 - 1.5-2.0m	MAR01990.005	Sediment	23.6	76.4	2.68	0.18
PR02 - 0.0m	MAR01990.006	Sediment	25.0	75.0	2.74	0.21
PR02 - 0.0-0.5m	MAR01990.007	Sediment	17.2	82.8	2.66	0.18
PR02 - 0.5-1.0m	MAR01990.008	Sediment	22.2	77.8	2.69	0.94
PR02 - 1.0-1.5m	MAR01990.009	Sediment	26.7	73.3	2.68	0.25
PR02 - 1.5-2.0m	MAR01990.010	Sediment	26.1	73.9	2.66	0.23
PR03 - 0.0m	MAR01990.011	Sediment	21.8	78.2	2.70	0.23
PR03 - 0.0-0.5m	MAR01990.012	Sediment	23.6	76.4	2.67	0.24
PR03 - 0.5-1.0m	MAR01990.013	Sediment	22.5	77.5	2.61	0.24
PR03 - 1.0-1.5m	MAR01990.014	Sediment	22.2	77.8	2.67	0.31
PR03 - 1.5-2.0m	MAR01990.015	Sediment	20.0	80.0	2.66	0.32
		Reference Material (% Recovery)	N/A	N/A	N/A	114
		QC Blank	N/A	N/A	N/A	<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

Test Report ID MAR01990
Issue Version 1
Customer Reference County Antrim Harbours Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	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
		Accreditation	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**
PR01 - 0.0m	MAR01990.001	Sediment	6.0	<0.03	28.6	7.6	5.2	<0.01	15.0
PR01 - 0.0-0.5m	MAR01990.002	Sediment	6.2	<0.03	34.8	3.8	5.6	<0.01	14.7
PR01 - 0.5-1.0m	MAR01990.003	Sediment	4.9	<0.03	22.7	2.6	4.6	<0.01	10.6
PR01 - 1.0-1.5m	MAR01990.004	Sediment	5.3	<0.03	23.1	3.1	4.7	<0.01	11.3
PR01 - 1.5-2.0m	MAR01990.005	Sediment	6.3	<0.03	24.1	3.4	5.5	<0.01	11.1
PR02 - 0.0m	MAR01990.006	Sediment	10.9	0.04	49.5	7.3	10.3	<0.01	24.2
PR02 - 0.0-0.5m	MAR01990.007	Sediment	6.1	0.03	20.6	3.2	6.8	<0.01	9.6
PR02 - 0.5-1.0m	MAR01990.008	Sediment	6.3	0.03	22.2	3.5	6.2	<0.01	10.1
PR02 - 1.0-1.5m	MAR01990.009	Sediment	5.8	<0.03	18.9	3.5	5.8	<0.01	9.4
PR02 - 1.5-2.0m	MAR01990.010	Sediment	5.0	<0.03	19.6	2.9	4.8	<0.01	9.8
PR03 - 0.0m	MAR01990.011	Sediment	5.6	0.03	23.7	4.3	5.7	<0.01	10.7
PR03 - 0.0-0.5m	MAR01990.012	Sediment	6.1	<0.03	21.8	4.5	6.3	<0.01	11.9
PR03 - 0.5-1.0m	MAR01990.013	Sediment	5.6	<0.03	20.0	3.7	5.5	<0.01	10.5
PR03 - 1.0-1.5m	MAR01990.014	Sediment	5.2	0.03	26.5	6.0	7.2	<0.01	11.9
PR03 - 1.5-2.0m	MAR01990.015	Sediment	4.8	0.03	24.1	4.3	6.5	<0.01	10.5
Certified Reference Material 2702 (% Recovery)			95	85	94	92	95	95	111
QC Blank			<0.14	<0.03	<1	<0.7	<0.6	<0.01	<0.4

* 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 MAR01990
Issue Version 1
Customer Reference County Antrim Harbours Marine Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ICPMS-MWSED*	ICPOES-MWSED*
		Limit of Detection	3.5	1750
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Zinc as Zn**	**Aluminium as Al**
PR01 - 0.0m	MAR01990.001	Sediment	15.2	17900
PR01 - 0.0-0.5m	MAR01990.002	Sediment	14.9	17300
PR01 - 0.5-1.0m	MAR01990.003	Sediment	11.5	18500
PR01 - 1.0-1.5m	MAR01990.004	Sediment	11.8	17300
PR01 - 1.5-2.0m	MAR01990.005	Sediment	13.0	16600
PR02 - 0.0m	MAR01990.006	Sediment	26.8	17600
PR02 - 0.0-0.5m	MAR01990.007	Sediment	18.5	19600
PR02 - 0.5-1.0m	MAR01990.008	Sediment	19.1	16600
PR02 - 1.0-1.5m	MAR01990.009	Sediment	13.2	18800
PR02 - 1.5-2.0m	MAR01990.010	Sediment	11.8	20000
PR03 - 0.0m	MAR01990.011	Sediment	15.6	19000
PR03 - 0.0-0.5m	MAR01990.012	Sediment	20.0	19500
PR03 - 0.5-1.0m	MAR01990.013	Sediment	17.6	17500
PR03 - 1.0-1.5m	MAR01990.014	Sediment	23.1	18800
PR03 - 1.5-2.0m	MAR01990.015	Sediment	20.1	18300
		Certified Reference Material 2702 (% Recovery)	93	97
		QC Blank	<3.5	<1750

* 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	MAR01990
Issue Version	1
Customer Reference	County Antrim Harbours Marine Sediment Analysis

		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)**
PR01 - 0.0m	MAR01990.001	Sediment	<1	<1
PR01 - 0.0-0.5m	MAR01990.002	Sediment	<1	<1
PR01 - 0.5-1.0m	MAR01990.003	Sediment	<1	<1
PR01 - 1.0-1.5m	MAR01990.004	Sediment	<1	<1
PR01 - 1.5-2.0m	MAR01990.005	Sediment	<1	<1
PR02 - 0.0m	MAR01990.006	Sediment	<1	<1
PR02 - 0.0-0.5m	MAR01990.007	Sediment	<1	<1
PR02 - 0.5-1.0m	MAR01990.008	Sediment	<1	<1
PR02 - 1.0-1.5m	MAR01990.009	Sediment	<1	<1
PR02 - 1.5-2.0m	MAR01990.010	Sediment	<1	<1
PR03 - 0.0m	MAR01990.011	Sediment	<1	<1
PR03 - 0.0-0.5m	MAR01990.012	Sediment	<1	<1
PR03 - 0.5-1.0m	MAR01990.013	Sediment	<1	<1
PR03 - 1.0-1.5m	MAR01990.014	Sediment	<1	<1
PR03 - 1.5-2.0m	MAR01990.015	Sediment	<1	<1
Certified Reference Material BCR-646 (% Recovery)			60	62
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	MAR01990
Issue Version	1
Customer Reference	County Antrim Harbours Marine Sediment Analysis

		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)**
PR03 - 0.0m	MAR01990.011	Sediment	<1	<1
PR03 - 0.0-0.5m	MAR01990.012	Sediment	<1	<1
PR03 - 0.5-1.0m	MAR01990.013	Sediment	<1	<1
PR03 - 1.0-1.5m	MAR01990.014	Sediment	<1	<1
PR03 - 1.5-2.0m	MAR01990.015	Sediment	<1	<1
Certified Reference Material BCR-646 (% Recovery)			88	76
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 MAR01990
Issue Version 1
Customer Reference County Antrim Harbours Marine Sediment Analysis

		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**
PR01 - 0.0m	MAR01990.001	Sediment	<1	<1	<1	<1	<1	<1
PR01 - 0.0-0.5m	MAR01990.002	Sediment	<1	<1	<1	<1	<1	<1
PR01 - 0.5-1.0m	MAR01990.003	Sediment	<1	<1	<1	<1	<1	<1
PR01 - 1.0-1.5m	MAR01990.004	Sediment	<1	<1	<1	<1	<1	<1
PR01 - 1.5-2.0m	MAR01990.005	Sediment	<1	<1	<1	<1	<1	<1
PR02 - 0.0m	MAR01990.006	Sediment	<1	<1	<1	<1	<1	<1
PR02 - 0.0-0.5m	MAR01990.007	Sediment	<1	<1	<1	<1	<1	<1
Certified Reference Material NIST 1941b (% Recovery)			72	119	68	70	69	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 MAR01990
Issue Version 1
Customer Reference County Antrim Harbours Marine Sediment Analysis

		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**
PR01 - 0.0m	MAR01990.001	Sediment	<1	<1	<1	<1	<1	<1
PR01 - 0.0-0.5m	MAR01990.002	Sediment	<1	<1	<1	<1	<1	<1
PR01 - 0.5-1.0m	MAR01990.003	Sediment	<1	<1	<1	<1	<1	<1
PR01 - 1.0-1.5m	MAR01990.004	Sediment	<1	<1	<1	<1	<1	<1
PR01 - 1.5-2.0m	MAR01990.005	Sediment	<1	<1	<1	<1	<1	<1
PR02 - 0.0m	MAR01990.006	Sediment	<1	<1	<1	<1	<1	<1
PR02 - 0.0-0.5m	MAR01990.007	Sediment	<1	<1	<1	<1	<1	<1
Certified Reference Material NIST 1941b (% Recovery)			63	84	93	121	87	49
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	MAR01990
Issue Version	1
Customer Reference	County Antrim Harbours Marine Sediment Analysis

		Units	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
		Limit of Detection	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**
PR01 - 0.0m	MAR01990.001	Sediment	<1	<1	<1	<1
PR01 - 0.0-0.5m	MAR01990.002	Sediment	<1	<1	<1	<1
PR01 - 0.5-1.0m	MAR01990.003	Sediment	<1	<1	<1	<1
PR01 - 1.0-1.5m	MAR01990.004	Sediment	<1	<1	<1	<1
PR01 - 1.5-2.0m	MAR01990.005	Sediment	<1	<1	<1	<1
PR02 - 0.0m	MAR01990.006	Sediment	<1	<1	<1	<1
PR02 - 0.0-0.5m	MAR01990.007	Sediment	<1	<1	<1	<1
Certified Reference Material NIST 1941b (% Recovery)			84	66	83	76
QC Blank			<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 MAR01990
Issue Version 1
Customer Reference County Antrim Harbours Marine Sediment Analysis

		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**
PR02 - 0.5-1.0m	MAR01990.008	Sediment	<1	<1	<1	<1	<1	<1
PR02 - 1.0-1.5m	MAR01990.009	Sediment	<1	<1	<1	<1	1.01	1.05
PR02 - 1.5-2.0m	MAR01990.010	Sediment	<1	<1	<1	<1	<1	<1
PR03 - 0.0m	MAR01990.011	Sediment	<1	<1	<1	1.80	2.32	2.83
PR03 - 0.0-0.5m	MAR01990.012	Sediment	<1	<1	<1	3.03	2.72	3.00
PR03 - 0.5-1.0m	MAR01990.013	Sediment	<1	<1	2.24	11.3	11.5	9.45
PR03 - 1.0-1.5m	MAR01990.014	Sediment	<1	3.76	4.47	11.1	22.8	13.7
PR03 - 1.5-2.0m	MAR01990.015	Sediment	2.24	<1	6.48	11.3	10.7	8.20
Certified Reference Material NIST 1941b (% Recovery)			64	112	68	65	63	90
QC Blank			<1	<1	<1	<1	<1	<1

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

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 MAR01990
Issue Version 1
Customer Reference County Antrim Harbours Marine Sediment Analysis

		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**
PR02 - 0.5-1.0m	MAR01990.008	Sediment	<1	<1	<1	<1	<1	<1
PR02 - 1.0-1.5m	MAR01990.009	Sediment	<1	<1	1.16	<1	2.52	<1
PR02 - 1.5-2.0m	MAR01990.010	Sediment	<1	<1	<1	<1	<1	<1
PR03 - 0.0m	MAR01990.011	Sediment	1.68	2.43	3.06	<1	6.10	<1
PR03 - 0.0-0.5m	MAR01990.012	Sediment	1.94	3.45	3.69	<1	7.10	<1
PR03 - 0.5-1.0m	MAR01990.013	Sediment	5.53	9.94	12.6	1.54	16.0	<1
PR03 - 1.0-1.5m	MAR01990.014	Sediment	15.0	17.6	12.5	2.82	19.9	1.88
PR03 - 1.5-2.0m	MAR01990.015	Sediment	5.99	10.6	13.2	1.44	23.2	3.28
Certified Reference Material NIST 1941b (% Recovery)			71	75	85	106	79	58
QC Blank			<1	<1	<1	<1	<1	<1

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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Test Report ID MAR01990
Issue Version 1
Customer Reference County Antrim Harbours Marine Sediment Analysis

		Units	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
		Limit of Detection	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**
PR02 - 0.5-1.0m	MAR01990.008	Sediment	<1	<1	<1	<1
PR02 - 1.0-1.5m	MAR01990.009	Sediment	<1	<1	1.41	2.26
PR02 - 1.5-2.0m	MAR01990.010	Sediment	<1	<1	<1	<1
PR03 - 0.0m	MAR01990.011	Sediment	1.79	<1	2.42	5.03
PR03 - 0.0-0.5m	MAR01990.012	Sediment	2.15	<1	1.95	5.94
PR03 - 0.5-1.0m	MAR01990.013	Sediment	5.92	<1	6.50	14.4
PR03 - 1.0-1.5m	MAR01990.014	Sediment	13.6	3.63	10.0	23.0
PR03 - 1.5-2.0m	MAR01990.015	Sediment	5.75	6.30	21.8	22.9
Certified Reference Material NIST 1941b (% Recovery)			75	62	76	68
QC Blank			<1	<1	<1	<1

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

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 MAR01990
Issue Version 1
Customer Reference County Antrim Harbours Marine Sediment Analysis

		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**
PR01 - 0.0m	MAR01990.001	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR01 - 0.0-0.5m	MAR01990.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR01 - 0.5-1.0m	MAR01990.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR01 - 1.0-1.5m	MAR01990.004	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR01 - 1.5-2.0m	MAR01990.005	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR02 - 0.0m	MAR01990.006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR02 - 0.0-0.5m	MAR01990.007	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR02 - 0.5-1.0m	MAR01990.008	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR02 - 1.0-1.5m	MAR01990.009	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR02 - 1.5-2.0m	MAR01990.010	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR03 - 0.0m	MAR01990.011	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR03 - 0.0-0.5m	MAR01990.012	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR03 - 0.5-1.0m	MAR01990.013	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR03 - 1.0-1.5m	MAR01990.014	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PR03 - 1.5-2.0m	MAR01990.015	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material NIST 1941b (% Recovery)			68	90	100	79	105	90	77
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 MAR01990
Issue Version 1
Customer Reference County Antrim Harbours Marine Sediment Analysis

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR01990.001-015	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMS-MWSED*	MAR01990.001-015	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPOES-MWSED*	MAR01990.001-015	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR01990.001-015	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/303/304	MAR01990.009-015	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	MAR01990.009-015	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

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

Test Report ID	MAR01990
Issue Version	1
Customer Reference	County Antrim Harbours Marine Sediment Analysis

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.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried and ground <2mm	Microwave assisted HF/Boric extraction followed by ICP analysis.
Organotins	Wet Sediment <2mm	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment <2mm	Solvent extraction and clean up followed by GC-MS 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		

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-25840-1
Initial Date of Issue:	08-Aug-2023
Re-Issue Details:	
Client	Geotechnical Environmental Services Limited
Client Address:	The Old Mill 22A Kilmoyle Road Ballybogey County Antrim BT53 6NR
Contact(s):	Robert Barry Caitlin Shiels
Project	22103NI Portrush Harbour Dredging SI, Portrush

Quotation No.:	Q23-31872	**Date Received:**	01-Aug-2023
Order No.:		**Date Instructed:**	01-Aug-2023
No. of Samples:	10		
Turnaround (Wkdays):	5	**Results Due:**	07-Aug-2023
Date Approved:	08-Aug-2023		

Approved By:

[redacted]

Details: S[redacted] Technical Manager

Results - Soil

Project: 22103NI Portrush Harbour Dredging SI, Portrush

Client: Geotechnical Environmental Services Limited		**Chemtest Job No.:**			23-25840	23-25840	23-25840	23-25840	23-25840	23-25840	23-25840	23-25840
Quotation No.: Q23-31872		**Chemtest Sample ID.:**			1682108	1682110	1682112	1682113	1682115	1682116	1682117	1682118
Order No.:		Client Sample Ref.:			ES1	ES3	ES5	ES1	ES3	ES4	ES5	ES1
		Client Sample ID.:			PR01	PR01	PR01	PR02	PR02	PR02	PR02	PR03
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.00	0.5	1.5	0.00	0.5	1.0	1.5	0.00
		Bottom Depth (m):				1.0	2.0		1.0	1.5	2.0	
		Date Sampled:			28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023
		Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	19	20	19	20	21	21	22	21
Chromatogram (AA Split)	N			N/A	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached
Chromatogram VPH	N			N/A	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached
pH	U	2010		4.0	8.9	8.7	8.6	8.6	8.8	8.8	8.7	8.7
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.25	0.27	0.27	0.21	0.37	0.35	0.31	0.35
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phosphorus (Total)	N	2430	mg/kg	10	170	130	180	210	130	170	110	170
Phosphate (Total)	N	2430	mg/kg	10	510	380	540	630	400	510	340	510
Sulphate (Total)	U	2430	%	0.010	0.14	0.13	0.18	0.22	0.21	0.28	0.14	0.20
Arsenic	U	2455	mg/kg	0.5	4.4	3.8	4.2	3.3	3.2	6.2	3.2	4.3
Barium	U	2455	mg/kg	0	4	3	4	3	4	7	7	5
Cadmium	U	2455	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.35	< 0.10	< 0.10
Chromium	U	2455	mg/kg	0.5	5.2	4.0	4.6	3.7	3.7	6.4	4.2	4.7
Molybdenum	U	2455	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5
Antimony	N	2455	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	U	2455	mg/kg	0.50	2.3	1.4	1.6	0.97	3.3	3.0	2.2	2.2
Mercury	U	2455	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	9.9	7.4	7.4	5.2	4.3	7.3	4.0	6.5
Lead	U	2455	mg/kg	0.50	1.8	1.6	1.7	1.2	1.6	3.3	1.9	2.2
Selenium	U	2455	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Zinc	U	2455	mg/kg	0.50	11	7.5	8.3	6.6	11	12	8.6	12
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12	U	2690	mg/kg	2.00	3.5	3.8	4.3	3.6	2.8	4.4	4.5	4.2
Aliphatic EPH >C12-C16	U	2690	mg/kg	1.00	1.9	1.2	2.1	< 1.0	1.4	1.9	2.2	2.0
Aliphatic EPH >C16-C21	U	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C21-C35	U	2690	mg/kg	3.00	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0

Results - Soil

Project: 22103NI Portrush Harbour Dredging SI, Portrush

Client: Geotechnical Environmental Services Limited			**Chemtest Job No.:**		23-25840	23-25840	23-25840	23-25840	23-25840	23-25840	23-25840	23-25840
Quotation No.: Q23-31872			**Chemtest Sample ID.:**		1682108	1682110	1682112	1682113	1682115	1682116	1682117	1682118
Order No.:			Client Sample Ref.:		ES1	ES3	ES5	ES1	ES3	ES4	ES5	ES1
			Client Sample ID.:		PR01	PR01	PR01	PR02	PR02	PR02	PR02	PR03
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.00	0.5	1.5	0.00	0.5	1.0	1.5	0.00
			Bottom Depth (m):			1.0	2.0		1.0	1.5	2.0	
			Date Sampled:		28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35	U	2690	mg/kg	5.00	5.5	5.1	6.3	< 5.0	< 5.0	6.8	6.7	6.4
Total Aliphatic EPH >C10-C40	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.5
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00	< 2.0	2.3	< 2.0	2.1	2.1	2.3	2.1	< 2.0
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	< 2.0	< 2.0	2.1	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Aromatic EPH >C10-C40	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	< 10	11	< 10	11
Total EPH >C10-C40	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	< 10	11	< 10	11
Florisil Cleanup	N		-	N/A	Done	Done	Done	Done	Done	Done	Done	Done
Diesel Present	N	2670		N/A	False	False	False	False	False	False	False	False
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 22103NI Portrush Harbour Dredging SI, Portrush

Client: Geotechnical Environmental Services Limited					**Chemtest Job No.:**	23-25840	23-25840	23-25840	23-25840	23-25840	23-25840	23-25840	23-25840
Quotation No.: Q23-31872					**Chemtest Sample ID.:**	1682108	1682110	1682112	1682113	1682115	1682116	1682117	1682118
Order No.:					Client Sample Ref.:	ES1	ES3	ES5	ES1	ES3	ES4	ES5	ES1
					Client Sample ID.:	PR01	PR01	PR01	PR02	PR02	PR02	PR02	PR03
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.00	0.5	1.5	0.00	0.5	1.0	1.5	0.00
					Bottom Depth (m):		1.0	2.0		1.0	1.5	2.0	
					Date Sampled:	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023	28-Jul-2023
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Benzo[a]pyrene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 22103NI Portrush Harbour Dredging SI, Portrush

Client: Geotechnical Environmental Services Limited		**Chemtest Job No.:**			23-25840	23-25840
Quotation No.: Q23-31872		**Chemtest Sample ID.:**			1682120	1682122
Order No.:		Client Sample Ref.:			ES3	ES5
		Client Sample ID.:			PR03	PR03
		Sample Type:			SOIL	SOIL
		Top Depth (m):			0.5	1.5
		Bottom Depth (m):			1.0	2.0
		Date Sampled:			28-Jul-2023	28-Jul-2023
		Asbestos Lab:			DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	22
Chromatogram (AA Split)	N			N/A	See Attached	See Attached
Chromatogram VPH	N			N/A	See Attached	See Attached
pH	U	2010		4.0	8.7	8.8
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.29	0.39
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50
Phosphorus (Total)	N	2430	mg/kg	10	150	110
Phosphate (Total)	N	2430	mg/kg	10	440	340
Sulphate (Total)	U	2430	%	0.010	0.19	0.17
Arsenic	U	2455	mg/kg	0.5	3.4	2.6
Barium	U	2455	mg/kg	0	6	4
Cadmium	U	2455	mg/kg	0.10	< 0.10	< 0.10
Chromium	U	2455	mg/kg	0.5	4.7	3.9
Molybdenum	U	2455	mg/kg	0.5	< 0.5	< 0.5
Antimony	N	2455	mg/kg	2.0	< 2.0	< 2.0
Copper	U	2455	mg/kg	0.50	17	1.7
Mercury	U	2455	mg/kg	0.05	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	5.9	5.0
Lead	U	2455	mg/kg	0.50	2.9	1.8
Selenium	U	2455	mg/kg	0.25	< 0.25	< 0.25
Zinc	U	2455	mg/kg	0.50	26	7.3
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	0.14	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12	U	2690	mg/kg	2.00	6.0	8.2
Aliphatic EPH >C12-C16	U	2690	mg/kg	1.00	3.2	6.8
Aliphatic EPH >C16-C21	U	2690	mg/kg	2.00	< 2.0	< 2.0
Aliphatic EPH >C21-C35	U	2690	mg/kg	3.00	9.8	10

Results - Soil

Project: 22103NI Portrush Harbour Dredging SI, Portrush

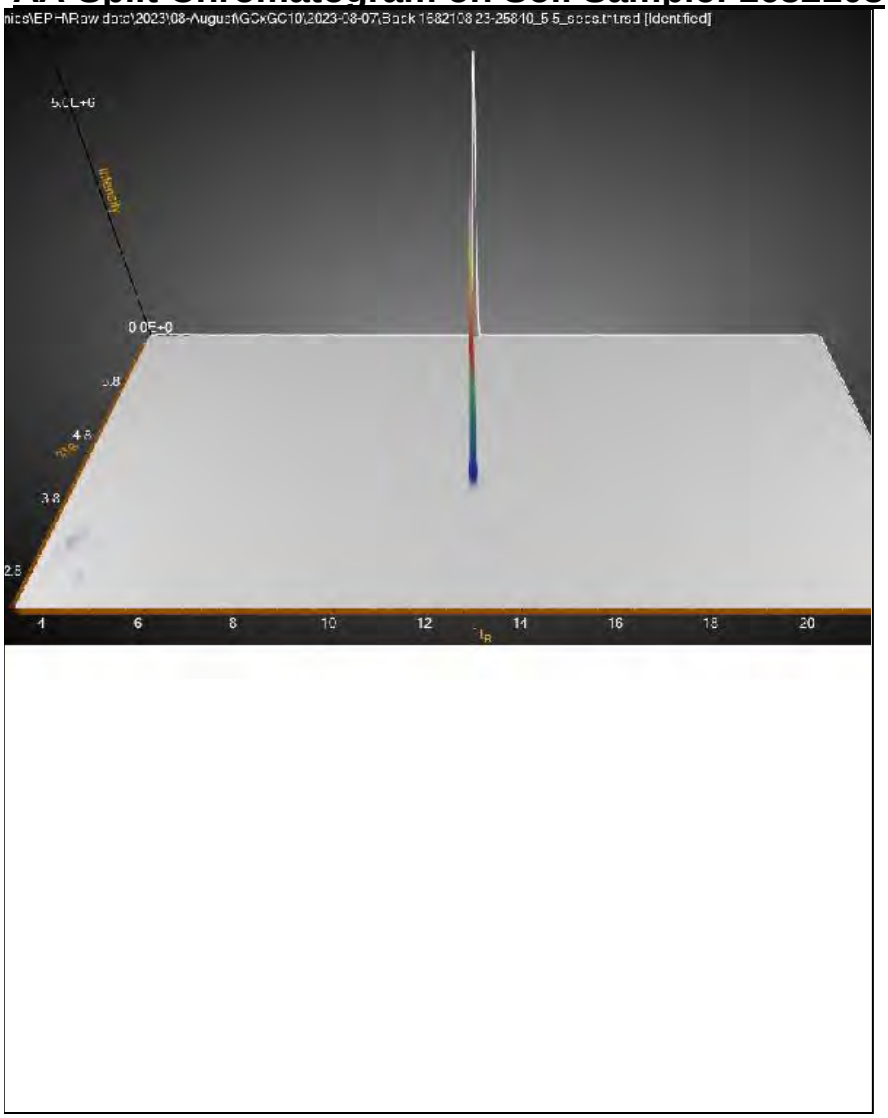
Client: Geotechnical Environmental Services Limited		**Chemtest Job No.:**			23-25840	23-25840
Quotation No.: Q23-31872		**Chemtest Sample ID.:**			1682120	1682122
Order No.:		Client Sample Ref.:			ES3	ES5
		Client Sample ID.:			PR03	PR03
		Sample Type:			SOIL	SOIL
		Top Depth (m):			0.5	1.5
		Bottom Depth (m):			1.0	2.0
		Date Sampled:			28-Jul-2023	28-Jul-2023
		Asbestos Lab:			DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	17	< 10
Total Aliphatic EPH >C10-C35	U	2690	mg/kg	5.00	19	25
Total Aliphatic EPH >C10-C40	N	2690	mg/kg	10.00	37	25
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00	1.2	2.1
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0	1.1
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00	2.4	2.1
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	11	3.7
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	47	1.8
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	14	9.0
Total Aromatic EPH >C10-C40	N	2690	mg/kg	10.00	61	11
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00	33	34
Total EPH >C10-C40	N	2690	mg/kg	10.00	98	36
Florisil Cleanup	N		-	N/A	Done	Done
Diesel Present	N	2670		N/A	False	False
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10

Results - Soil

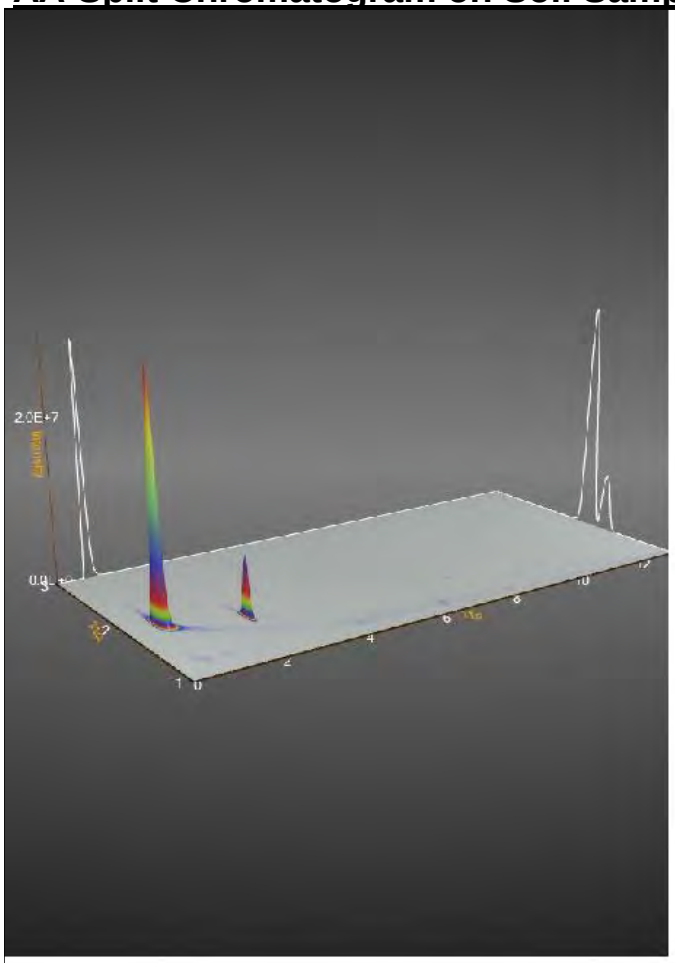
Project: 22103NI Portrush Harbour Dredging SI, Portrush

Client: Geotechnical Environmental Services Limited			**Chemtest Job No.:**		23-25840	23-25840
Quotation No.: Q23-31872			**Chemtest Sample ID.:**		1682120	1682122
Order No.:			Client Sample Ref.:		ES3	ES5
			Client Sample ID.:		PR03	PR03
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.5	1.5
			Bottom Depth (m):		1.0	2.0
			Date Sampled:		28-Jul-2023	28-Jul-2023
			Asbestos Lab:		DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10

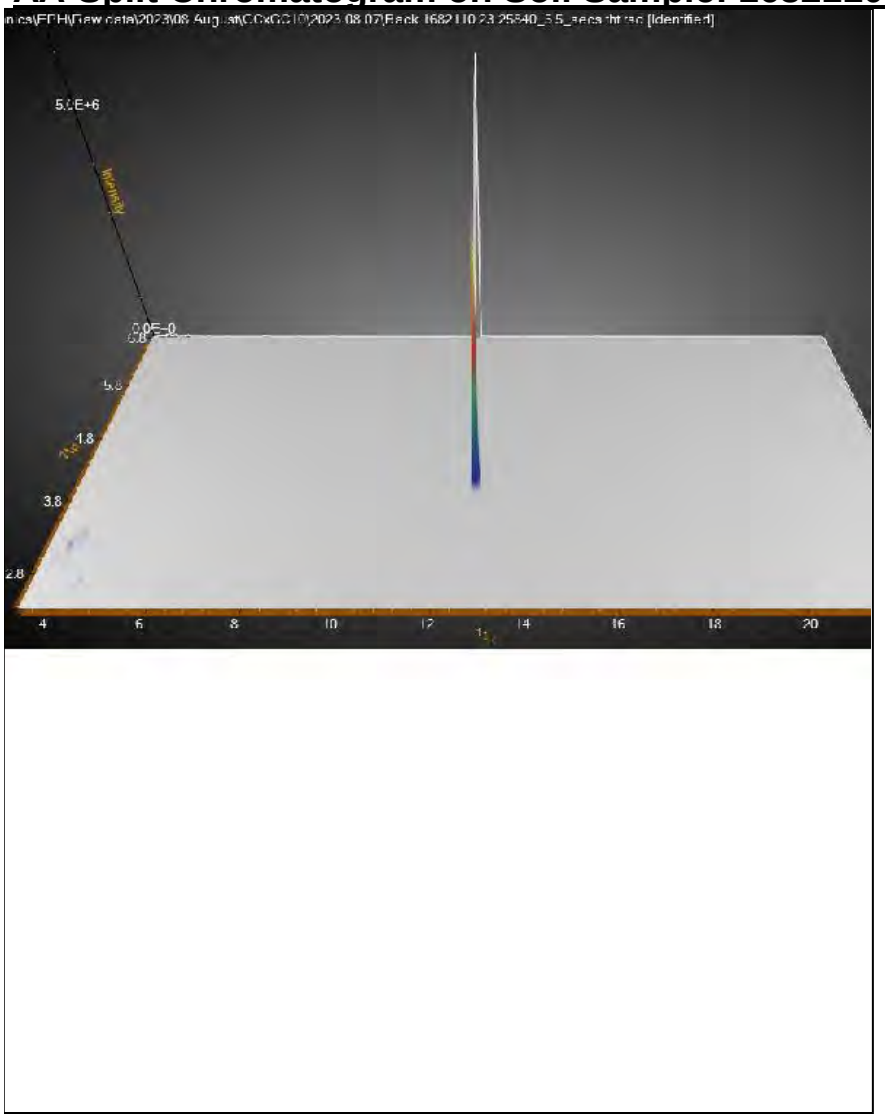
AA-Split Chromatogram on Soil Sample: 1682108



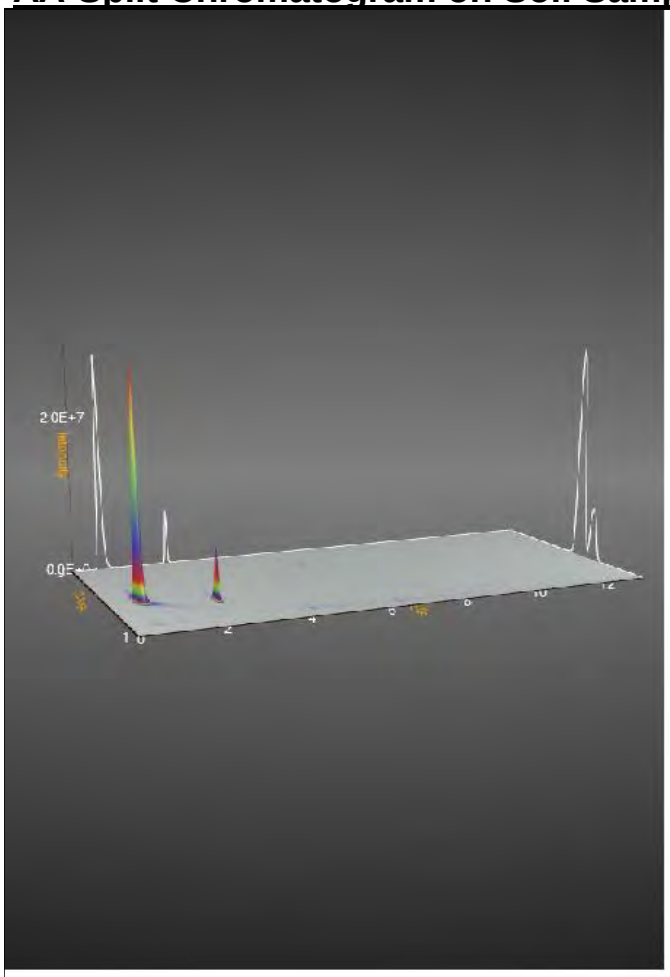
AA-Split Chromatogram on Soil Sample: 1682108



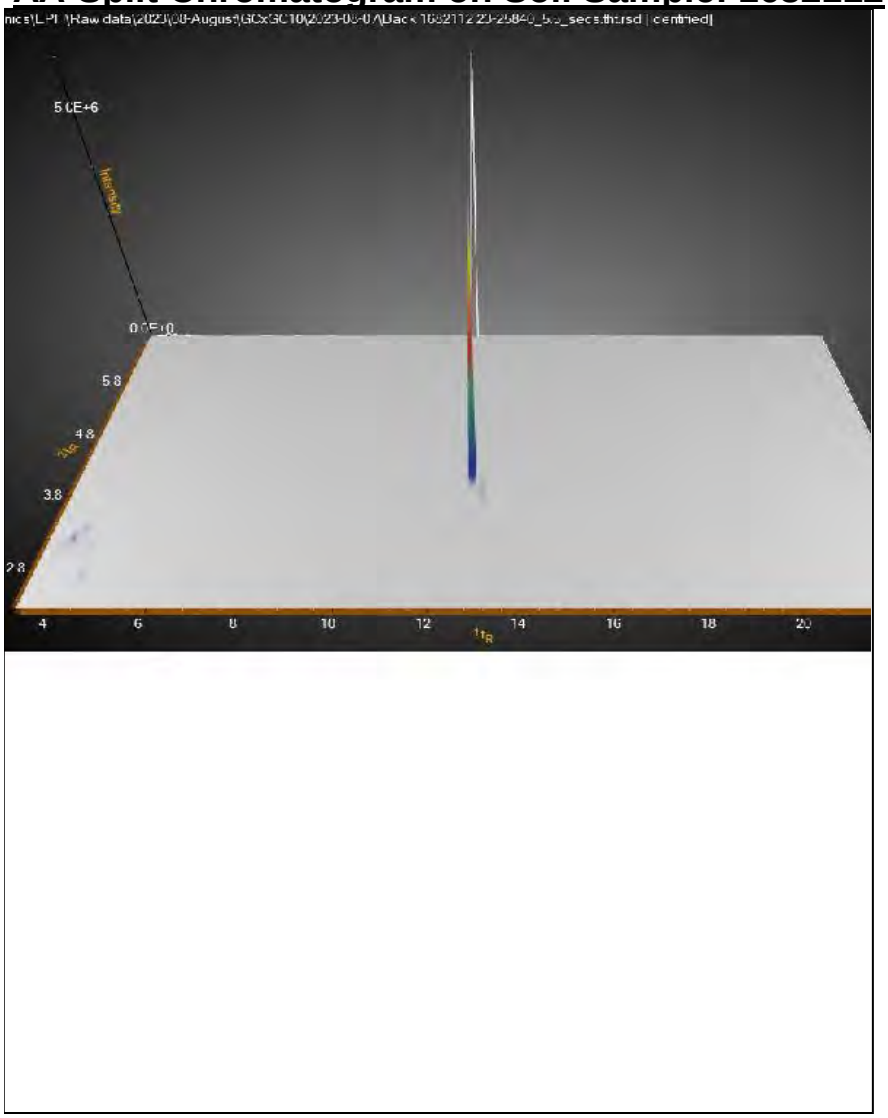
AA-Split Chromatogram on Soil Sample: 1682110



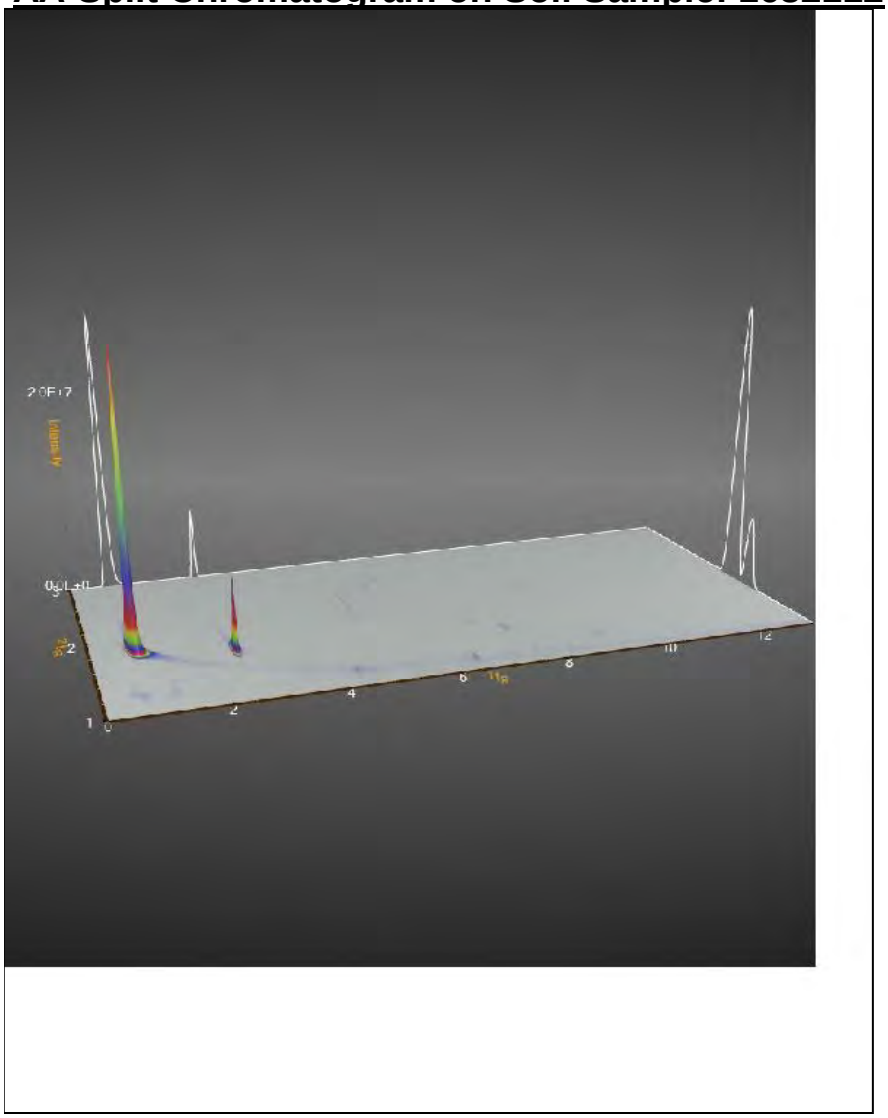
AA-Split Chromatogram on Soil Sample: 1682110



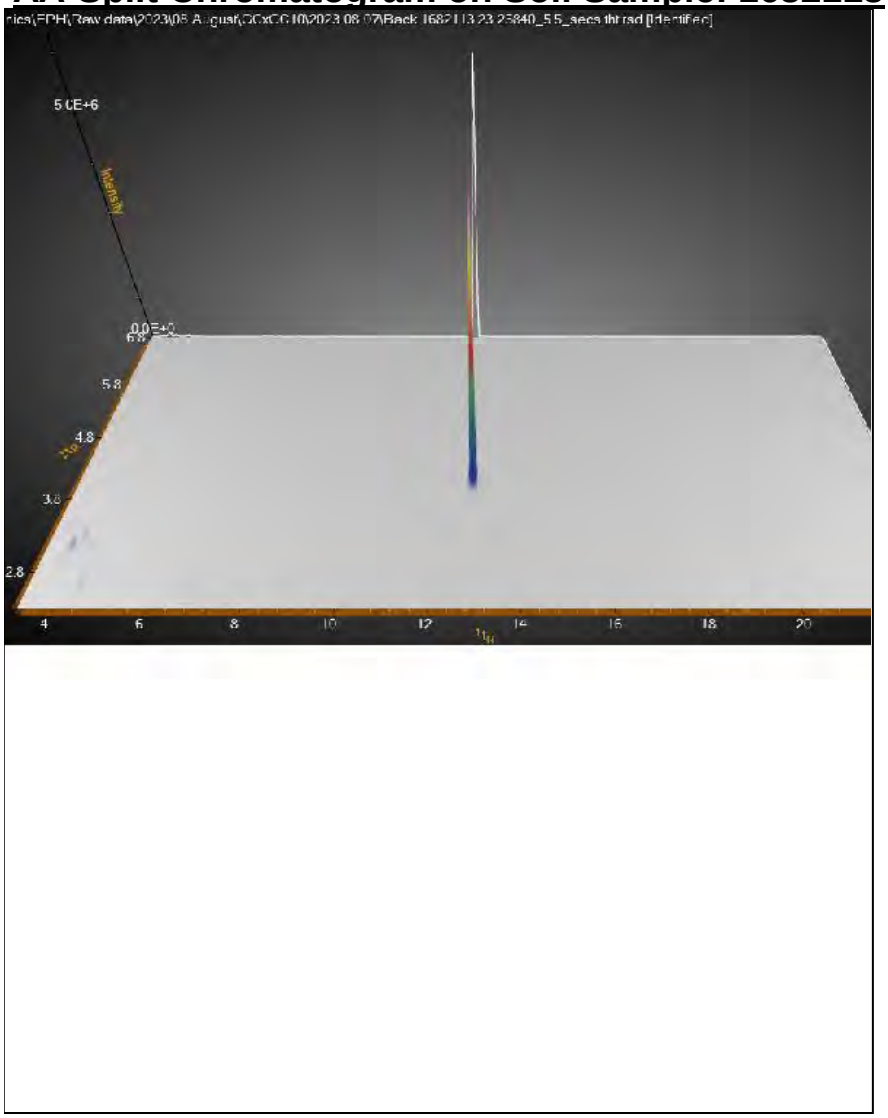
AA-Split Chromatogram on Soil Sample: 1682112



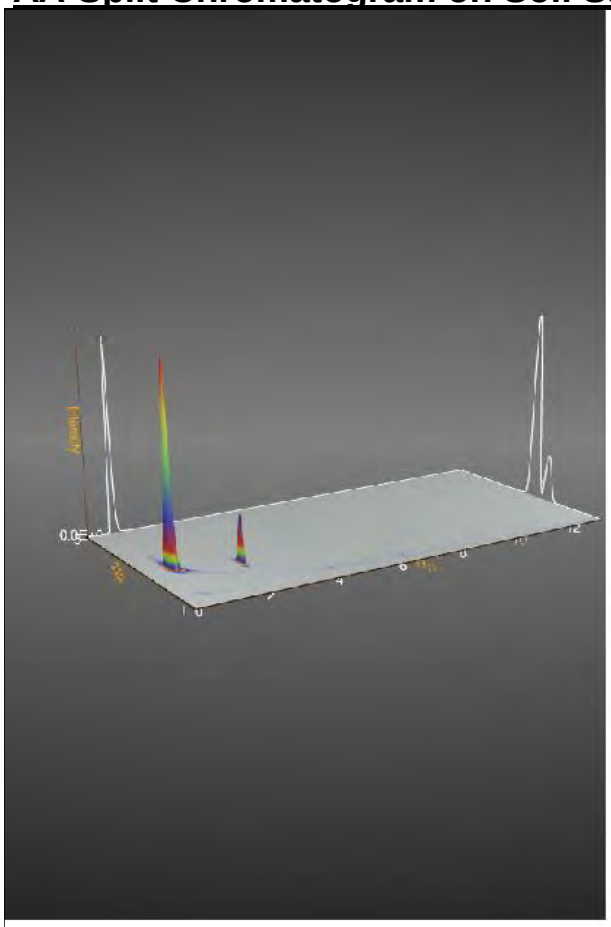
AA-Split Chromatogram on Soil Sample: 1682112



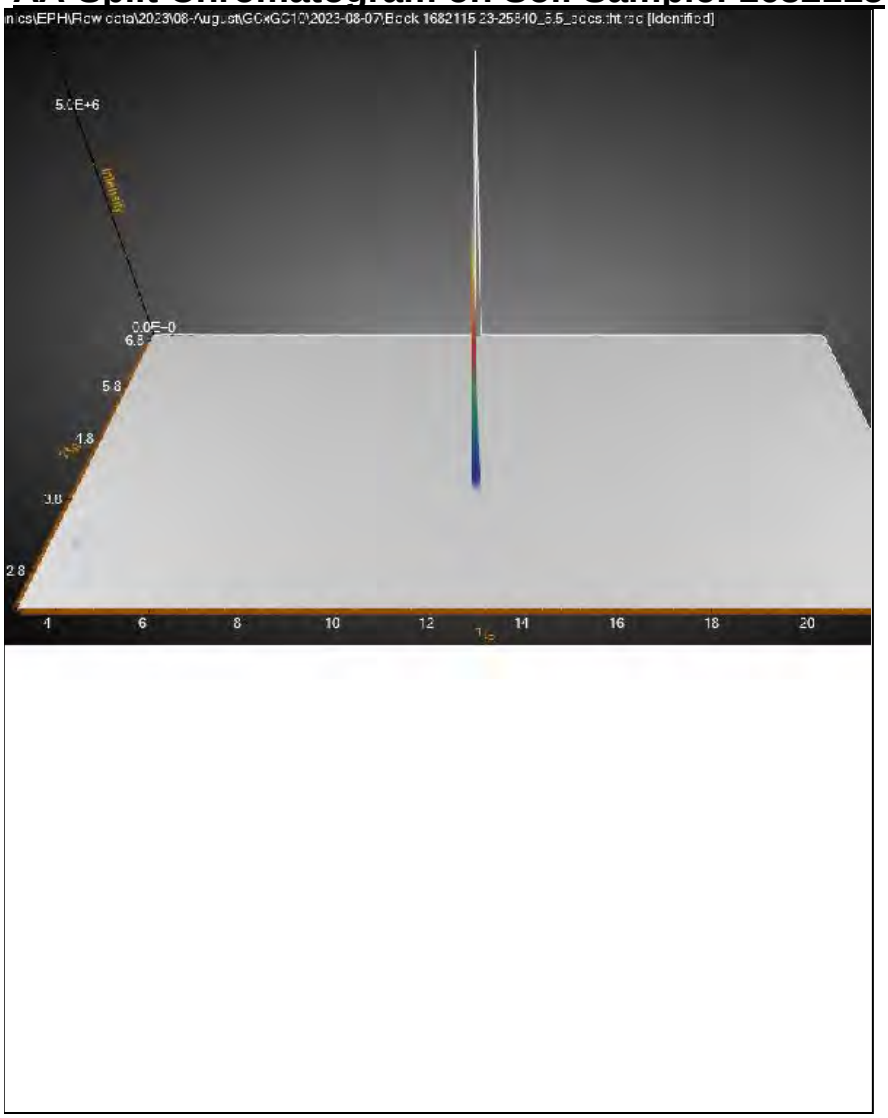
AA-Split Chromatogram on Soil Sample: 1682113



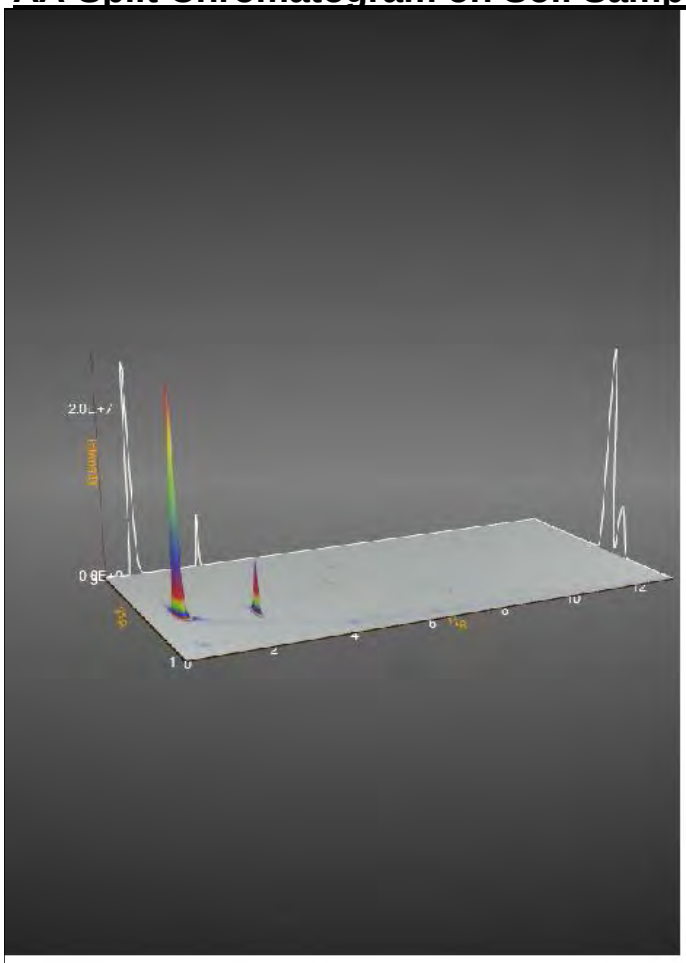
AA-Split Chromatogram on Soil Sample: 1682113



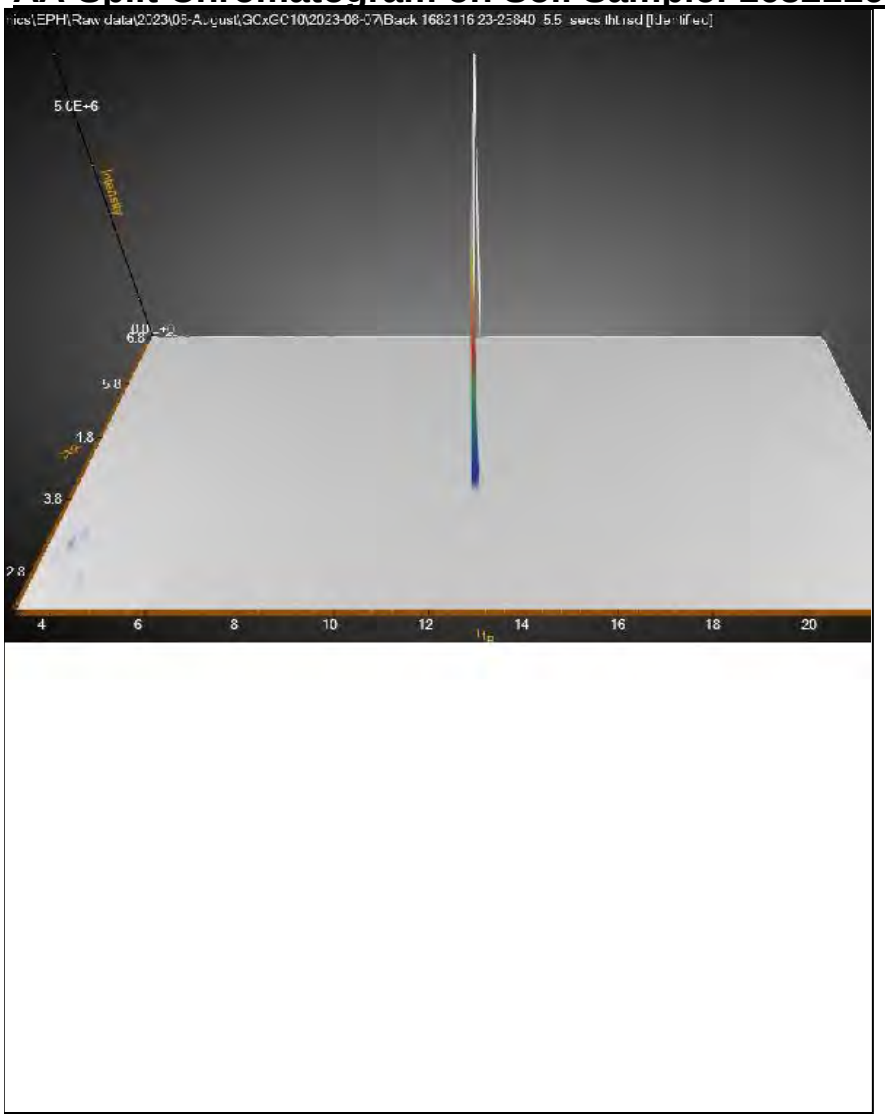
AA-Split Chromatogram on Soil Sample: 1682115



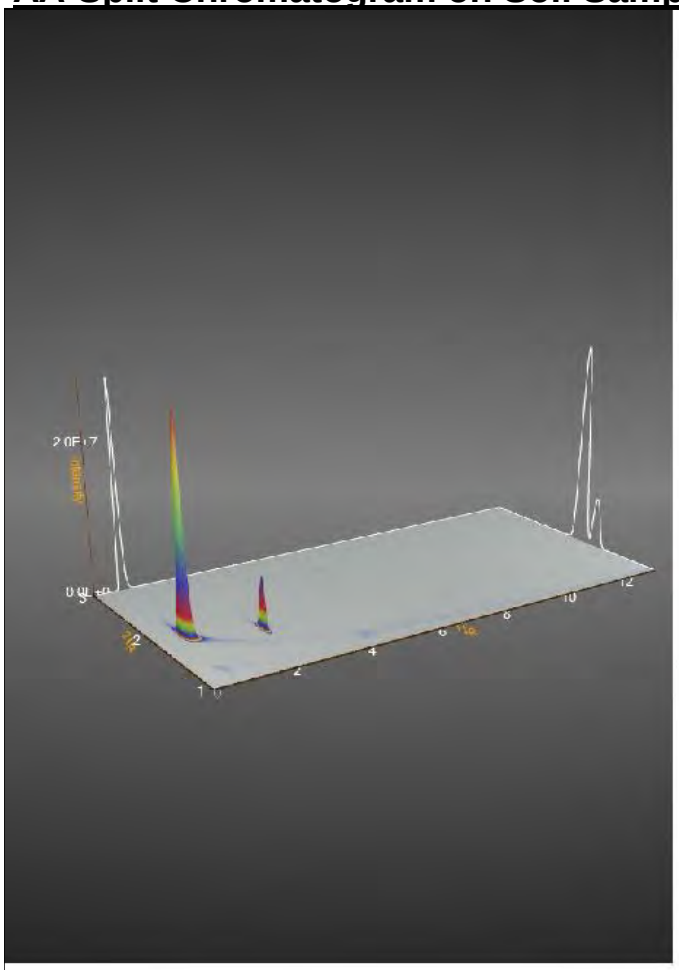
AA-Split Chromatogram on Soil Sample: 1682115



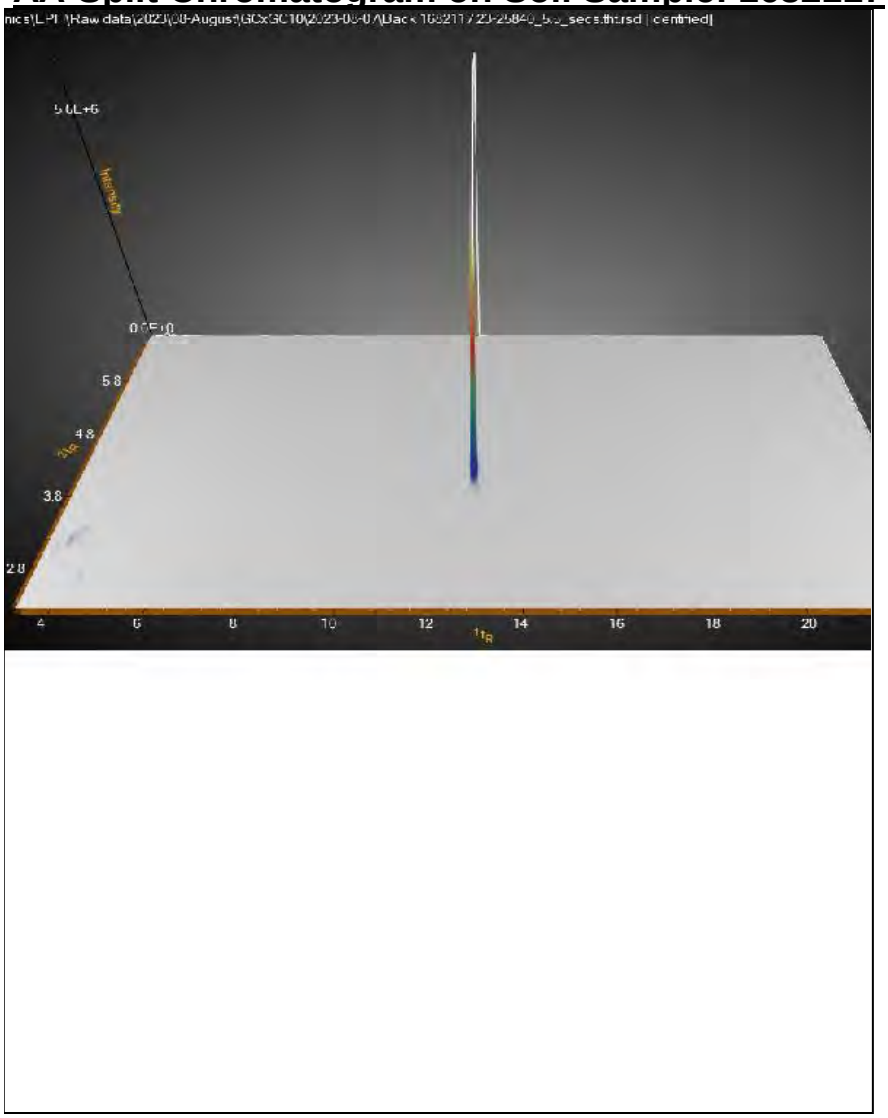
AA-Split Chromatogram on Soil Sample: 1682116



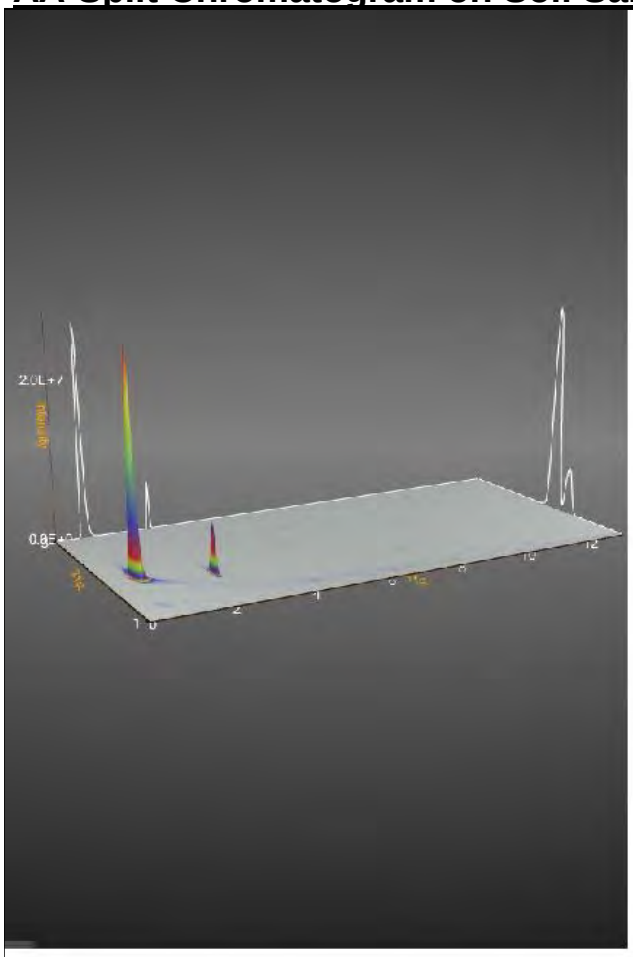
AA-Split Chromatogram on Soil Sample: 1682116



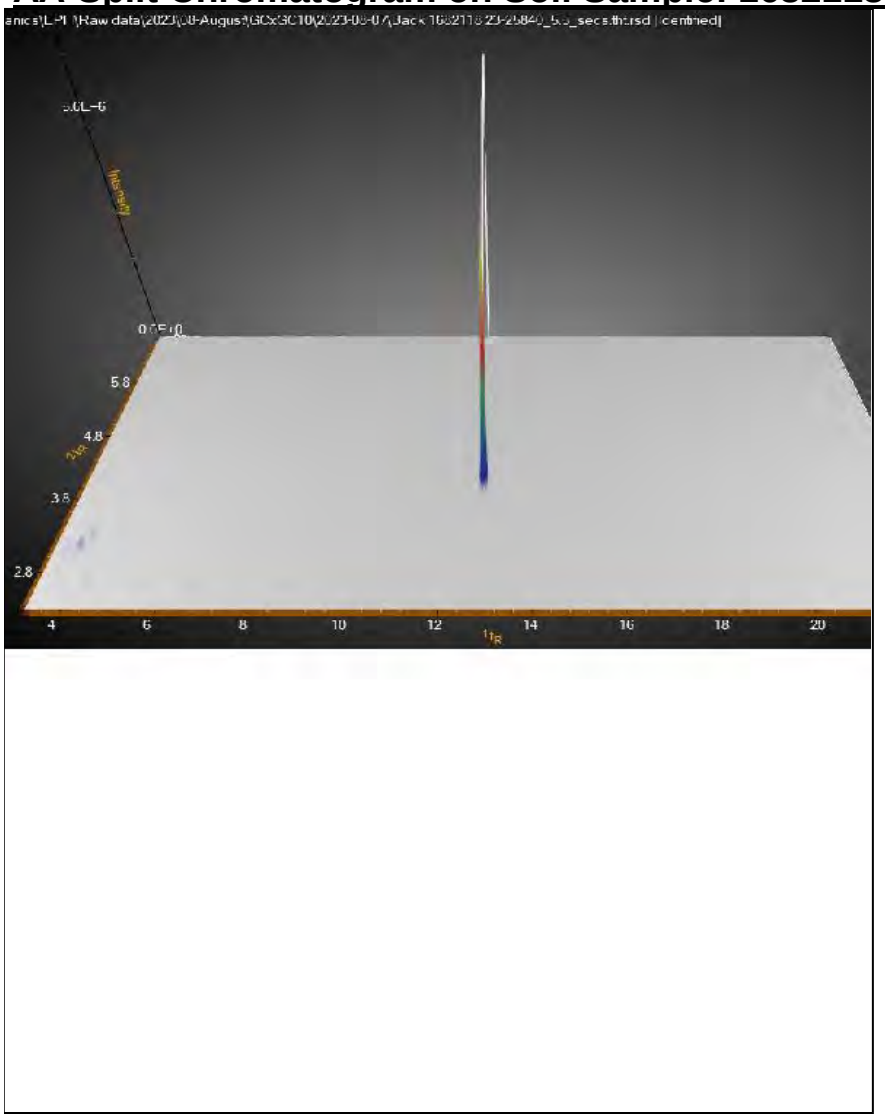
AA-Split Chromatogram on Soil Sample: 1682117



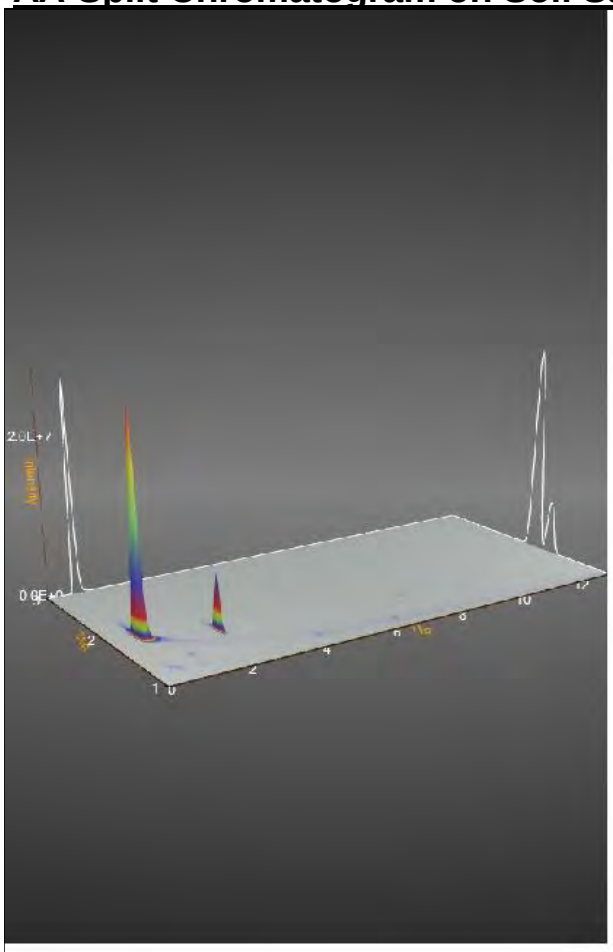
AA-Split Chromatogram on Soil Sample: 1682117



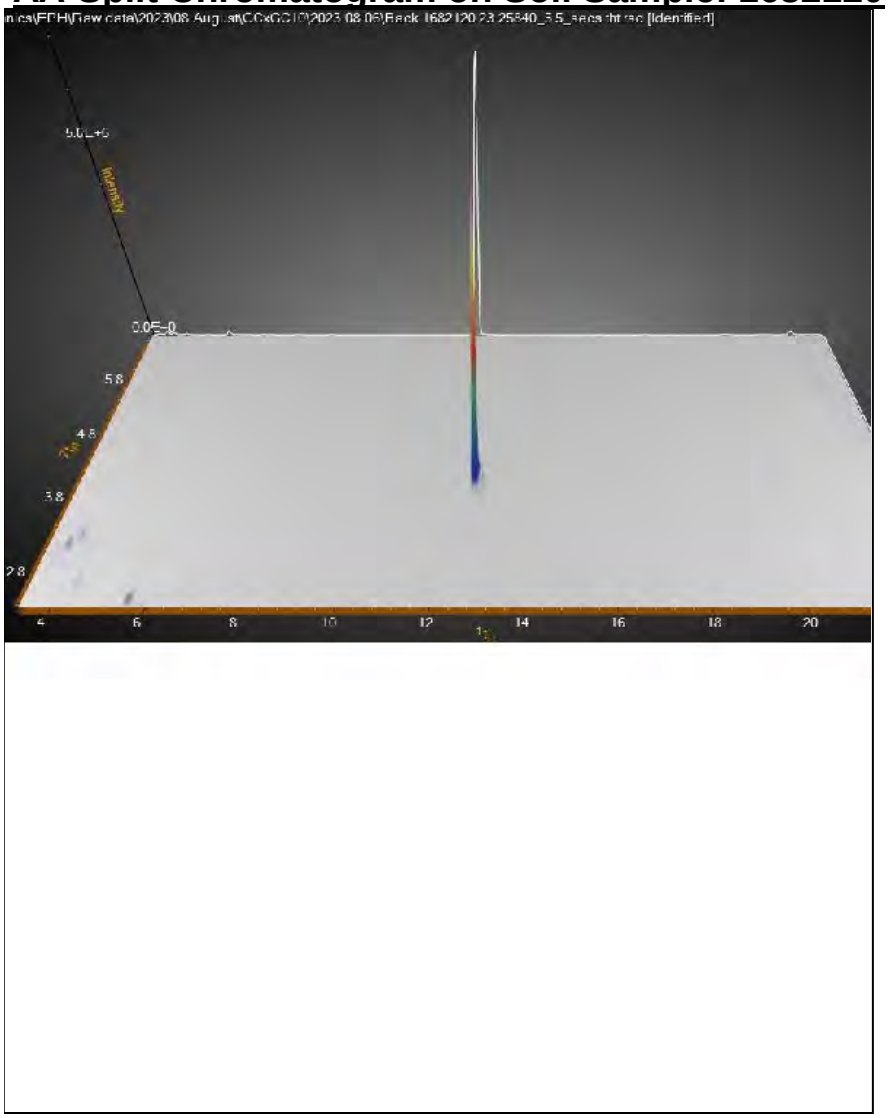
AA-Split Chromatogram on Soil Sample: 1682118



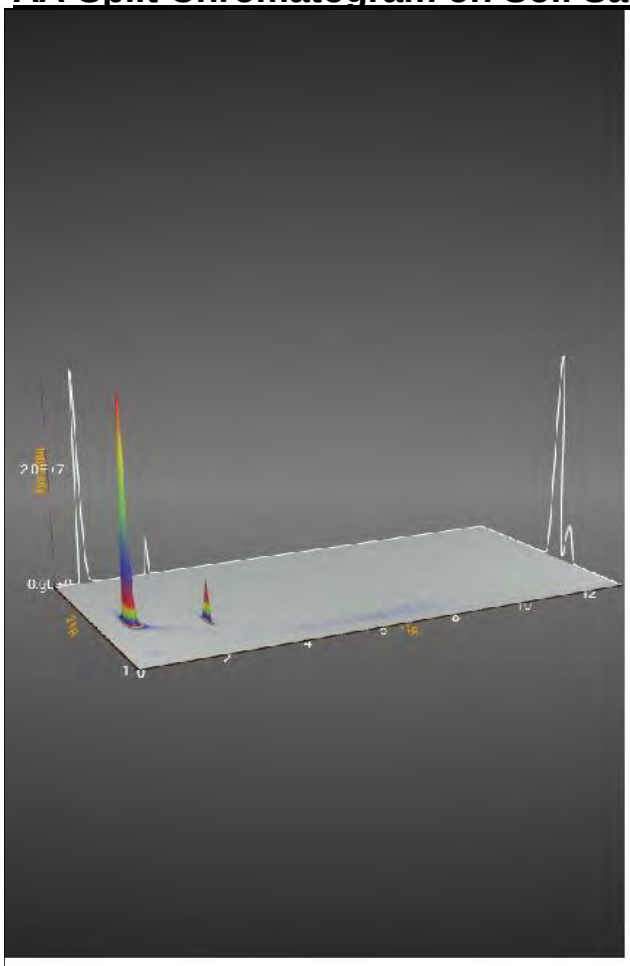
AA-Split Chromatogram on Soil Sample: 1682118



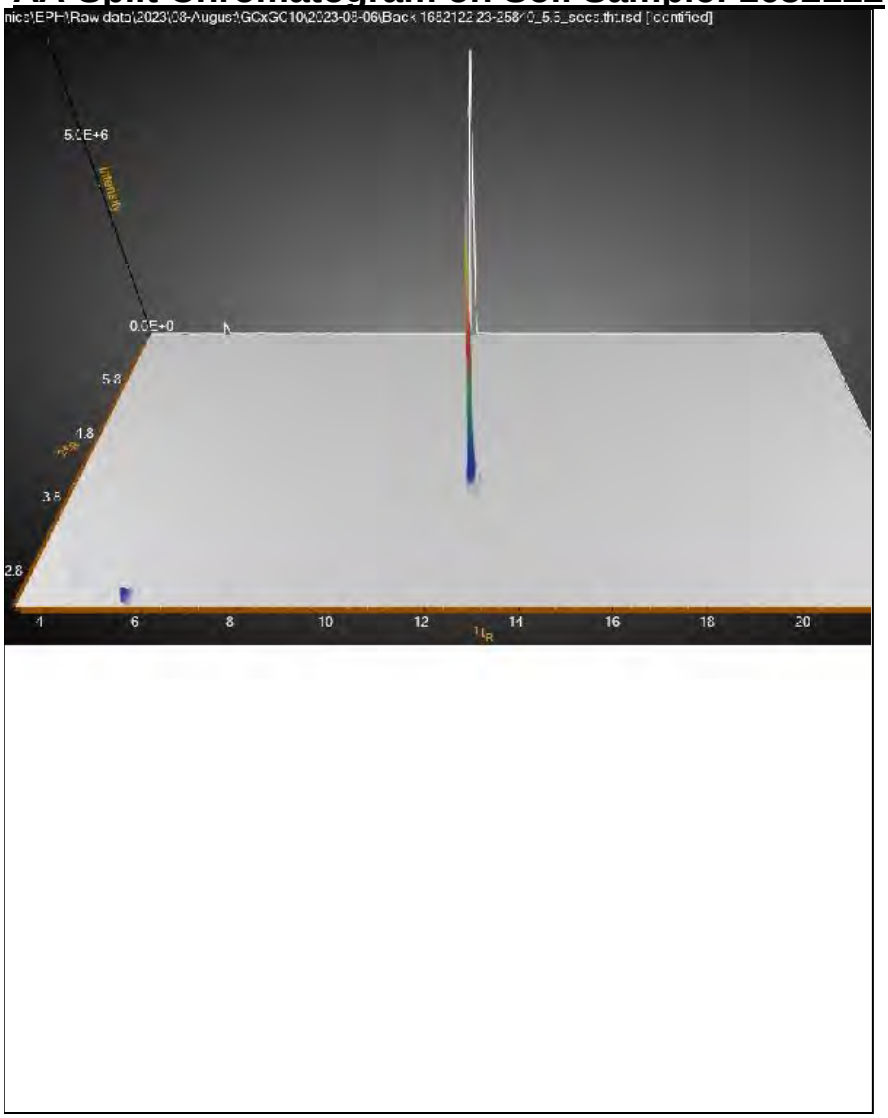
AA-Split Chromatogram on Soil Sample: 1682120



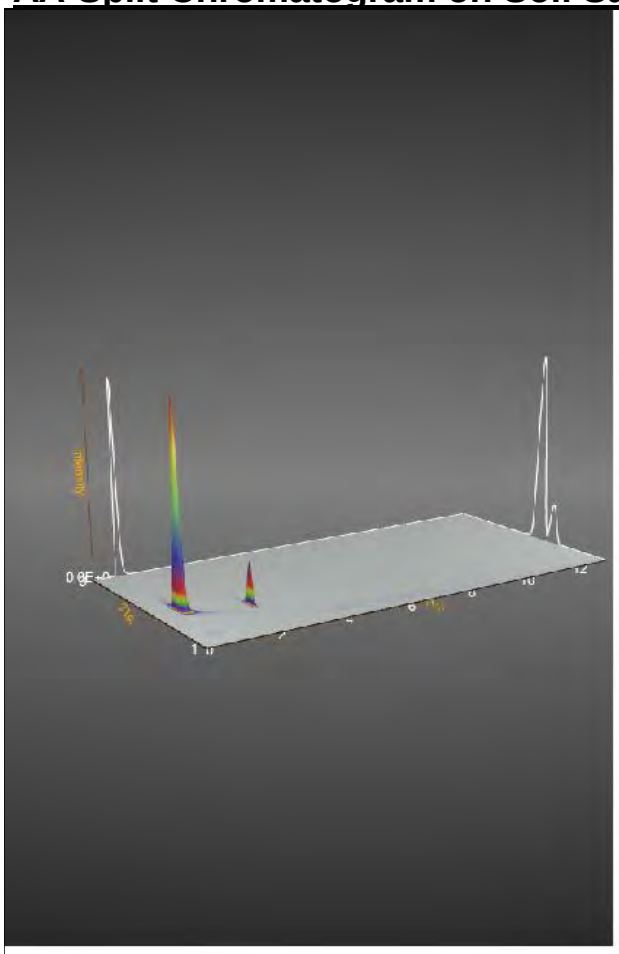
AA-Split Chromatogram on Soil Sample: 1682120



AA-Split Chromatogram on Soil Sample: 1682122



AA-Split Chromatogram on Soil Sample: 1682122



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
23-25840	1682108	S		ES1	PR01	0.00	No	N/A
23-25840	1682110	S		ES3	PR01	0.5	No	N/A
23-25840	1682112	S		ES5	PR01	1.5	No	N/A
23-25840	1682113	S		ES1	PR02	0.00	No	N/A
23-25840	1682115	S		ES3	PR02	0.5	No	N/A
23-25840	1682116	S		ES4	PR02	1.0	No	N/A
23-25840	1682117	S		ES5	PR02	1.5	No	N/A
23-25840	1682118	S		ES1	PR03	0.00	No	N/A
23-25840	1682120	S		ES3	PR03	0.5	No	N/A
23-25840	1682122	S		ES5	PR03	1.5	No	N/A

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-25841-1
Initial Date of Issue:	14-Aug-2023
Re-Issue Details:	
Client	Geotechnical Environmental Services Limited
Client Address:	The Old Mill 22A Kilmoyle Road Ballybogey County Antrim BT53 6NR
Contact(s):	Robert Barry Caitlin Shiels
Project	22103NI Portrush Harbour Dredging SI, Portrush

Quotation No.:	Q23-31872	**Date Received:**	01-Aug-2023
Order No.:		**Date Instructed:**	01-Aug-2023
No. of Samples:	10		
Turnaround (Wkdays):	7	**Results Due:**	09-Aug-2023
Date Approved:	14-Aug-2023		

Approved By:

[redacted]

Details: [redacted] Technical Manager

Results - 2 Stage WAC

Project: 22103NI Portrush Harbour Dredging SI, Portrush

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-25841								
Chemtest Sample ID:	1682123								
Sample Ref:	ES1								
Sample ID:	PR01								
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):									
Sampling Date:	28-Jul-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.71	3	5	6
Loss On Ignition	2610	M	%			0.72	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0080	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0031	0.0004	0.0061	0.0078	0.5	2	25
Barium	1455	U	0.008	< 0.005	0.016	0.013	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0025	0.0007	0.0048	0.0038	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0019	< 0.0002	0.0037	0.0029	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0009	< 0.0005	0.0019	0.0014	0.1	0.5	7
Zinc	1455	U	0.016	0.015	0.031	0.15	4	50	200
Chloride	1220	U	2200	130	4300	4500	800	15000	25000
Fluoride	1220	U	0.52	0.10	1.0	1.6	10	150	500
Sulphate	1220	U	320	19	630	650	1000	20000	50000
Total Dissolved Solids	1020	N	3500	220	6900	7200	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	3.2	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	19

Leachate Test Information	
Leachant volume 1st extract/l	0.308
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.268

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Portrush Harbour Dredging SI, Portrush

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-25841								
Chemtest Sample ID:	1682124								
Sample Ref:	ES3								
Sample ID:	PR01								
Sample Location:									
Top Depth(m):	0.5								
Bottom Depth(m):	1.0								
Sampling Date:	28-Jul-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.61	3	5	6
Loss On Ignition	2610	M	%			0.72	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0070	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0037	0.0003	0.0072	0.0067	0.5	2	25
Barium	1455	U	0.009	< 0.005	0.017	0.010	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0018	< 0.0005	0.0036	0.0021	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0020	< 0.0002	0.0038	0.0023	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0010	< 0.0005	0.0019	0.0011	0.1	0.5	7
Zinc	1455	U	0.005	0.005	0.010	0.047	4	50	200
Chloride	1220	U	2000	110	3900	3300	800	15000	25000
Fluoride	1220	U	0.44	0.092	< 1.0	1.3	10	150	500
Sulphate	1220	U	290	16	570	480	1000	20000	50000
Total Dissolved Solids	1020	N	3900	210	7700	6400	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	3.4	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	20

Leachate Test Information	
Leachant volume 1st extract/l	0.306
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.203

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Portrush Harbour Dredging SI, Portrush

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-25841								
Chemtest Sample ID:	1682125								
Sample Ref:	ES5								
Sample ID:	PR01								
Sample Location:									
Top Depth(m):	1.5								
Bottom Depth(m):	2.0								
Sampling Date:	28-Jul-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.89	3	5	6
Loss On Ignition	2610	M	%			0.75	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0050	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0036	0.0020	0.0069	0.022	0.5	2	25
Barium	1455	U	0.011	< 0.005	0.021	0.013	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0033	0.0011	0.0065	0.0041	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0022	0.0002	0.0043	0.0047	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0011	< 0.0005	0.0021	0.0013	0.1	0.5	7
Zinc	1455	U	0.006	0.012	0.012	0.11	4	50	200
Chloride	1220	U	1900	120	3600	3300	800	15000	25000
Fluoride	1220	U	0.60	0.15	1.2	2.0	10	150	500
Sulphate	1220	U	290	19	560	520	1000	20000	50000
Total Dissolved Solids	1020	N	3000	290	5800	6200	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.3	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	19

Leachate Test Information	
Leachant volume 1st extract/l	0.308
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.215

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Portrush Harbour Dredging SI, Portrush

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-25841								
Chemtest Sample ID:	1682126								
Sample Ref:	ES1								
Sample ID:	PR02								
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):									
Sampling Date:	28-Jul-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.95	3	5	6
Loss On Ignition	2610	M	%			0.75	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0080	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0022	0.0004	0.0042	0.0056	0.5	2	25
Barium	1455	U	0.007	< 0.005	0.014	0.0068	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0024	0.0007	0.0047	0.0023	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0006	< 0.0002	0.0012	0.0006	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	0.0010	< 0.0005	0.0088	0.5	10	50
Antimony	1455	U	0.0028	< 0.0005	0.0054	0.0027	0.06	0.7	5
Selenium	1455	U	0.0011	0.0005	0.0022	0.0058	0.1	0.5	7
Zinc	1455	U	0.006	0.004	0.011	0.042	4	50	200
Chloride	1220	U	7.7	1.0	15	16	800	15000	25000
Fluoride	1220	U	0.12	0.099	< 1.0	1.0	10	150	500
Sulphate	1220	U	19	4.6	37	60	1000	20000	50000
Total Dissolved Solids	1020	N	60	6.8	120	120	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	3.7	4.2	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	20

Leachate Test Information	
Leachant volume 1st extract/l	0.307
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.168

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Portrush Harbour Dredging SI, Portrush

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-25841								
Chemtest Sample ID:	1682127								
Sample Ref:	ES3								
Sample ID:	PR02								
Sample Location:									
Top Depth(m):	0.5								
Bottom Depth(m):	1.0								
Sampling Date:	28-Jul-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.75	3	5	6
Loss On Ignition	2610	M	%			1.1	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0034	0.0005	0.0066	0.010	0.5	2	25
Barium	1455	U	0.014	< 0.005	0.028	0.023	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0018	0.0005	0.0035	0.0029	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.010	0.0003	0.020	0.019	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0005	< 0.0005	0.0010	0.0008	0.06	0.7	5
Selenium	1455	U	0.0014	< 0.0005	0.0027	0.0023	0.1	0.5	7
Zinc	1455	U	0.004	0.004	0.009	0.041	4	50	200
Chloride	1220	U	2100	90	4200	4200	800	15000	25000
Fluoride	1220	U	0.51	0.090	< 1.0	1.6	10	150	500
Sulphate	1220	U	310	14	600	620	1000	20000	50000
Total Dissolved Solids	1020	N	4200	200	8100	8400	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.0	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	21

Leachate Test Information	
Leachant volume 1st extract/l	0.304
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.283

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Portrush Harbour Dredging SI, Portrush

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-25841								
Chemtest Sample ID:	1682128								
Sample Ref:	ES4								
Sample ID:	PR02								
Sample Location:									
Top Depth(m):	1.0								
Bottom Depth(m):	1.5								
Sampling Date:	28-Jul-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.78	3	5	6
Loss On Ignition	2610	M	%			1.2	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0030	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0015	0.0029	0.0030	0.027	0.5	2	25
Barium	1455	U	0.039	< 0.005	0.075	0.049	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0058	0.0009	0.011	0.0074	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0013	0.0012	0.0026	0.013	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0012	< 0.0005	0.0023	0.0015	0.06	0.7	5
Selenium	1455	U	0.0018	0.0006	0.0035	0.0075	0.1	0.5	7
Zinc	1455	U	0.007	0.011	0.014	0.10	4	50	200
Chloride	1220	U	27	180	52	1600	800	15000	25000
Fluoride	1220	U	0.16	0.18	< 1.0	1.8	10	150	500
Sulphate	1220	U	19	26	37	250	1000	20000	50000
Total Dissolved Solids	1020	N	350	370	690	3600	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	3.7	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	21

Leachate Test Information	
Leachant volume 1st extract/l	0.303
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.223

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Portrush Harbour Dredging SI, Portrush

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-25841								
Chemtest Sample ID:	1682129								
Sample Ref:	ES5								
Sample ID:	PR02						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	1.5								
Bottom Depth(m):	2.0								
Sampling Date:	28-Jul-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			0.92	3	5	6
Loss On Ignition	2610	M	%			1.0	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0080	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0033	0.0006	0.0065	0.010	0.5	2	25
Barium	1455	U	0.009	< 0.005	0.018	0.014	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0024	0.0007	0.0046	0.0035	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.017	0.0009	0.033	0.033	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0011	< 0.0005	0.0021	0.0016	0.1	0.5	7
Zinc	1455	U	0.006	0.007	0.012	0.069	4	50	200
Chloride	1220	U	2500	130	4800	4800	800	15000	25000
Fluoride	1220	U	0.60	0.10	1.2	1.7	10	150	500
Sulphate	1220	U	380	19	730	720	1000	20000	50000
Total Dissolved Solids	1020	N	4400	290	8600	9000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.3	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	22

Leachate Test Information	
Leachant volume 1st extract/l	0.302
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.261

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Portrush Harbour Dredging SI, Portrush

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-25841								
Chemtest Sample ID:	1682130								
Sample Ref:	ES1								
Sample ID:	PR03								
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):									
Sampling Date:	28-Jul-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.30	3	5	6
Loss On Ignition	2610	M	%			1.0	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0080	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0047	0.0003	0.0092	0.0098	0.5	2	25
Barium	1455	U	0.010	< 0.005	0.019	0.016	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0030	0.0012	0.0059	0.0050	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0023	< 0.0002	0.0045	0.0038	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	0.0013	< 0.0005	0.011	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0013	< 0.0005	0.0026	0.0022	0.1	0.5	7
Zinc	1455	U	0.017	0.019	0.033	0.19	4	50	200
Chloride	1220	U	1900	9.8	3700	3200	800	15000	25000
Fluoride	1220	U	0.47	0.092	< 1.0	1.5	10	150	500
Sulphate	1220	U	270	1.5	520	450	1000	20000	50000
Total Dissolved Solids	1020	N	3700	19	7200	6200	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	5.9	5.0	< 50	51	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	21

Leachate Test Information	
Leachant volume 1st extract/l	0.304
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.286

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Portrush Harbour Dredging SI, Portrush

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-25841								
Chemtest Sample ID:	1682131								
Sample Ref:	ES3								
Sample ID:	PR03								
Sample Location:									
Top Depth(m):	0.5								
Bottom Depth(m):	1.0								
Sampling Date:	28-Jul-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.87	3	5	6
Loss On Ignition	2610	M	%			1.1	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0040	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0052	0.0034	0.010	0.037	0.5	2	25
Barium	1455	U	0.008	< 0.005	0.015	0.012	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0015	0.0011	0.0029	0.0023	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0092	0.0010	0.018	0.023	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0007	< 0.0005	0.0014	0.0011	0.06	0.7	5
Selenium	1455	U	0.0011	0.0005	0.0021	0.0060	0.1	0.5	7
Zinc	1455	U	0.006	0.016	0.011	0.15	4	50	200
Chloride	1220	U	2000	110	4000	4100	800	15000	25000
Fluoride	1220	U	0.54	0.16	1.1	2.2	10	150	500
Sulphate	1220	U	300	22	590	650	1000	20000	50000
Total Dissolved Solids	1020	N	3900	280	7600	8400	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	6.1	3.3	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	20

Leachate Test Information	
Leachant volume 1st extract/l	0.307
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.270

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Portrush Harbour Dredging SI, Portrush

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-25841								
Chemtest Sample ID:	1682132								
Sample Ref:	ES5								
Sample ID:	PR03								
Sample Location:									
Top Depth(m):	1.5								
Bottom Depth(m):	2.0								
Sampling Date:	28-Jul-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.81	3	5	6
Loss On Ignition	2610	M	%			1.1	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0080	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0035	0.0010	0.0068	0.014	0.5	2	25
Barium	1455	U	0.009	< 0.005	0.017	0.013	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0005	0.0006	0.0010	0.0007	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.029	0.0018	0.057	0.058	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0013	< 0.0005	0.0026	0.0019	0.06	0.7	5
Selenium	1455	U	0.0010	< 0.0005	0.0020	0.0015	0.1	0.5	7
Zinc	1455	U	0.008	0.010	0.016	0.10	4	50	200
Chloride	1220	U	2200	140	4300	4400	800	15000	25000
Fluoride	1220	U	0.63	0.10	1.2	1.8	10	150	500
Sulphate	1220	U	350	23	670	700	1000	20000	50000
Total Dissolved Solids	1020	N	4300	310	8400	8900	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	7.2	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	22

Leachate Test Information	
Leachant volume 1st extract/l	0.302
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.254

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

GEOTECHNICAL
ENVIRONMENTAL SERVICES
LIMITED

APPENDIX 4

BALLYCASTLE HARBOUR
BOREHOLE LOGS AND SEDIMENT SAMPLE PHOTOGRAPHS;
LABORATORY TEST RESULTS

GEOTECHNICAL
ENVIRONMENTAL SERVICES
LIMITED

Site	Borehole Number
Portrush, Ballycastle and Ballintoy Harbours Dredging Programme	BC01

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler and Geoprobe Macro Core Sampler.	54mm cased to 2.00m	-2.75	Causeway Coast and Glens Borough Council	23103NI
	Location (Handheld GPS) 312189 E 441492 N	**Dates** 04/08/2023	**Engineer** Doran Consulting	**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 0.00-0.50	ES1 ES2						Dark gey and light grey silty fine to medium SAND		
0.50-1.00	ES2								
1.00-1.50	ES3					(2.00)			
1.50-2.00	ES4								
				Borehole terminated at specified depth. 04/08/2023:	-4.75	2.00	Complete at 2.00m		

Remarks

Scale (approx)	Logged By
1:20	RB

Figure No. 23103NI.BC01

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Portrush, Ballycastle and Ballintoy Harbours Dredging Programme	BC02

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler and Geoprobe Macro Core Sampler.	54mm cased to 1.60m	-2.00	Causeway Coast and Glens Borough Council	23103NI
	Location (Handheld GPS) 312120 E 441471 N	**Dates** 04/08/2023	**Engineer** Doran Consulting	**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 0.00-0.50	ES1 ES2					(0.50)	Grey and brownish grey silty fine to medium SAND containing decayed organic matter.		
0.50-1.00	ES3				-2.50	0.50	Grey silty fine to medium SAND containing occasional decayed organic matter.		
1.00-1.50	ES4					(1.10)			
				Unable to progress sampler below 1.6m depth. 04/08/2023:	-3.60	1.60	Complete at 1.60m		

Remarks

Scale (approx)	Logged By
1:20	RB

Figure No. 23103NI.BC02

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Portrush, Ballycastle and Ballintoy Harbours Dredging Programme	BC03

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler and Geoprobe Macro Core Sampler.	54mm cased to 0.60m	-2.30	Causeway Coast and Glens Borough Council	23103NI
	Location (Handheld GPS) 312120 E 441406 N	**Dates** 04/08/2023	**Engineer** Doran Consulting	**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 0.00-0.50	ES1 ES2					(0.50)	Dark grey slightly sandy SILT containing shell fragments.		
					-2.80	0.50 (0.10)	Suspected BEDROCK: Reovered as dark grey angular fine GRAVEL.		
				Unable to progress sampler below 0.6m depth. 04/08/2023:	-2.90	0.60	Complete at 0.60m		

Remarks

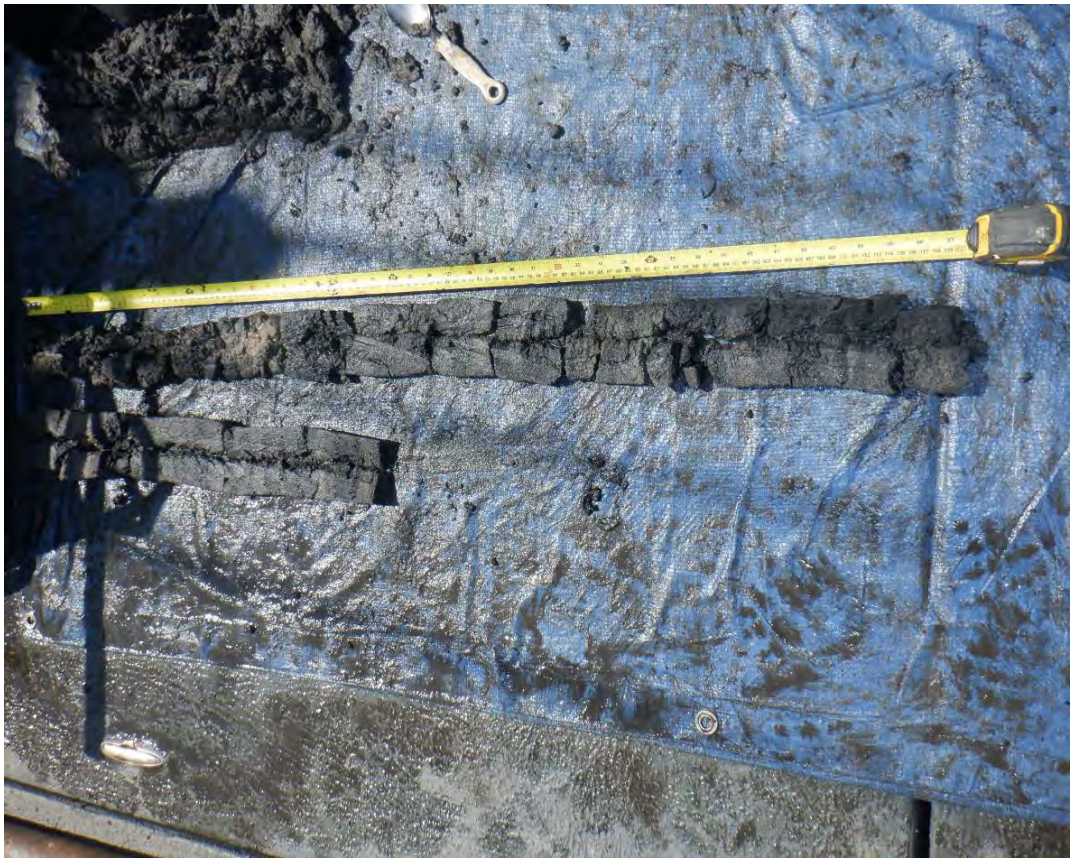
Scale (approx)	Logged By
1:20	RB

Figure No. 23103NI.BC03

BC01 Van Veen Sediment Sampler Recovery

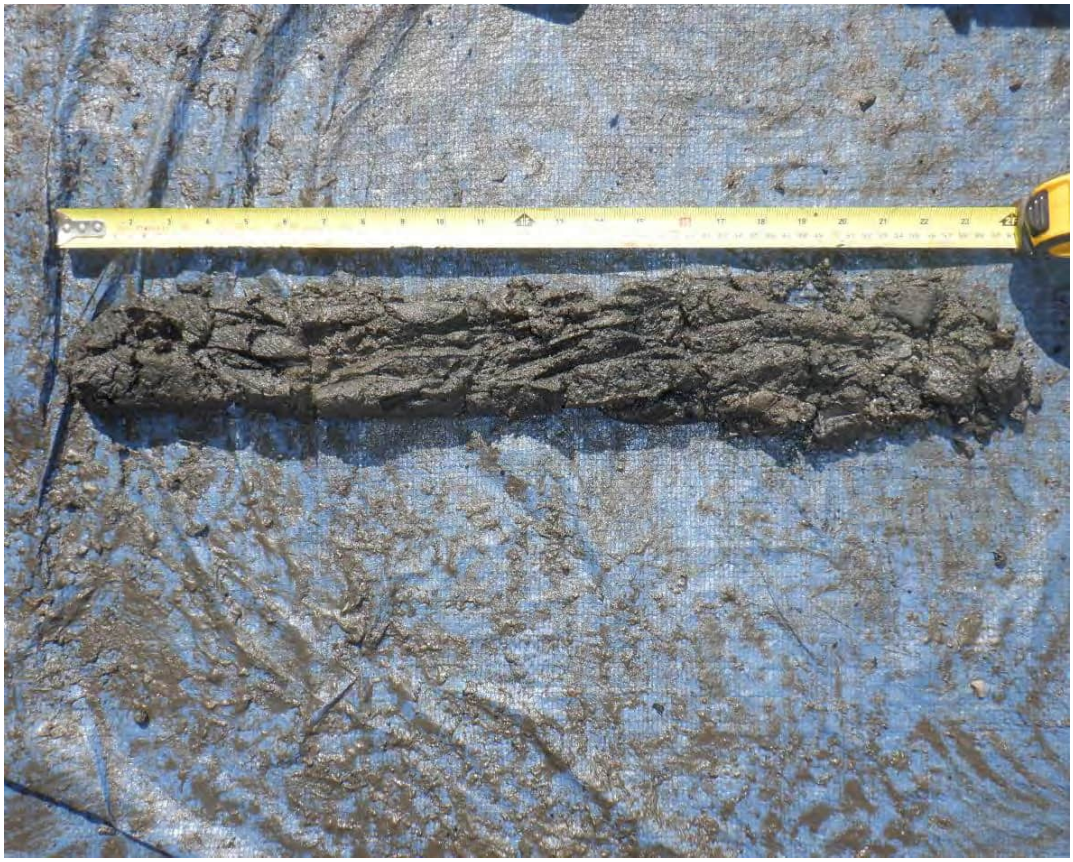
BC01 0m-2.0m Macro Core Sampler Recovery

BC02 Van Veen Sediment Sampler Recovery



BC01 0m-2.0m Macro Core Sampler Recovery

BC03 Van Veen Sediment Sampler Recovery



BC03 0m-0.6m Macro Core Sampler Recovery

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 MAR01994

Issue Version: 1

Customer: Geotechnical Environmental Services Ltd, The Old Mill, 22A Kilmoyle Road, Ballybogey, Country Antrim, BT53 6NR

Customer Reference: Ballycastle Harbour - Sediment Analysis

Date Sampled: 04-Aug-23

Date Samples Received: 09-Aug-23

Test Report Date: 31-Aug-23

Condition of samples: Cold Satisfactory

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

[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

Test Report ID MAR01994
Issue Version 1
Customer Reference Ballycastle Harbour - Sediment Analysis

		Units	%	%	Mg/m3	% M/M
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_03*	WSLM59*
		Limit of Detection	0.2	0.2	N/A	0.02
		Accreditation	UKAS	UKAS	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Particle Density**	**TOC**
BC01 - 0.0m	MAR01994.001	Sediment	31.1	68.9	2.75	0.83
BC01 - 0.0-0.5m	MAR01994.002	Sediment	31.4	68.6	2.72	0.89
BC01 - 0.5-1.0m	MAR01994.003	Sediment	31.9	68.1	2.70	0.92
BC01 - 1.0-1.5m	MAR01994.004	Sediment	24.5	75.5	2.76	0.54
BC01 - 1.5-2.0m	MAR01994.005	Sediment	29.7	70.3	2.72	0.55
BC02 - 0.0m	MAR01994.006	Sediment	37.0	63.0	2.68	2.23
BC02 - 0.0-0.5m	MAR01994.007	Sediment	31.5	68.5	2.79	3.24
BC02 - 0.5-1.0m	MAR01994.008	Sediment	30.2	69.8	2.71	0.81
BC02 - 1.0-1.5m	MAR01994.009	Sediment	28.3	71.7	2.71	0.69
BC03 - 0.0m	MAR01994.010	Sediment	39.0	61.0	2.66	1.52
BC03 - 0.0-0.5m	MAR01994.011	Sediment	42.0	58.0	2.68	1.62
		Reference Material (% Recovery)	N/A	N/A	N/A	98
		QC Blank	N/A	N/A	N/A	<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

Test Report ID MAR01993
Issue Version 1
Customer Reference Ballintoy Harbour - Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	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
		Accreditation	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**
BC01 - 0.0m	MAR01994.001	Sediment	6.1	0.12	75.2	15.7	10.9	<0.01	36.0
BC01 - 0.0-0.5m	MAR01994.002	Sediment	6.2	0.12	74.2	14.4	9.7	<0.01	35.8
BC01 - 0.5-1.0m	MAR01994.003	Sediment	5.8	0.06	81.7	12.8	9.0	<0.01	34.4
BC01 - 1.0-1.5m	MAR01994.004	Sediment	6.1	0.08	77.8	15.2	13.3	<0.01	34.8
BC01 - 1.5-2.0m	MAR01994.005	Sediment	5.9	0.07	74.9	12.8	9.4	<0.01	32.8
BC02 - 0.0m	MAR01994.006	Sediment	7.7	0.16	67.0	18.0	11.3	<0.01	33.4
BC02 - 0.0-0.5m	MAR01994.007	Sediment	7.7	0.13	69.6	18.6	11.8	<0.01	32.9
BC02 - 0.5-1.0m	MAR01994.008	Sediment	6.2	0.07	60.8	13.5	9.1	<0.01	30.4
BC02 - 1.0-1.5m	MAR01994.009	Sediment	5.7	0.07	59.2	13.1	9.1	<0.01	30.0
BC03 - 0.0m	MAR01994.010	Sediment	8.2	0.12	93.2	29.8	14.3	<0.01	43.0
BC03 - 0.0-0.5m	MAR01994.011	Sediment	9.4	0.14	107	34.4	17.0	<0.01	50.6
Certified Reference Material 2702 (% Recovery)			97	92	95	98	88	119	109
QC Blank			<0.14	<0.03	<1	<0.7	<0.6	<0.01	<0.4

* 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	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ICPMS-MWSED*	ICPOES-MWSED*
		Limit of Detection	3.5	1750
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Zinc as Zn**	**Aluminium as Al**
BC01 - 0.0m	MAR01994.001	Sediment	51.8	31400
BC01 - 0.0-0.5m	MAR01994.002	Sediment	46.2	34900
BC01 - 0.5-1.0m	MAR01994.003	Sediment	42.0	31800
BC01 - 1.0-1.5m	MAR01994.004	Sediment	56.1	38000
BC01 - 1.5-2.0m	MAR01994.005	Sediment	42.4	33000
BC02 - 0.0m	MAR01994.006	Sediment	59.6	27000
BC02 - 0.0-0.5m	MAR01994.007	Sediment	64.3	29800
BC02 - 0.5-1.0m	MAR01994.008	Sediment	42.0	23400
BC02 - 1.0-1.5m	MAR01994.009	Sediment	43.9	26400
BC03 - 0.0m	MAR01994.010	Sediment	88.2	40800
BC03 - 0.0-0.5m	MAR01994.011	Sediment	118	44400
	Certified Reference Material 2702 (% Recovery)		101	95
	QC Blank		<3.5	<1750

* 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 MAR01994
Issue Version 1
Customer Reference Ballycastle Harbour - Sediment Analysis

		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)**
BC01 - 0.0m	MAR01994.001	Sediment	<5	<5
BC01 - 0.0-0.5m	MAR01994.002	Sediment	<5	<5
BC01 - 0.5-1.0m	MAR01994.003	Sediment	<5	<5
BC01 - 1.0-1.5m	MAR01994.004	Sediment	<5	<5
BC01 - 1.5-2.0m	MAR01994.005	Sediment	<5	<5
BC02 - 0.0m	MAR01994.006	Sediment	<5	<5
BC02 - 0.0-0.5m	MAR01994.007	Sediment	<5	<5
BC02 - 0.5-1.0m	MAR01994.008	Sediment	<5	<5
BC02 - 1.0-1.5m	MAR01994.009	Sediment	<5	<5
BC03 - 0.0m	MAR01994.010	Sediment	<5	<5
BC03 - 0.0-0.5m	MAR01994.011	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			93	81
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 MAR01994
Issue Version 1
Customer Reference Ballycastle Harbour - Sediment Analysis

		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**
BC01 - 0.0m	MAR01994.001	Sediment	<5	<5	<5	<5	<5	<5
BC01 - 0.0-0.5m	MAR01994.002	Sediment	<5	<5	<5	13.4	15.9	19.9
BC01 - 0.5-1.0m	MAR01994.003	Sediment	<5	<5	<5	<5	<5	<5
BC01 - 1.0-1.5m	MAR01994.004	Sediment	<5	<5	<5	19.1	28.7	28.3
BC01 - 1.5-2.0m	MAR01994.005	Sediment	<5	<5	<5	8.17	11.8	11.1
BC02 - 0.0m	MAR01994.006	Sediment	<5	<5	<5	<5	<5	<5
BC02 - 0.0-0.5m	MAR01994.007	Sediment	<5	<5	<5	22.2	31.7	31.9
BC02 - 0.5-1.0m	MAR01994.008	Sediment	<5	<5	<5	16.7	30.9	23.6
BC02 - 1.0-1.5m	MAR01994.009	Sediment	<5	<5	<5	<5	<5	<5
BC03 - 0.0m	MAR01994.010	Sediment	<5	<5	13.5	26.0	25.2	25.9
BC03 - 0.0-0.5m	MAR01994.011	Sediment	<5	<5	<5	<5	9.20	8.88
Certified Reference Material Nist 1941b(% Recovery)			73	108	70	67	62	93
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 MAR01994
Issue Version 1
Customer Reference Ballycastle Harbour - Sediment Analysis

		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**
BC01 - 0.0m	MAR01994.001	Sediment	8.30	<5	6.83	<5	10.7	<5
BC01 - 0.0-0.5m	MAR01994.002	Sediment	11.5	19.6	17.5	<5	32.6	<5
BC01 - 0.5-1.0m	MAR01994.003	Sediment	<5	<5	<5	<5	7.48	<5
BC01 - 1.0-1.5m	MAR01994.004	Sediment	22.7	30.4	24.0	<5	36.8	<5
BC01 - 1.5-2.0m	MAR01994.005	Sediment	12.0	13.2	11.6	<5	17.5	<5
BC02 - 0.0m	MAR01994.006	Sediment	<5	<5	<5	<5	<5	<5
BC02 - 0.0-0.5m	MAR01994.007	Sediment	31.9	32.5	29.5	<5	48.8	<5
BC02 - 0.5-1.0m	MAR01994.008	Sediment	21.7	24.6	22.6	<5	32.2	<5
BC02 - 1.0-1.5m	MAR01994.009	Sediment	<5	<5	<5	<5	10.4	<5
BC03 - 0.0m	MAR01994.010	Sediment	25.6	27.6	32.6	<5	71.4	<5
BC03 - 0.0-0.5m	MAR01994.011	Sediment	9.17	10.2	9.15	<5	20.1	<5
Certified Reference Material Nist 1941b(% Recovery)			63	80	89	112	85	53
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 MAR01994
Issue Version 1
Customer Reference Ballycastle Harbour - Sediment Analysis

		Units	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
		Limit of Detection	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**
BC01 - 0.0m	MAR01994.001	Sediment	<5	<5	<5	13.3
BC01 - 0.0-0.5m	MAR01994.002	Sediment	10.2	<5	9.99	31.4
BC01 - 0.5-1.0m	MAR01994.003	Sediment	<5	<5	<5	8.57
BC01 - 1.0-1.5m	MAR01994.004	Sediment	20.1	<5	9.69	37.7
BC01 - 1.5-2.0m	MAR01994.005	Sediment	<5	<5	7.80	23.3
BC02 - 0.0m	MAR01994.006	Sediment	<5	8	<5	13.7
BC02 - 0.0-0.5m	MAR01994.007	Sediment	26.5	8.0	22.5	51.2
BC02 - 0.5-1.0m	MAR01994.008	Sediment	23.7	<5	13.6	32.5
BC02 - 1.0-1.5m	MAR01994.009	Sediment	<5	<5	<5	12.6
BC03 - 0.0m	MAR01994.010	Sediment	20.5	<5	36.3	63.7
BC03 - 0.0-0.5m	MAR01994.011	Sediment	<5	<5	10.6	19.7
Certified Reference Material Nist 1941b(% Recovery)			80	64	82	73
QC Blank			<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 MAR01994
Issue Version 1
Customer Reference Ballycastle Harbour - Sediment Analysis

		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**
BC01 - 0.0m	MAR01994.001	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BC01 - 0.0-0.5m	MAR01994.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BC01 - 0.5-1.0m	MAR01994.003*	Sediment	0.10	0.10	0.21	0.20	0.21	0.22	0.16
BC01 - 1.0-1.5m	MAR01994.004	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BC01 - 1.5-2.0m	MAR01994.005	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BC02 - 0.0m	MAR01994.006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BC02 - 0.0-0.5m	MAR01994.007	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BC02 - 0.5-1.0m	MAR01994.008	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BC02 - 1.0-1.5m	MAR01994.009	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BC03 - 0.0m	MAR01994.010	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BC03 - 0.0-0.5m	MAR01994.011	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Nist 1941b(% Recovery)			72	99	101	96	124	105	108
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 MAR01994
Issue Version 1
Customer Reference Ballycastle Harbour - Sediment Analysis

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR01994.001-011	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMS-MWSED*	MAR01994.001-011	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPOES-MWSED*	MAR01994.001-011	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR01994.001-011	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR01994.001-011	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/302	MAR01994.003	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 (PCB138) . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR01994.001-011	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	MAR01994.001-011	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	MAR01994.001-011	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

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

Test Report ID	MAR01994
Issue Version	1
Customer Reference	Ballycastle Harbour - Sediment Analysis

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.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried and ground <2mm	Microwave assisted HF/Boric extraction followed by ICP analysis.
Organotins	Wet Sediment <2mm	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment <2mm	Solvent extraction and clean up followed by GC-MS 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		

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Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	23-26620-1
Initial Date of Issue:	14-Aug-2023
Re-Issue Details:	
Client	Geotechnical Environmental Services Limited
Client Address:	The Old Mill 22A Kilmoyle Road Ballybogey County Antrim BT53 6NR
Contact(s):	Caitlin Shiels Robert Barry
Project	22103NI Ballycastle Harbour Dredging SI, Ballycastle

Quotation No.:	Q23-31872	**Date Received:**	08-Aug-2023
Order No.:		**Date Instructed:**	08-Aug-2023
No. of Samples:	9		
Turnaround (Wkdays):	5	**Results Due:**	14-Aug-2023
Date Approved:	14-Aug-2023		

Approved By:

[redacted]

Details: [redacted], Technical Manager

Results - Soil

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

Client: Geotechnical Environmental Services Limited				Chemtest Job No.:	23-26620	23-26620	23-26620	23-26620	23-26620	23-26620	23-26620	23-26620
Quotation No.: Q23-31872				Chemtest Sample ID.:	1685255	1685256	1685257	1685259	1685260	1685262	1685263	1685264
Order No.:				Client Sample Ref.:	ES1	ES2	ES3	ES5	ES1	ES3	ES4	ES1
				Client Sample ID.:	BC01	BC01	BC01	BC01	BC02	BC02	BC02	BC03
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.00	0.00	0.50	1.50	0.00	0.50	1.00	0.00
				Bottom Depth (m):		0.50	1.00	2.00		1.00	1.50	
				Date Sampled:	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023
				Asbestos Lab:	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	18	13	17	49	17	19	19
Chromatogram (AA Split)	N			N/A	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached
Chromatogram VPH	N			N/A	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached
pH	U	2010		4.0	7.6	7.6	7.8	7.7	7.9	7.8	7.8	7.8
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.60	0.77	0.62	0.71	0.57	0.92	0.83	0.63
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phosphorus (Total)	N	2430	mg/kg	10	410	510	640	540	390	110	530	620
Phosphate (Total)	N	2430	mg/kg	10	1300	1600	2000	1700	1200	320	1600	1900
Sulphate (Total)	U	2430	%	0.010	0.67	0.77	0.87	0.85	0.88	0.26	0.84	1.2
Arsenic	U	2455	mg/kg	0.5	6.9	7.5	8.1	6.7	5.8	7.6	6.9	11
Barium	U	2455	mg/kg	0	20	49	23	20	13	30	41	74
Cadmium	U	2455	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.11	0.10	0.17
Chromium	U	2455	mg/kg	0.5	24	25	29	25	17	24	24	41
Molybdenum	U	2455	mg/kg	0.5	0.8	0.8	0.7	0.7	0.6	1.5	0.9	2.5
Antimony	N	2455	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	U	2455	mg/kg	0.50	20	24	22	19	16	25	21	47
Mercury	U	2455	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	41	42	54	44	27	38	41	55
Lead	U	2455	mg/kg	0.50	10	12	9.7	10	7.0	13	11	18
Selenium	U	2455	mg/kg	0.25	0.58	0.63	0.70	0.60	0.46	0.65	0.55	0.94
Zinc	U	2455	mg/kg	0.50	59	66	65	57	51	95	65	130
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12	U	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	3.3	2.6	2.6	< 2.0	< 2.0
Aliphatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	5.4	1.1	1.1	< 1.0	< 1.0
Aliphatic EPH >C16-C21	U	2690	mg/kg	2.00	< 2.0	2.9	< 2.0	5.1	4.1	< 2.0	< 2.0	6.5

Results - Soil

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

Client: Geotechnical Environmental Services Limited					Chemtest Job No.:	23-26620	23-26620	23-26620	23-26620	23-26620	23-26620	23-26620	23-26620
Quotation No.: Q23-31872					Chemtest Sample ID.:	1685255	1685256	1685257	1685259	1685260	1685262	1685263	1685264
Order No.:					Client Sample Ref.:	ES1	ES2	ES3	ES5	ES1	ES3	ES4	ES1
					Client Sample ID.:	BC01	BC01	BC01	BC01	BC02	BC02	BC02	BC03
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.00	0.00	0.50	1.50	0.00	0.50	1.00	0.00
					Bottom Depth (m):		0.50	1.00	2.00		1.00	1.50	
					Date Sampled:	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023
					Asbestos Lab:	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aliphatic EPH >C21-C35	U	2690	mg/kg	3.00		< 3.0	< 3.0	< 3.0	4.9	3.6	< 3.0	< 3.0	7.8
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35	U	2690	mg/kg	5.00		5.7	6.5	< 5.0	19	11	5.9	5.6	16
Total Aliphatic EPH >C10-C40	N	2690	mg/kg	10.00		< 10	< 10	< 10	19	11	< 10	< 10	16
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25		< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00		16	15	14	15	27	15	15	15
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00		29	39	21	11	79	7.1	13	54
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00		< 1.0	1.0	< 1.0	2.6	2.6	< 1.0	< 1.0	2.0
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00		44	54	35	26	110	23	28	70
Total Aromatic EPH >C10-C40	N	2690	mg/kg	10.00		44	55	35	29	110	23	28	72
Total VPH >C5-C10	U	2780	mg/kg	0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00		50	61	39	45	120	28	34	86
Total EPH >C10-C40	N	2690	mg/kg	10.00		50	62	39	47	120	28	34	88
Florisil Cleanup	N		-	N/A		Done	Done	Done	Done	Done	Done	Done	Done
Diesel Present	N	2670		N/A		False	False	False	False	False	False	False	False
Benzene	U	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10		0.30	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10		0.38	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10		0.23	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

Client: Geotechnical Environmental Services Limited					**Chemtest Job No.:**	23-26620	23-26620	23-26620	23-26620	23-26620	23-26620	23-26620	23-26620
Quotation No.: Q23-31872					**Chemtest Sample ID.:**	1685255	1685256	1685257	1685259	1685260	1685262	1685263	1685264
Order No.:					Client Sample Ref.:	ES1	ES2	ES3	ES5	ES1	ES3	ES4	ES1
					Client Sample ID.:	BC01	BC01	BC01	BC01	BC02	BC02	BC02	BC03
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.00	0.00	0.50	1.50	0.00	0.50	1.00	0.00
					Bottom Depth (m):		0.50	1.00	2.00		1.00	1.50	
					Date Sampled:	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023	04-Aug-2023
					Asbestos Lab:	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Benzo[b]fluoranthene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

Client: Geotechnical Environmental Services Limited			**Chemtest Job No.:**		23-26620
Quotation No.: Q23-31872			**Chemtest Sample ID.:**		1685265
Order No.:			Client Sample Ref.:		ES1
			Client Sample ID.:		BC03
			Sample Type:		SOIL
			Top Depth (m):		0.00
			Bottom Depth (m):		0.50
			Date Sampled:		04-Aug-2023
			Asbestos Lab:		NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
Moisture	N	2030	%	0.020	23
Chromatogram (AA Split)	N			N/A	See Attached
Chromatogram VPH	N			N/A	See Attached
pH	U	2010		4.0	7.8
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.12
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50
Phosphorus (Total)	N	2430	mg/kg	10	720
Phosphate (Total)	N	2430	mg/kg	10	2200
Sulphate (Total)	U	2430	%	0.010	1.3
Arsenic	U	2455	mg/kg	0.5	15
Barium	U	2455	mg/kg	0	37
Cadmium	U	2455	mg/kg	0.10	0.18
Chromium	U	2455	mg/kg	0.5	44
Molybdenum	U	2455	mg/kg	0.5	2.4
Antimony	N	2455	mg/kg	2.0	< 2.0
Copper	U	2455	mg/kg	0.50	49
Mercury	U	2455	mg/kg	0.05	0.05
Nickel	U	2455	mg/kg	0.50	61
Lead	U	2455	mg/kg	0.50	30
Selenium	U	2455	mg/kg	0.25	1.1
Zinc	U	2455	mg/kg	0.50	150
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25
Aliphatic EPH >C10-C12	U	2690	mg/kg	2.00	3.5
Aliphatic EPH >C12-C16	U	2690	mg/kg	1.00	3.8
Aliphatic EPH >C16-C21	U	2690	mg/kg	2.00	7.5

Results - Soil

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

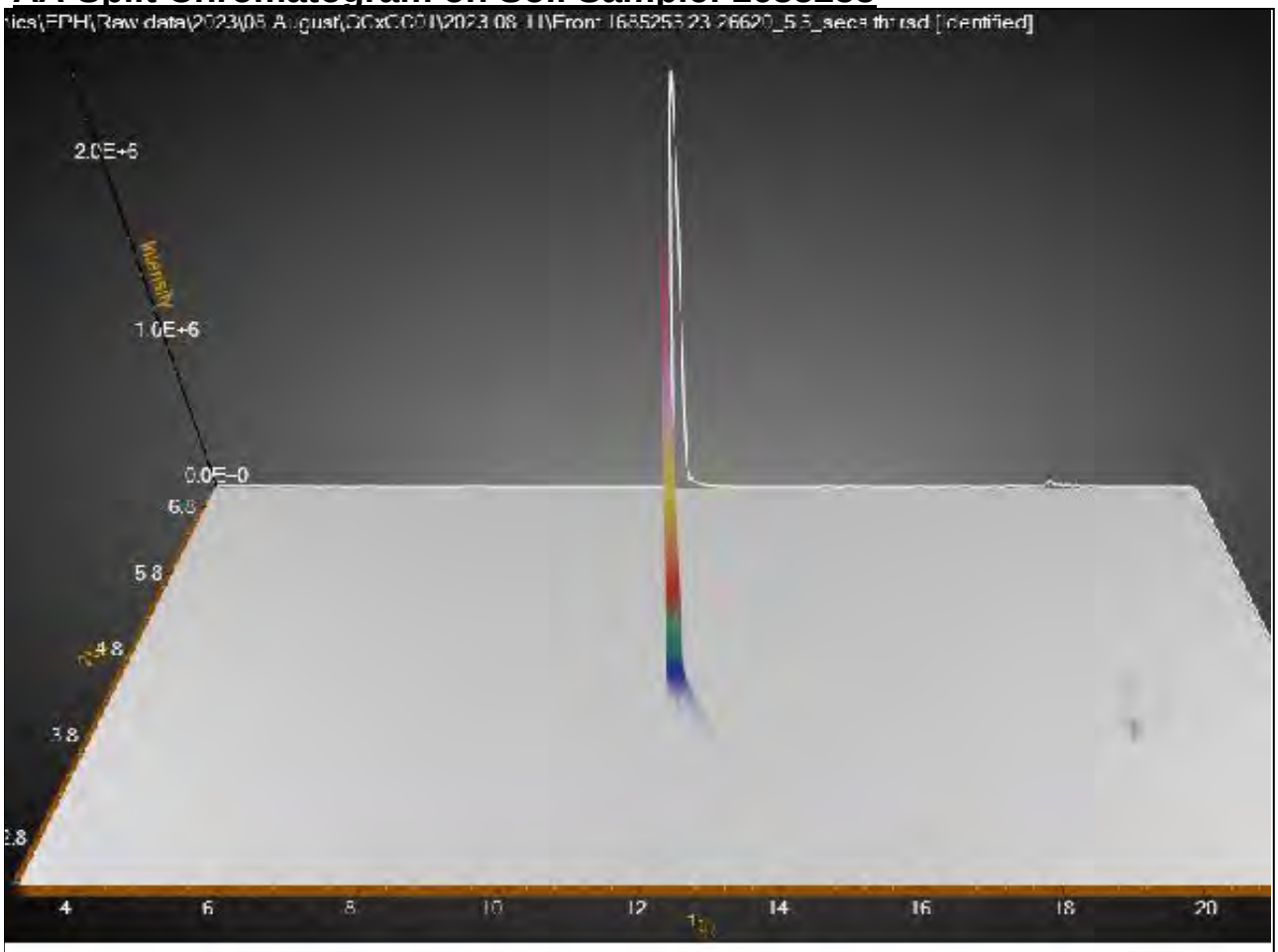
Client: Geotechnical Environmental Services Limited			**Chemtest Job No.:**		23-26620
Quotation No.: Q23-31872			**Chemtest Sample ID.:**		1685265
Order No.:			Client Sample Ref.:		ES1
			Client Sample ID.:		BC03
			Sample Type:		SOIL
			Top Depth (m):		0.00
			Bottom Depth (m):		0.50
			Date Sampled:		04-Aug-2023
			Asbestos Lab:		NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aliphatic EPH >C21-C35	U	2690	mg/kg	3.00	5.2
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	< 10
Total Aliphatic EPH >C10-C35	U	2690	mg/kg	5.00	20
Total Aliphatic EPH >C10-C40	N	2690	mg/kg	10.00	20
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00	16
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	39
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	1.3
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	56
Total Aromatic EPH >C10-C40	N	2690	mg/kg	10.00	57
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00	76
Total EPH >C10-C40	N	2690	mg/kg	10.00	77
Florisil Cleanup	N		-	N/A	Done
Diesel Present	N	2670		N/A	False
Benzene	U	2760	µg/kg	1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10

Results - Soil

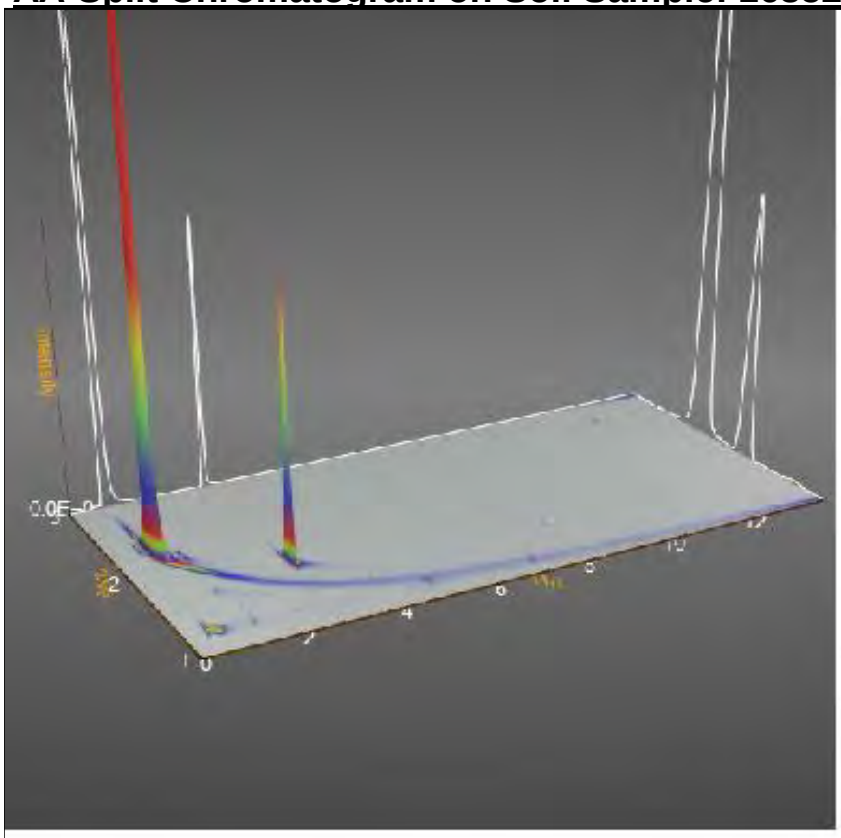
Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

Client: Geotechnical Environmental Services Limited			**Chemtest Job No.:**		23-26620
Quotation No.: Q23-31872			**Chemtest Sample ID.:**		1685265
Order No.:			Client Sample Ref.:		ES1
			Client Sample ID.:		BC03
			Sample Type:		SOIL
			Top Depth (m):		0.00
			Bottom Depth (m):		0.50
			Date Sampled:		04-Aug-2023
			Asbestos Lab:		NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10

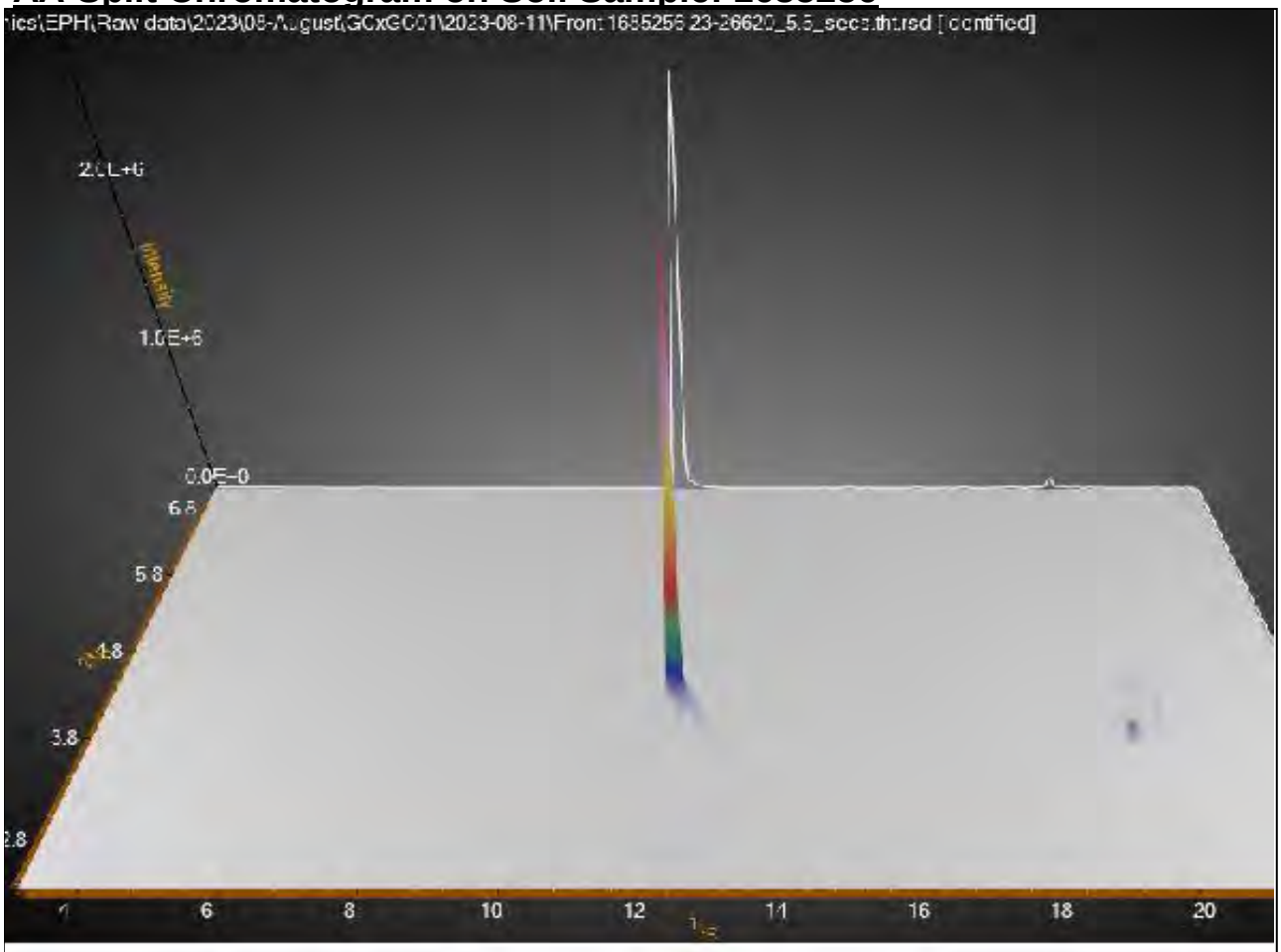
AA-Split Chromatogram on Soil Sample: 1685255



AA-Split Chromatogram on Soil Sample: 1685255



AA-Split Chromatogram on Soil Sample: 1685256



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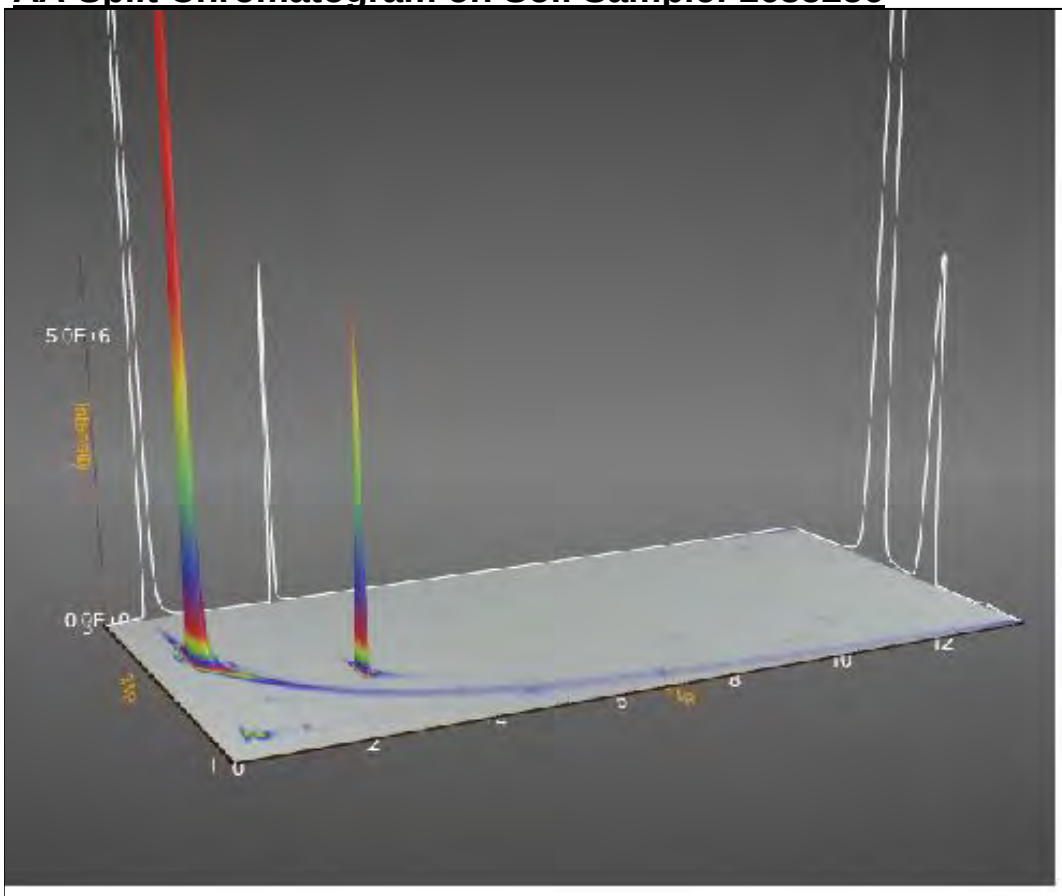
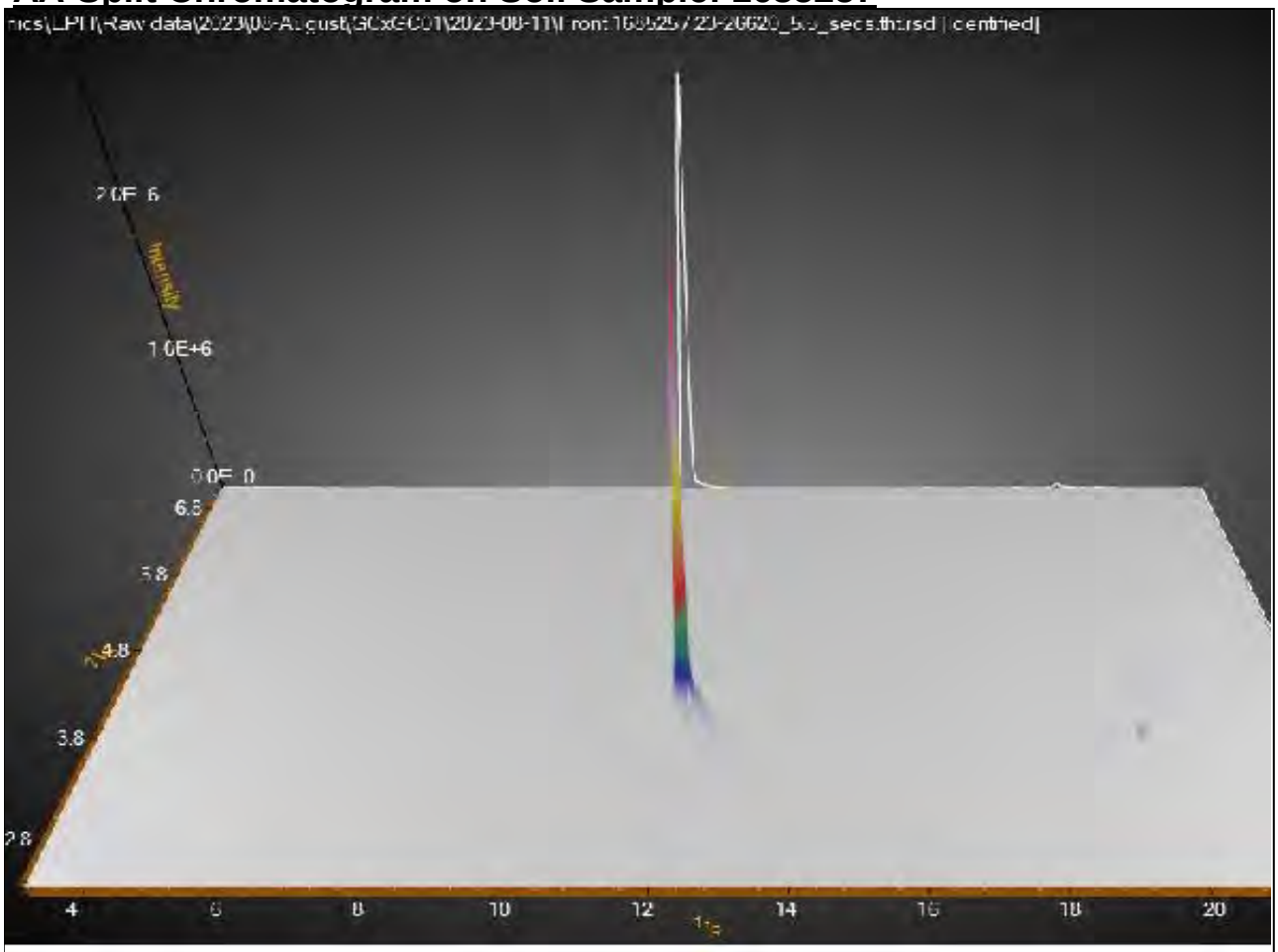
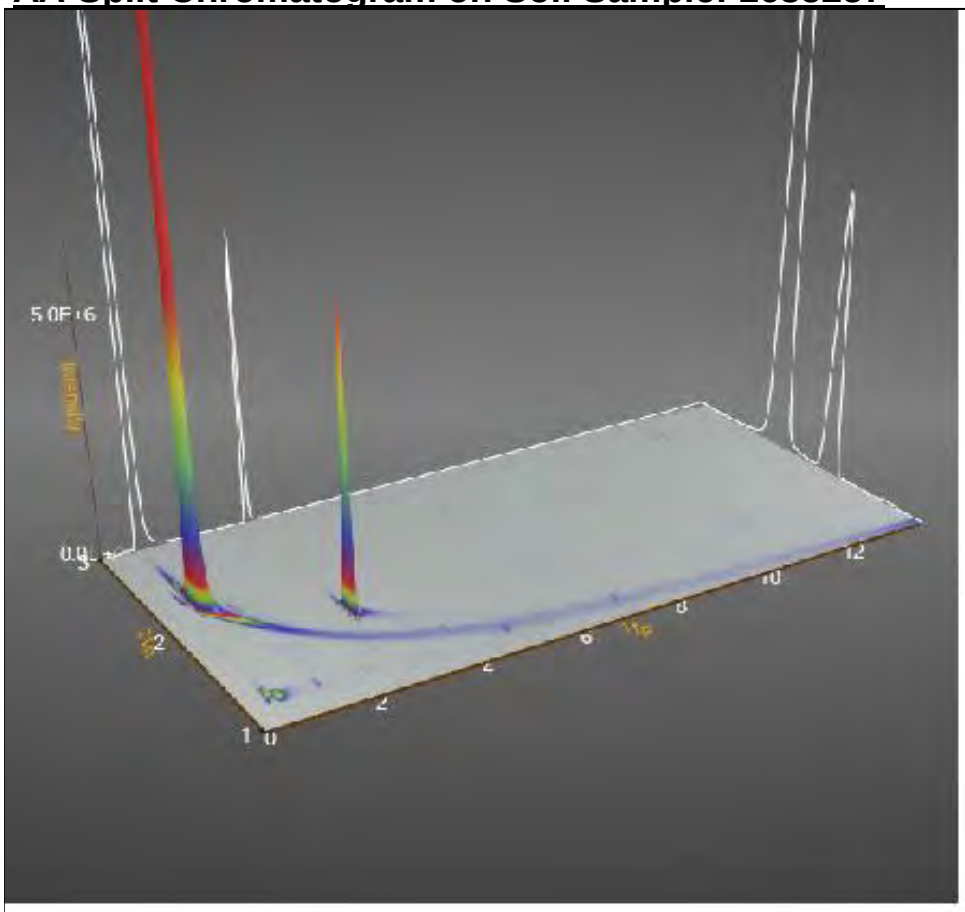


AA-Split Chromatogram on Soil Sample: 1685257



AA-Split Chromatogram on Soil Sample: 1685257



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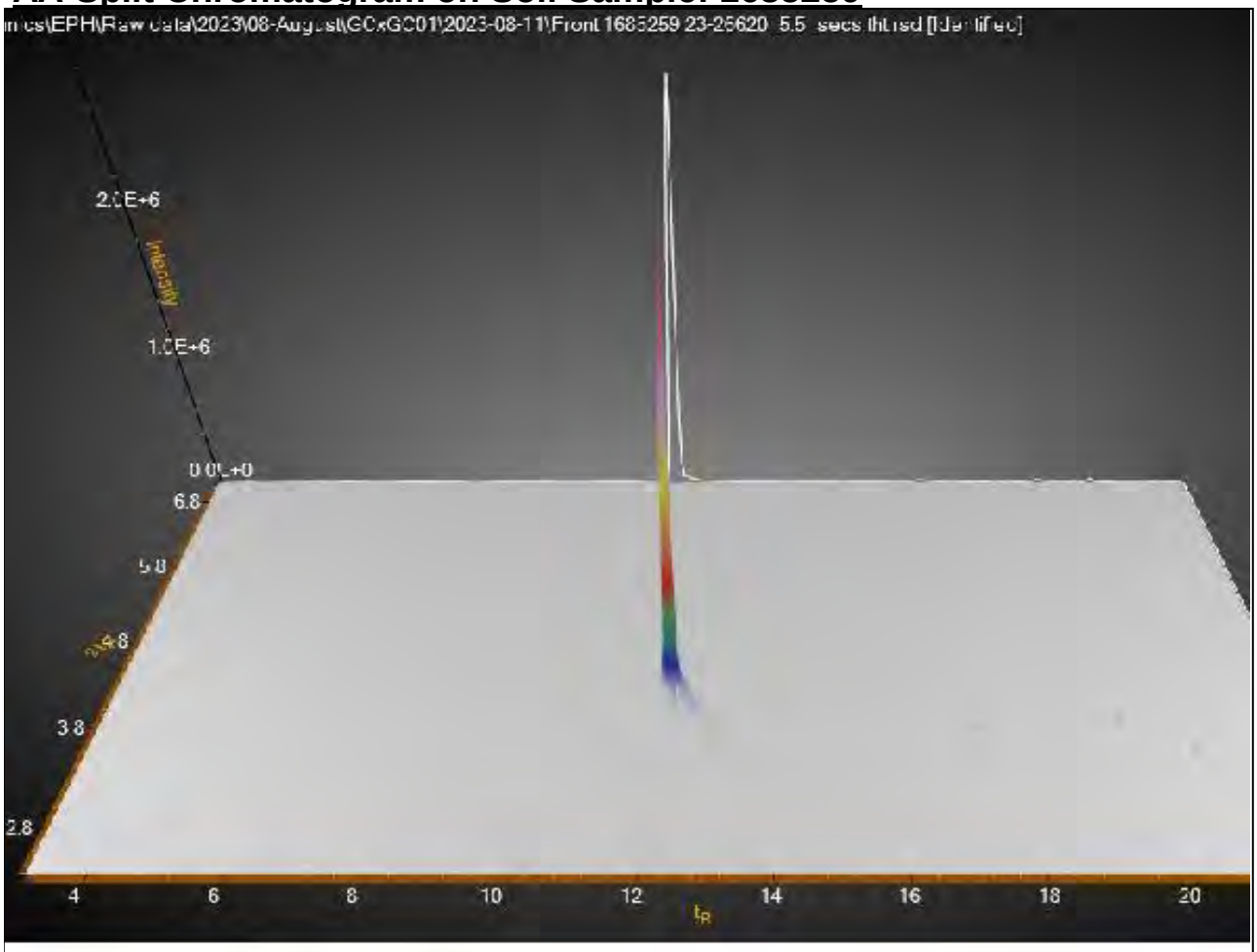

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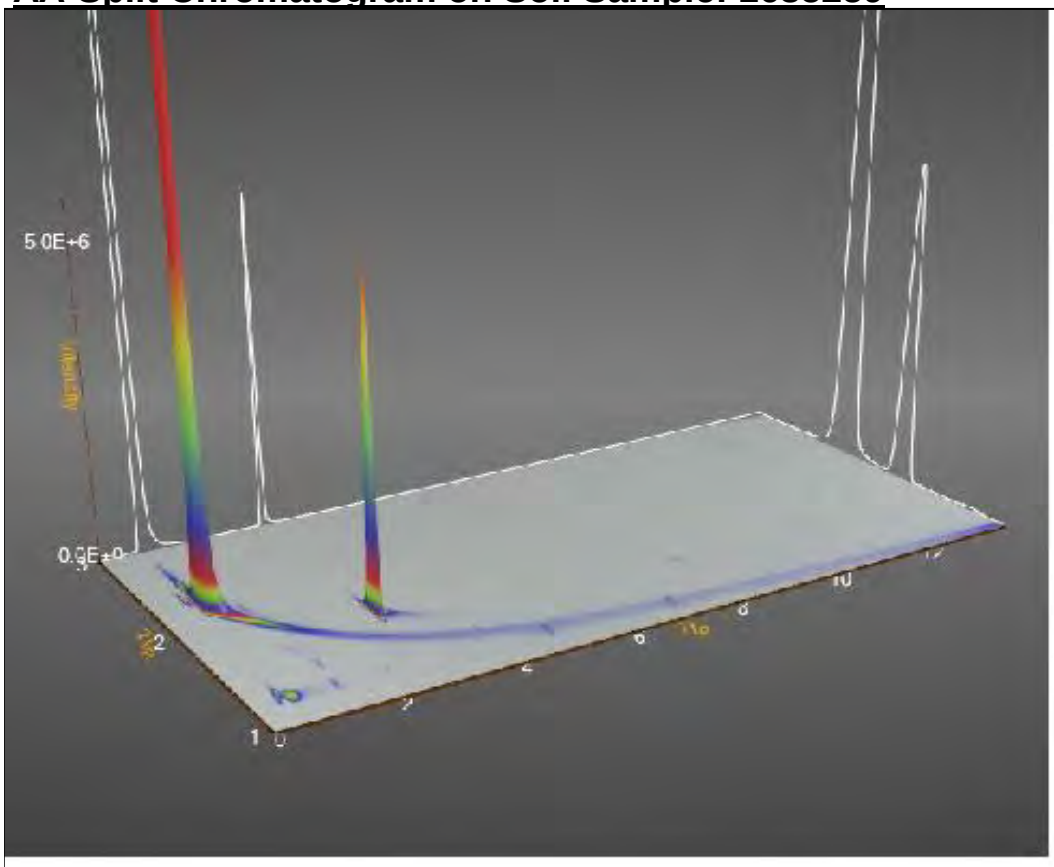

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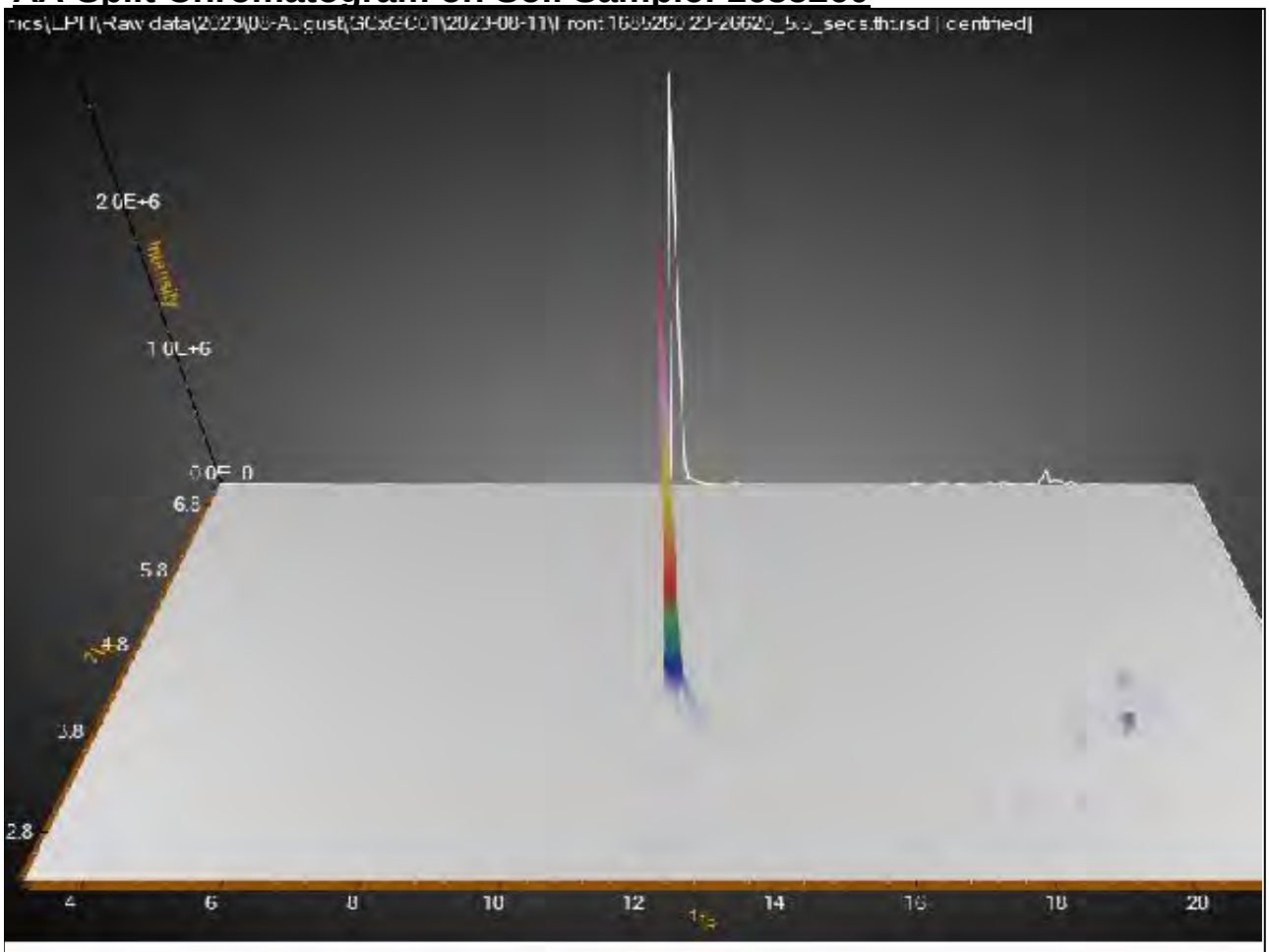

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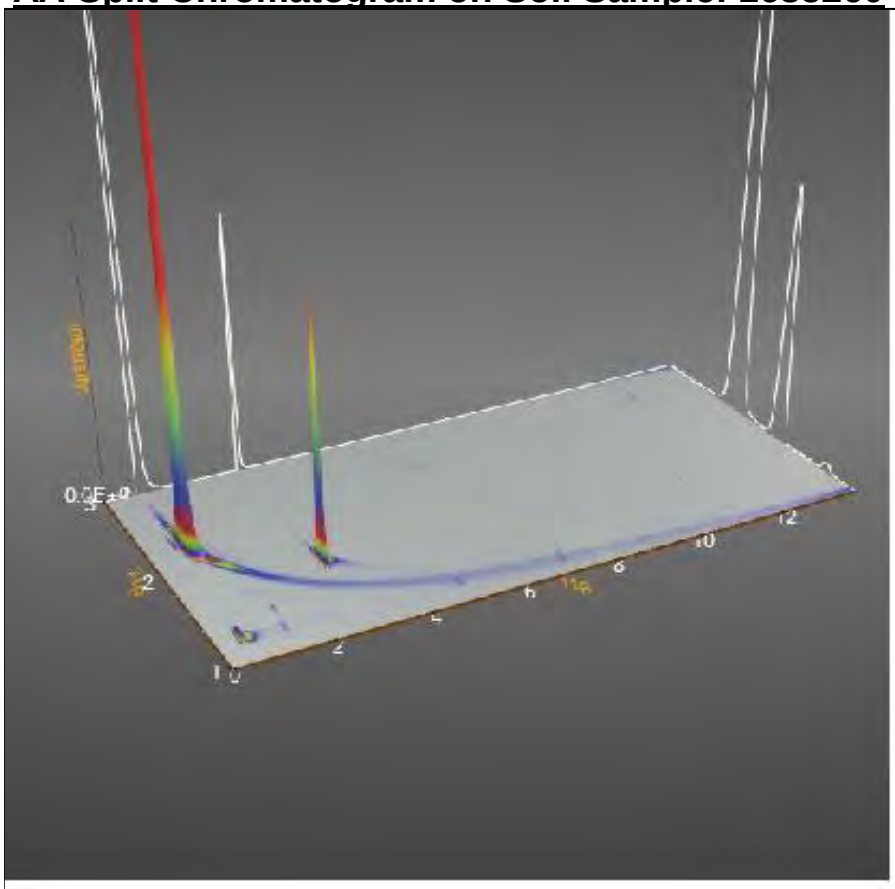
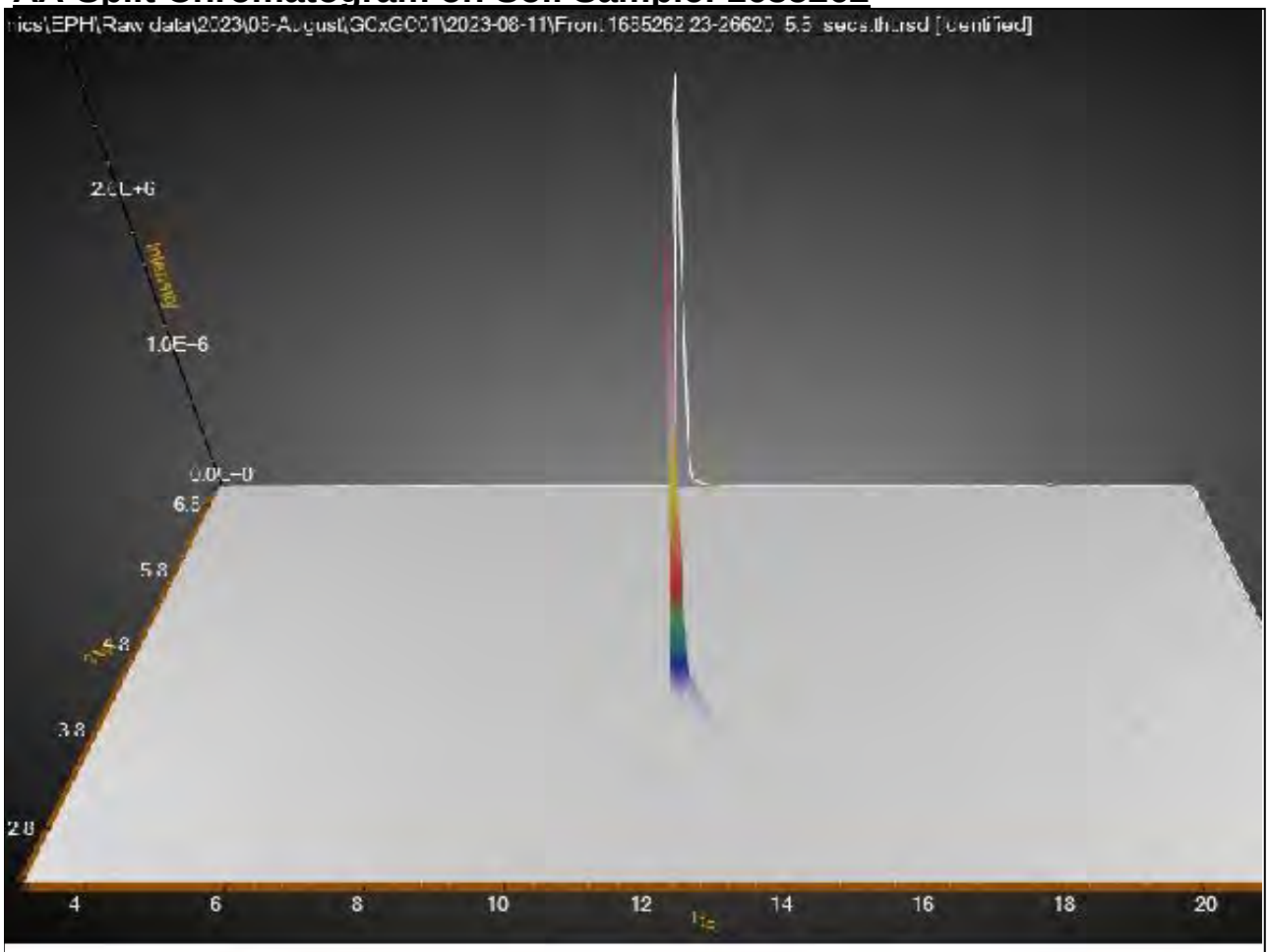
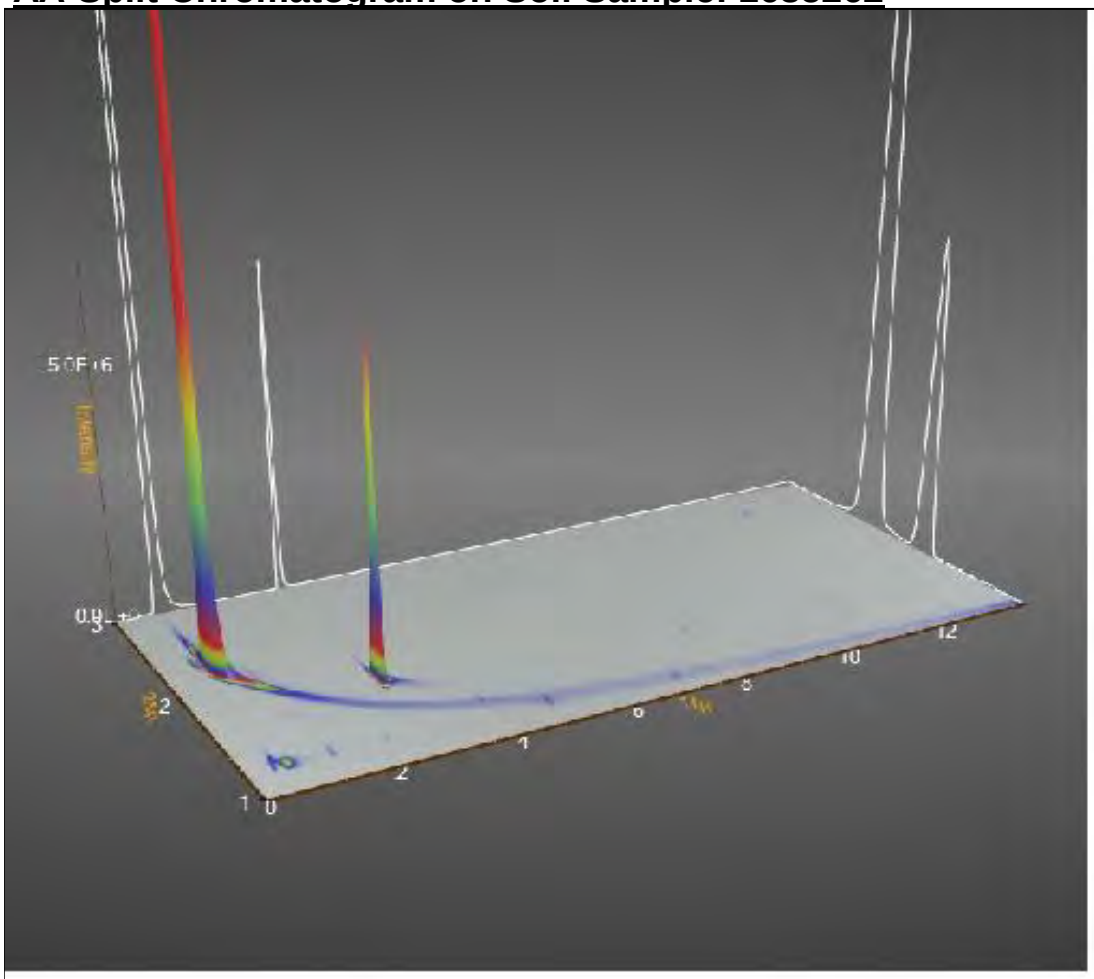


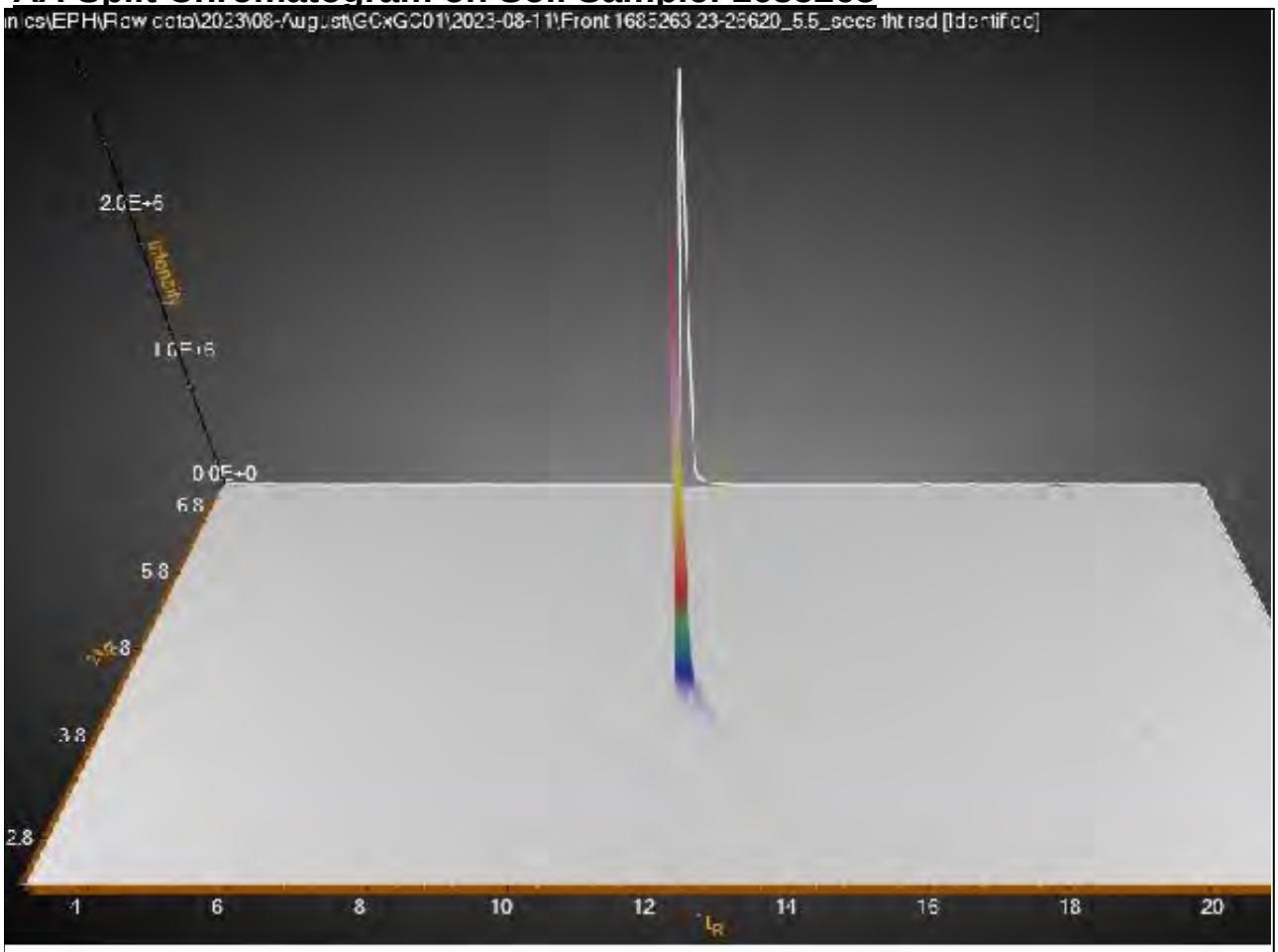
AA-Split Chromatogram on Soil Sample: 1685262



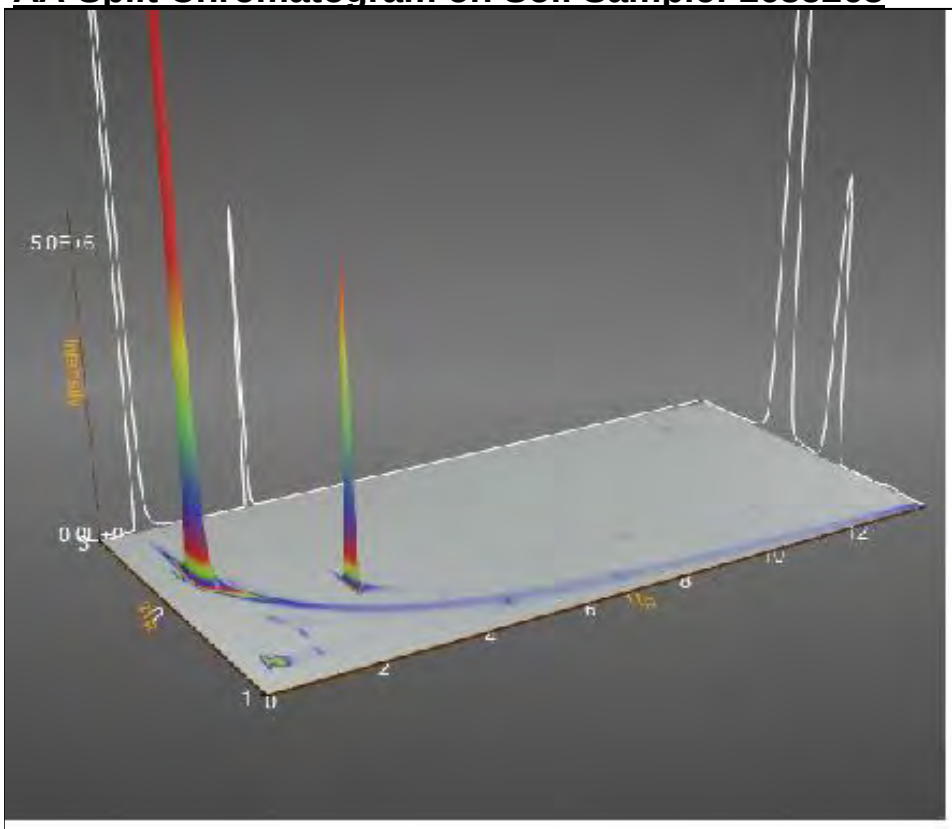
AA-Split Chromatogram on Soil Sample: 1685262



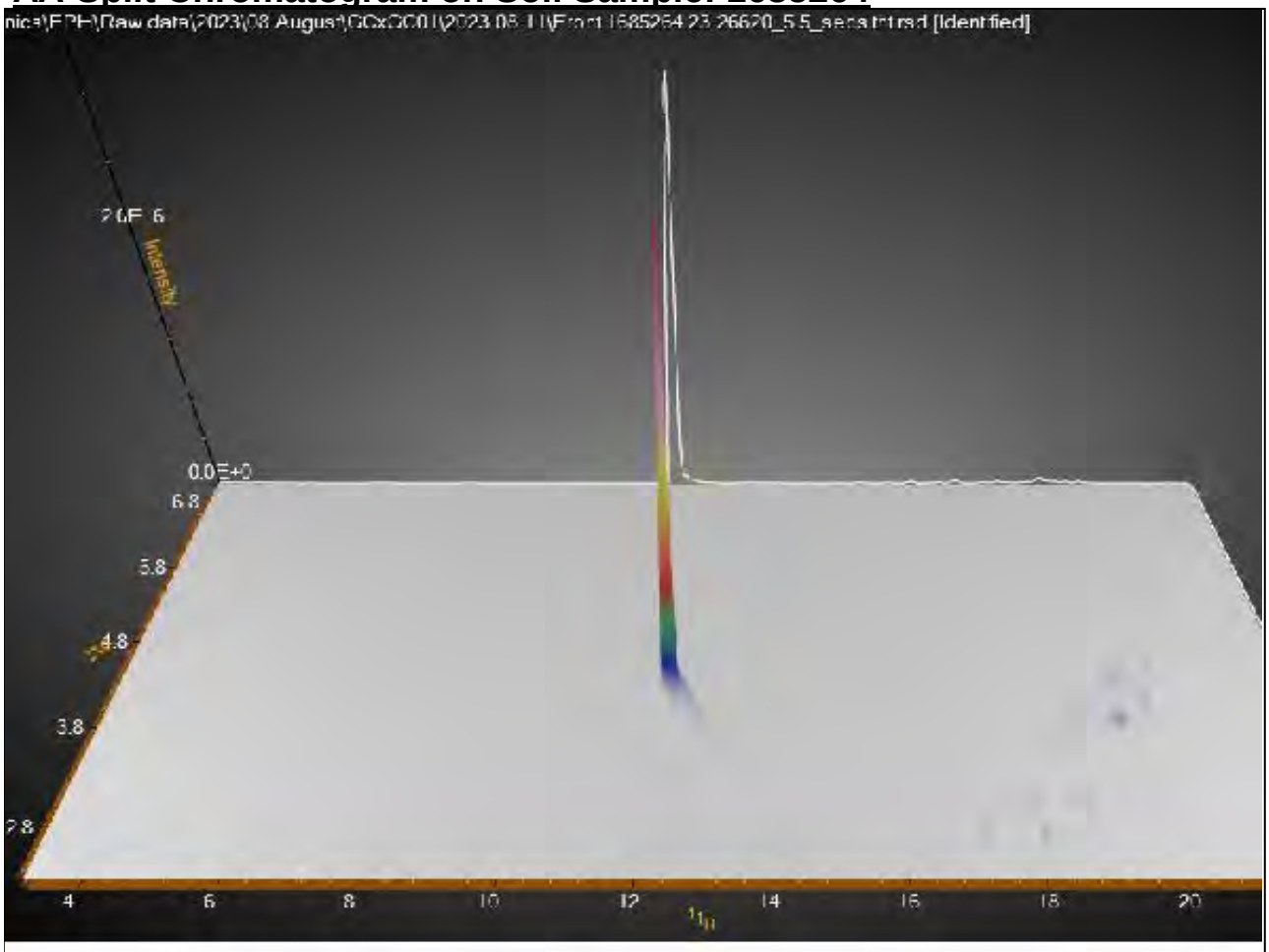
AA-Split Chromatogram on Soil Sample: 1685263



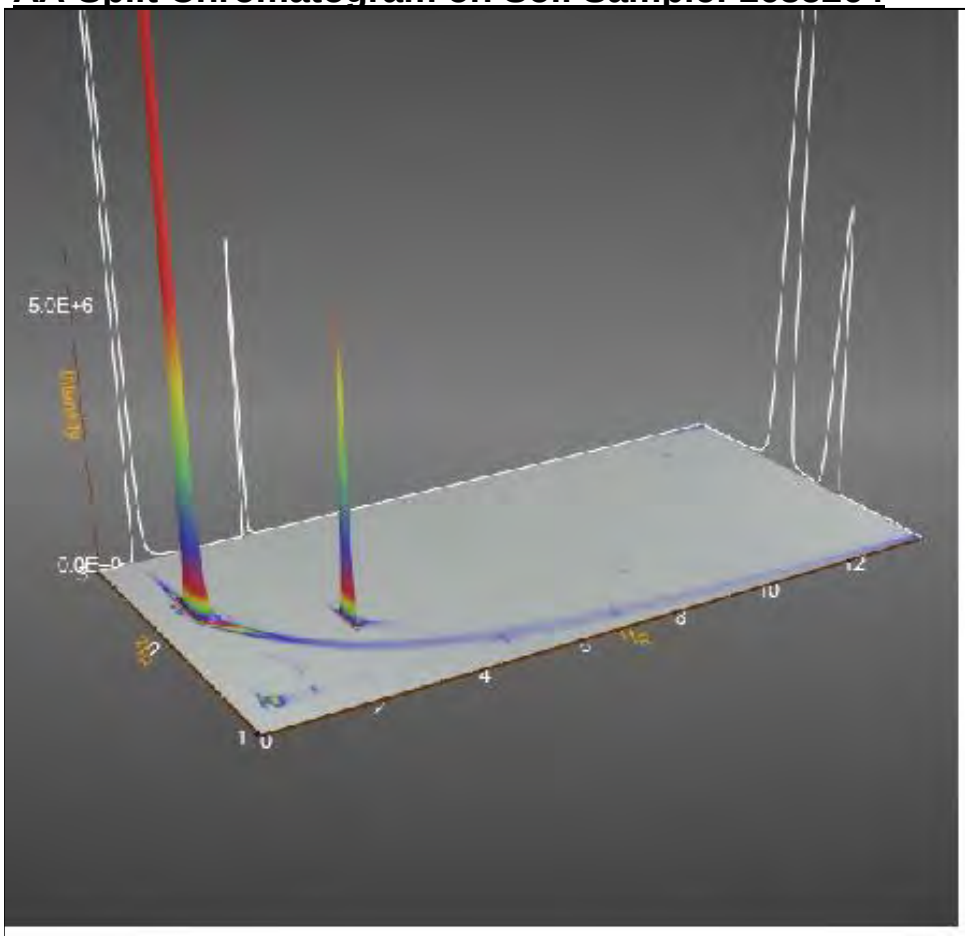
AA-Split Chromatogram on Soil Sample: 1685263



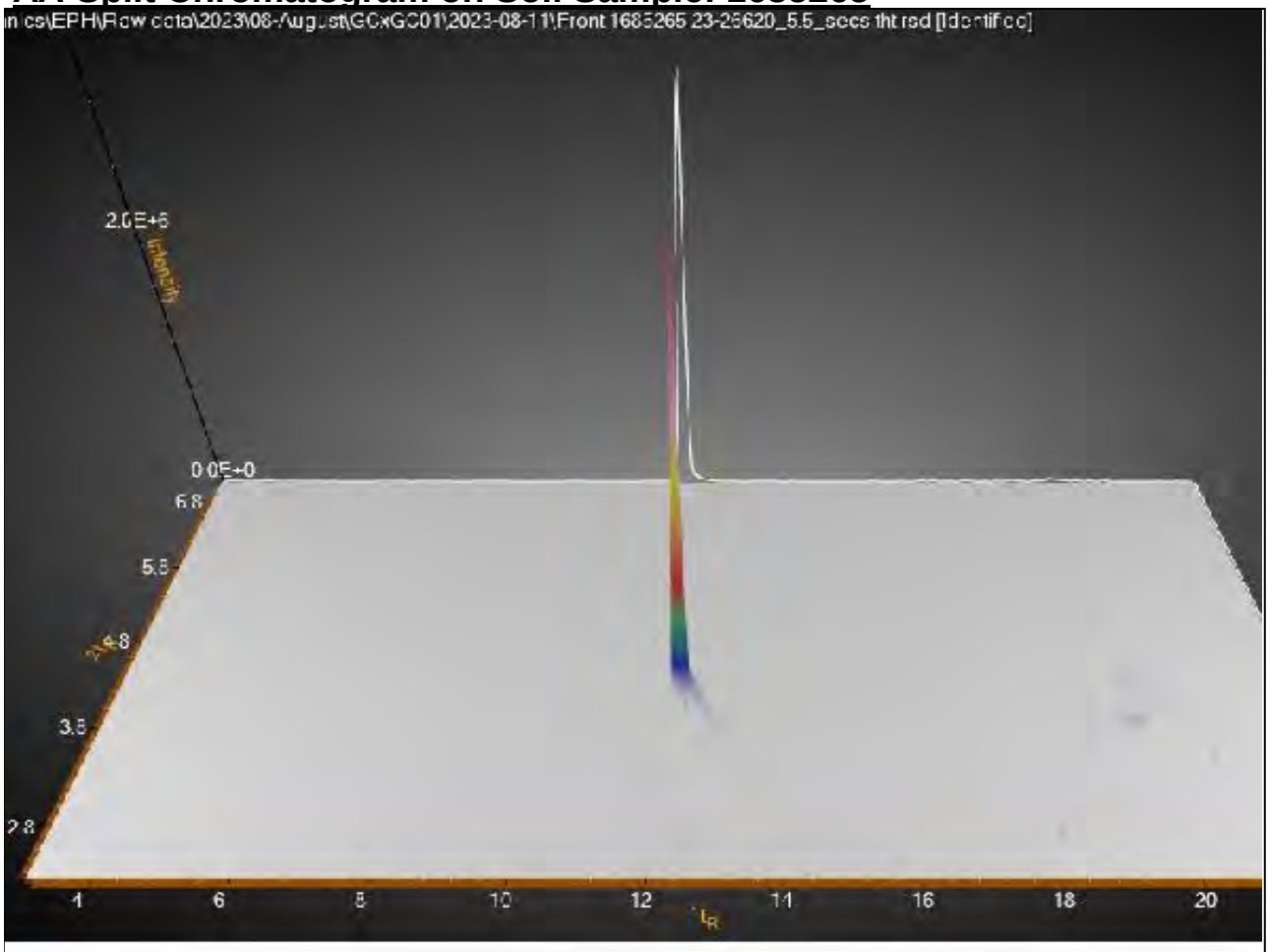
AA-Split Chromatogram on Soil Sample: 1685264



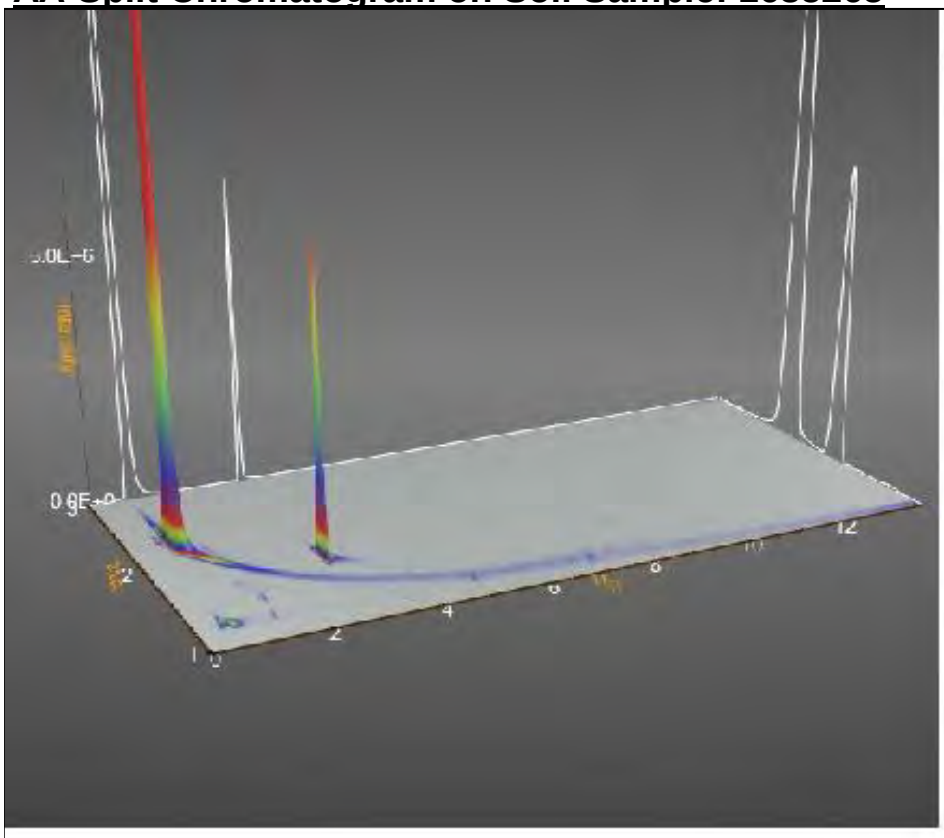
AA-Split Chromatogram on Soil Sample: 1685264



AA-Split Chromatogram on Soil Sample: 1685265



AA-Split Chromatogram on Soil Sample: 1685265



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
23-26620	1685255	S		ES1	BC01	0.00	No	Indiscernible
23-26620	1685256	S		ES2	BC01	0.00	No	Indiscernible
23-26620	1685257	S		ES3	BC01	0.50	No	Indiscernible
23-26620	1685259	S		ES5	BC01	1.50	No	Indiscernible
23-26620	1685260	S		ES1	BC02	0.00	No	Indiscernible
23-26620	1685262	S		ES3	BC02	0.50	No	Indiscernible
23-26620	1685263	S		ES4	BC02	1.00	No	Indiscernible
23-26620	1685264	S		ES1	BC03	0.00	No	Indiscernible
23-26620	1685265	S		ES1	BC03	0.00	No	Indiscernible

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-26621-1
Initial Date of Issue:	18-Aug-2023
Re-Issue Details:	
Client	Geotechnical Environmental Services Limited
Client Address:	The Old Mill 22A Kilmoyle Road Ballybogey County Antrim BT53 6NR
Contact(s):	Caitlin Shiels Robert Barry
Project	22103NI Ballycastle Harbour Dredging SI, Ballycastle

Quotation No.:	Q23-31872	**Date Received:**	08-Aug-2023
Order No.:		**Date Instructed:**	08-Aug-2023
No. of Samples:	9		
Turnaround (Wkdays):	7	**Results Due:**	16-Aug-2023
Date Approved:	18-Aug-2023		

Approved By:

[redacted]

Details: [redacted] Technical Manager

Results - 2 Stage WAC

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26621								
Chemtest Sample ID:	1685266								
Sample Ref:	ES1								
Sample ID:	BC01								
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):									
Sampling Date:	04-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.65	3	5	6
Loss On Ignition	2610	M	%			3.5	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			2.5	100	--	--
pH	2010	M				7.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.011	0.0039	0.022	0.047	0.5	2	25
Barium	1455	U	0.008	0.010	0.015	0.10	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0091	0.0045	0.018	0.050	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0009	0.0006	0.0018	0.0065	0.06	0.7	5
Selenium	1455	U	0.0016	0.0019	0.0031	0.019	0.1	0.5	7
Zinc	1455	U	0.013	0.008	0.025	0.082	4	50	200
Chloride	1220	U	1900	200	3700	3900	800	15000	25000
Fluoride	1220	U	0.67	0.29	1.3	3.3	10	150	500
Sulphate	1220	U	250	54	490	760	1000	20000	50000
Total Dissolved Solids	1020	N	3600	690	7000	10000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.9	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	20

Leachate Test Information	
Leachant volume 1st extract/l	0.307
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.199

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26621								
Chemtest Sample ID:	1685267								
Sample Ref:	ES2								
Sample ID:	BC01						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):	0.50								
Sampling Date:	04-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			0.47	3	5	6
Loss On Ignition	2610	M	%			3.1	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0030	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0063	0.0035	0.012	0.040	0.5	2	25
Barium	1455	U	0.008	0.013	0.016	0.12	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0066	0.0039	0.013	0.043	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0007	< 0.0005	0.0014	0.0011	0.06	0.7	5
Selenium	1455	U	0.0008	0.0012	0.0016	0.011	0.1	0.5	7
Zinc	1455	U	0.017	0.017	0.033	0.17	4	50	200
Chloride	1220	U	1400	210	2700	3900	800	15000	25000
Fluoride	1220	U	0.43	0.32	< 1.0	3.4	10	150	500
Sulphate	1220	U	160	54	310	700	1000	20000	50000
Total Dissolved Solids	1020	N	2700	700	5200	10000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.0	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	17

Leachate Test Information	
Leachant volume 1st extract/l	0.313
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.276

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26621								
Chemtest Sample ID:	1685268								
Sample Ref:	ES3								
Sample ID:	BC01						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	0.50								
Bottom Depth(m):	1.00								
Sampling Date:	04-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			0.76	3	5	6
Loss On Ignition	2610	M	%			3.0	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.013	0.0042	0.025	0.051	0.5	2	25
Barium	1455	U	0.009	0.009	0.019	0.086	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.011	0.0053	0.022	0.058	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0008	0.0005	0.0015	0.0054	0.06	0.7	5
Selenium	1455	U	0.0010	0.0011	0.0020	0.011	0.1	0.5	7
Zinc	1455	U	0.005	< 0.003	0.010	0.005	4	50	200
Chloride	1220	U	2300	300	4500	5000	800	15000	25000
Fluoride	1220	U	0.67	0.30	1.3	3.4	10	150	500
Sulphate	1220	U	310	64	610	880	1000	20000	50000
Total Dissolved Solids	1020	N	4400	870	8600	12000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	5.4	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	18

Leachate Test Information	
Leachant volume 1st extract/l	0.311
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.173

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26621								
Chemtest Sample ID:	1685269								
Sample Ref:	ES5								
Sample ID:	BC01						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	1.50								
Bottom Depth(m):	2.00								
Sampling Date:	04-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			0.36	3	5	6
Loss On Ignition	2610	M	%			1.7	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0030	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0085	0.0019	0.017	0.026	0.5	2	25
Barium	1455	U	0.007	0.020	0.013	0.18	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	0.0008	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0067	0.0024	0.013	0.028	0.5	10	30
Nickel	1455	U	< 0.0005	0.0014	< 0.0005	0.012	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0007	< 0.0005	0.0013	0.0008	0.06	0.7	5
Selenium	1455	U	0.0006	0.0009	0.0011	0.0082	0.1	0.5	7
Zinc	1455	U	0.015	0.010	0.029	0.11	4	50	200
Chloride	1220	U	1500	170	3000	3300	800	15000	25000
Fluoride	1220	U	0.52	0.21	1.0	2.4	10	150	500
Sulphate	1220	U	200	42	390	600	1000	20000	50000
Total Dissolved Solids	1020	N	2900	630	5700	8900	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.7	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	17

Leachate Test Information	
Leachant volume 1st extract/l	0.313
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.198

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26621								
Chemtest Sample ID:	1685270								
Sample Ref:	ES1								
Sample ID:	BC02								
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):									
Sampling Date:	04-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			1.7	3	5	6
Loss On Ignition	2610	M	%			1.8	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0040	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.020	0.0045	0.031	0.060	0.5	2	25
Barium	1455	U	0.008	0.012	0.013	0.11	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	0.0016	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0071	0.0025	0.011	0.029	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0006	< 0.0005	0.0010	0.0007	0.06	0.7	5
Selenium	1455	U	0.0009	0.0008	0.0013	0.0078	0.1	0.5	7
Zinc	1455	U	0.014	0.011	0.022	0.11	4	50	200
Chloride	1220	U	2200	170	3400	3800	800	15000	25000
Fluoride	1220	U	0.66	0.23	1.0	2.7	10	150	500
Sulphate	1220	U	290	41	440	660	1000	20000	50000
Total Dissolved Solids	1020	N	4100	620	6300	9700	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	7.6	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	49

Leachate Test Information	
Leachant volume 1st extract/l	0.184
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.188

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26621								
Chemtest Sample ID:	1685271								
Sample Ref:	ES3								
Sample ID:	BC02								
Sample Location:									
Top Depth(m):	0.50								
Bottom Depth(m):	1.00								
Sampling Date:	04-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.49	3	5	6
Loss On Ignition	2610	M	%			2.1	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0060	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0061	0.0022	0.012	0.027	0.5	2	25
Barium	1455	U	0.006	0.014	0.013	0.13	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.019	0.0053	0.038	0.071	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0010	< 0.0005	0.0020	0.0014	0.06	0.7	5
Selenium	1455	U	< 0.0005	0.0010	< 0.0005	0.0088	0.1	0.5	7
Zinc	1455	U	0.012	< 0.003	0.023	0.015	4	50	200
Chloride	1220	U	1900	240	3700	4500	800	15000	25000
Fluoride	1220	U	0.63	0.26	1.2	3.1	10	150	500
Sulphate	1220	U	210	47	420	690	1000	20000	50000
Total Dissolved Solids	1020	N	3600	740	7200	11000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.7	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	17

Leachate Test Information	
Leachant volume 1st extract/l	0.313
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.231

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26621								
Chemtest Sample ID:	1685272								
Sample Ref:	ES4								
Sample ID:	BC02								
Sample Location:									
Top Depth(m):	1.00								
Bottom Depth(m):	1.50								
Sampling Date:	04-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.71	3	5	6
Loss On Ignition	2610	M	%			8.9	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0030	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0048	0.0022	0.0095	0.026	0.5	2	25
Barium	1455	U	0.008	0.009	0.015	0.085	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.025	0.0083	0.049	0.10	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0009	< 0.0005	0.0018	0.0012	0.06	0.7	5
Selenium	1455	U	0.0006	0.0007	0.0013	0.0072	0.1	0.5	7
Zinc	1455	U	0.010	0.007	0.019	0.073	4	50	200
Chloride	1220	U	2000	290	4000	5100	800	15000	25000
Fluoride	1220	U	0.71	0.32	1.4	3.7	10	150	500
Sulphate	1220	U	230	54	450	760	1000	20000	50000
Total Dissolved Solids	1020	N	4000	850	7900	12000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	5.9	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	19

Leachate Test Information	
Leachant volume 1st extract/l	0.310
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.222

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26621								
Chemtest Sample ID:	1685273								
Sample Ref:	ES1								
Sample ID:	BC03								
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):									
Sampling Date:	04-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			1.2	3	5	6
Loss On Ignition	2610	M	%			4.6	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0070	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.015	0.0082	0.029	0.088	0.5	2	25
Barium	1455	U	0.007	0.009	0.014	0.087	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.024	0.011	0.048	0.12	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0016	< 0.0005	0.0031	0.0016	0.06	0.7	5
Selenium	1455	U	< 0.0005	0.0009	< 0.0005	0.0082	0.1	0.5	7
Zinc	1455	U	< 0.003	0.008	< 0.003	0.072	4	50	200
Chloride	1220	U	1900	410	3700	5600	800	15000	25000
Fluoride	1220	U	0.60	0.33	1.2	3.6	10	150	500
Sulphate	1220	U	220	70	420	840	1000	20000	50000
Total Dissolved Solids	1020	N	3500	1100	6900	14000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	7.3	3.0	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	19

Leachate Test Information	
Leachant volume 1st extract/l	0.308
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.177

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballycastle Harbour Dredging SI, Ballycastle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26621						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Chemtest Sample ID:	1685274								
Sample Ref:	ES1								
Sample ID:	BC03								
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):	0.50								
Sampling Date:	04-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			1.4	3	5	6
Loss On Ignition	2610	M	%			4.7	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0050	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.013	0.0051	0.026	0.060	0.5	2	25
Barium	1455	U	0.007	0.012	0.013	0.11	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.039	0.012	0.075	0.15	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0015	< 0.0005	0.0030	0.0017	0.06	0.7	5
Selenium	1455	U	< 0.0005	0.0009	< 0.0005	0.0083	0.1	0.5	7
Zinc	1455	U	0.013	0.006	0.025	0.068	4	50	200
Chloride	1220	U	1800	200	3500	3800	800	15000	25000
Fluoride	1220	U	0.72	0.28	1.4	3.3	10	150	500
Sulphate	1220	U	230	46	440	660	1000	20000	50000
Total Dissolved Solids	1020	N	2300	660	4500	8500	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	8.0	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	23

Leachate Test Information	
Leachant volume 1st extract/l	0.296
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.199

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

GEOTECHNICAL
ENVIRONMENTAL SERVICES
LIMITED

APPENDIX 5

BALLINTOY HARBOUR
BOREHOLE LOGS AND SEDIMENT SAMPLE PHOTOGRAPHS;
LABORATORY TEST RESULTS

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Portrush, Ballycastle and Ballintoy Harbours Dredging Programme	BN01

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Geoprobe Macro Core Sampler.	52mm cased to 3.00m	0.81	Causeway Coast and Glens Borough Council	23103NI
	Location (Handheld GPS) 303764 E 445365 N	**Dates** 03/08/2023	**Engineer** Doran Consulting	**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	ES1						Yellowish brown fine to medium SAND.		
0.00-0.50	ES2								
						(0.70)			
0.50-1.00	ES3								
					0.11	0.70	Dark grey fine to medium SAND.		
1.00-1.50	ES4								
1.50-2.00	ES5								
						(2.30)			
2.00-2.50	ES6								
2.50-3.00	ES7								
				Borehole terminated at specified depth. 03/08/2023:	-2.19	3.00	Complete at 3.00m		

Remarks

Scale (approx)	Logged By
1:20	RB

Figure No. 23103NI.BN01

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Portrush, Ballycastle and Ballintoy Harbours Dredging Programme	BN02

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Geoprobe Macro Core Sampler.	54mm cased to 1.50m	-0.83	Causeway Coast and Glens Borough Council	23103NI
	Location (Handheld GPS) 303781 E 445367 N	**Dates** 03/08/2023	**Engineer** Doran Consulting	**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 0.00-0.50	ES1 ES2						Dark grey fine to medium SAND with strong organic type odour.		
0.50-1.00	ES3					(1.50)			
1.00-1.50	ES4								
				Borehole terminated at specified depth. 03/08/2023:	-2.33	1.50	Complete at 1.50m		

Remarks

Scale (approx)	Logged By
1:20	RB

Figure No. 23103NI.BN02

ES1

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED

Site	Borehole Number
Portrush, Ballycastle and Ballintoy Harbours Dredging Programme	BN03

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Van Veen 2kg Capacity Grab Sampler.		-1.56	Causeway Coast and Glens Borough Council	23103NI
	Location (Handheld GPS) 303812 E 445371 N	**Dates** 03/08/2023	**Engineer** Doran Consulting	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.15)	Dark grey fine to medium SAND with organic type odour..		
				Borehole terminated at specified depth. 03/08/2023:	-1.71	0.15	Complete at 0.15m		

Remarks

Scale (approx)	Logged By
1:20	RB

Figure No. 23103NI.BN03

BN01 0m-3m Macro Core Sampler Recovery

BN02 0.5m-1.5m Macro Core Sampler Recovery

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 MAR01993

Issue Version: 1

Customer: Geotechnical Environmental Services Ltd, The Old Mill, 22A Kilmoyle Road, Ballybogey, Country Antrim, BT53 6NR

Customer Reference: Ballintoy Harbour - Sediment Analysis

Date Sampled: 03-Aug-23

Date Samples Received: 09-Aug-23

Test Report Date: 31-Aug-23

Condition of samples: Cold Satisfactory

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

[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

Test Report ID	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		Units	%	%	Mg/m3	% M/M
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_03*	WSLM59*
		Limit of Detection	0.2	0.2	N/A	0.02
		Accreditation	UKAS	UKAS	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Particle Density**	**TOC**
BN01 - 0.0m	MAR01993.001	Sediment	5.14	94.9	2.68	0.06
BN01 - 0.0-0.5m	MAR01993.002	Sediment	6.51	93.5	2.67	0.07
BN01 - 0.5-1.0m	MAR01993.003	Sediment	13.9	86.1	2.67	0.12
BN01 - 1.0-1.5m	MAR01993.004	Sediment	22.7	77.3	2.68	0.19
BN01 - 1.5-2.0m	MAR01993.005	Sediment	29.0	71.0	2.67	0.44
BN01 - 2.0-2.5m	MAR01993.006	Sediment	25.3	74.7	2.67	0.55
BN01 - 2.3-3.0m	MAR01993.007	Sediment	25.8	74.2	2.68	0.52
BN02 - 0.0m	MAR01993.008	Sediment	23.9	76.1	2.74	0.23
BN02 - 0.0-0.5m	MAR01993.009	Sediment	26.6	73.4	2.68	0.30
BN02 - 0.5-1.0m	MAR01993.010	Sediment	19.4	80.6	2.70	0.36
BN02 - 1.0-1.5m	MAR01993.011	Sediment	27.1	72.9	2.69	0.31
BN03 - 0.0m	MAR01993.012	Sediment	23.4	76.6	2.68	0.31
		Reference Material (% Recovery)	N/A	N/A	N/A	100
		QC Blank	N/A	N/A	N/A	<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

Test Report ID MAR01993
Issue Version 1
Customer Reference Ballintoy Harbour - Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	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
		Accreditation	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**
BN01 - 0.0m	MAR01993.001	Sediment	4.6	<0.03	31.2	4.7	6.6	<0.01	13.4
BN01 - 0.0-0.5m	MAR01993.002	Sediment	4.5	<0.03	21.6	3.1	5.5	<0.01	10.5
BN01 - 0.5-1.0m	MAR01993.003	Sediment	5.9	<0.03	17.4	3.2	5.0	<0.01	9.4
BN01 - 1.0-1.5m	MAR01993.004	Sediment	6.0	0.03	25.0	5.2	6.6	<0.01	10.2
BN01 - 1.5-2.0m	MAR01993.005	Sediment	6.0	0.07	18.0	4.0	5.8	<0.01	8.5
BN01 - 2.0-2.5m	MAR01993.006	Sediment	5.7	0.09	14.4	4.7	5.8	<0.01	7.9
BN01 - 2.3-3.0m	MAR01993.007	Sediment	6.3	0.07	16.5	4.0	6.3	<0.01	8.9
BN02 - 0.0m	MAR01993.008	Sediment	5.5	<0.03	13.0	3.0	5.4	<0.01	7.0
BN02 - 0.0-0.5m	MAR01993.009	Sediment	4.2	0.04	18.0	4.0	4.4	0.04	7.4
BN02 - 0.5-1.0m	MAR01993.010	Sediment	5.4	0.06	16.7	4.1	5.8	<0.01	10.3
BN02 - 1.0-1.5m	MAR01993.011	Sediment	5.0	0.04	18.4	3.7	4.6	<0.01	10.6
BN03 - 0.0m	MAR01993.012	Sediment	5.4	0.05	21.2	3.5	4.8	<0.01	11.1
Certified Reference Material 2702 (% Recovery)			97	92	95	98	88	119	109
QC Blank			<0.14	<0.03	<1	<0.7	<0.6	<0.01	<0.4

* 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	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ICPMS-MWSED*	ICPOES-MWSED*
		Limit of Detection	3.5	1750
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Zinc as Zn**	**Aluminium as Al**
BN01 - 0.0m	MAR01993.001	Sediment	14.9	16000
BN01 - 0.0-0.5m	MAR01993.002	Sediment	12.6	15900
BN01 - 0.5-1.0m	MAR01993.003	Sediment	13.5	15500
BN01 - 1.0-1.5m	MAR01993.004	Sediment	16.7	16300
BN01 - 1.5-2.0m	MAR01993.005	Sediment	15.0	10800
BN01 - 2.0-2.5m	MAR01993.006	Sediment	17.3	13500
BN01 - 2.3-3.0m	MAR01993.007	Sediment	17.0	14600
BN02 - 0.0m	MAR01993.008	Sediment	13.9	13300
BN02 - 0.0-0.5m	MAR01993.009	Sediment	12.7	13000
BN02 - 0.5-1.0m	MAR01993.010	Sediment	13.3	16500
BN02 - 1.0-1.5m	MAR01993.011	Sediment	11.9	12500
BN03 - 0.0m	MAR01993.012	Sediment	14.9	14200
		Certified Reference Material 2702 (% Recovery)	101	98
		QC Blank	<3.5	<1750

* 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	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		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)**
BN01 - 0.0m	MAR01993.001	Sediment	<1	<1
BN01 - 0.0-0.5m	MAR01993.002	Sediment	<1	<1
BN01 - 0.5-1.0m	MAR01993.003	Sediment	<1	<1
BN01 - 1.0-1.5m	MAR01993.004	Sediment	<1	<1
BN01 - 1.5-2.0m	MAR01993.005	Sediment	<1	<1
BN01 - 2.0-2.5m	MAR01993.006	Sediment	<1	<1
BN01 - 2.3-3.0m	MAR01993.007	Sediment	<1	<1
BN02 - 0.0m	MAR01993.008	Sediment	<1	<1
BN02 - 0.0-0.5m	MAR01993.009	Sediment	<1	<1
BN02 - 0.5-1.0m	MAR01993.010	Sediment	<1	<1
BN02 - 1.0-1.5m	MAR01993.011	Sediment	<1	<1
BN03 - 0.0m	MAR01993.012	Sediment	<1	<1
Certified Reference Material BCR-646 (% Recovery)			88	76
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 MAR01993
Issue Version 1
Customer Reference Ballintoy Harbour - Sediment Analysis

		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**
BN01 - 0.0m	MAR01993.001	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 0.0-0.5m	MAR01993.002	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 0.5-1.0m	MAR01993.003	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 1.0-1.5m	MAR01993.004	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 1.5-2.0m	MAR01993.005	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 2.0-2.5m	MAR01993.006	Sediment	<1	<1	<1	<1	<1	1.37
BN01 - 2.3-3.0m	MAR01993.007	Sediment	<1	<1	<1	2.35	2.20	2.05
BN02 - 0.0m	MAR01993.008	Sediment	<1	1.16	4.05	17.2	14.6	11.2
BN02 - 0.0-0.5m	MAR01993.009	Sediment	<1	<1	<1	<1	<1	<1
BN02 - 0.5-1.0m	MAR01993.010	Sediment	<1	<1	<1	<1	<1	<1
BN02 - 1.0-1.5m	MAR01993.011	Sediment	<1	<1	<1	<1	<1	<1
BN03 - 0.0m	MAR01993.012	Sediment	<1	<1	<1	<1	<1	<1
Certified Reference Material Nist 1941b(% Recovery)			80	116	70	72	64	90
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 MAR01993
Issue Version 1
Customer Reference Ballintoy Harbour - Sediment Analysis

		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**
BN01 - 0.0m	MAR01993.001	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 0.0-0.5m	MAR01993.002	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 0.5-1.0m	MAR01993.003	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 1.0-1.5m	MAR01993.004	Sediment	<1	<1	<1	<1	1.80	<1
BN01 - 1.5-2.0m	MAR01993.005	Sediment	<1	<1	<1	<1	3.24	<1
BN01 - 2.0-2.5m	MAR01993.006	Sediment	<1	1.54	1.78	<1	2.36	<1
BN01 - 2.3-3.0m	MAR01993.007	Sediment	<1	2.19	2.31	<1	5.99	<1
BN02 - 0.0m	MAR01993.008	Sediment	6.62	14.0	15.4	1.97	34.1	<1
BN02 - 0.0-0.5m	MAR01993.009	Sediment	<1	<1	<1	<1	1.84	<1
BN02 - 0.5-1.0m	MAR01993.010	Sediment	<1	<1	<1	<1	<1	<1
BN02 - 1.0-1.5m	MAR01993.011	Sediment	<1	<1	1.38	<1	1.93	<1
BN03 - 0.0m	MAR01993.012	Sediment	<1	<1	1.36	<1	1.43	<1
Certified Reference Material Nist 1941b(% Recovery)			71	79	92	104	88	52
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 MAR01993
Issue Version 1
Customer Reference Ballintoy Harbour - Sediment Analysis

		Units	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
		Limit of Detection	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**
BN01 - 0.0m	MAR01993.001	Sediment	<1	<1	<1	<1
BN01 - 0.0-0.5m	MAR01993.002	Sediment	<1	<1	<1	<1
BN01 - 0.5-1.0m	MAR01993.003	Sediment	<1	<1	<1	<1
BN01 - 1.0-1.5m	MAR01993.004	Sediment	<1	<1	1.90	1.81
BN01 - 1.5-2.0m	MAR01993.005	Sediment	<1	1.89	3.71	3.33
BN01 - 2.0-2.5m	MAR01993.006	Sediment	<1	2.35	5.28	2.68
BN01 - 2.3-3.0m	MAR01993.007	Sediment	1.55	<1	1.43	4.35
BN02 - 0.0m	MAR01993.008	Sediment	8.11	<1	9.39	27.7
BN02 - 0.0-0.5m	MAR01993.009	Sediment	<1	<1	1.98	2.25
BN02 - 0.5-1.0m	MAR01993.010	Sediment	<1	<1	1.39	<1
BN02 - 1.0-1.5m	MAR01993.011	Sediment	<1	1.69	3.18	2.21
BN03 - 0.0m	MAR01993.012	Sediment	<1	1.81	2.94	2.37
Certified Reference Material Nist 1941b(% Recovery)			77	64	82	77
QC Blank			<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 MAR01993
Issue Version 1
Customer Reference Ballintoy Harbour - Sediment Analysis

		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**
BN01 - 0.0m	MAR01993.001	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 0.0-0.5m	MAR01993.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 0.5-1.0m	MAR01993.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 1.0-1.5m	MAR01993.004	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 1.5-2.0m	MAR01993.005	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 2.0-2.5m	MAR01993.006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 2.3-3.0m	MAR01993.007	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN02 - 0.0m	MAR01993.008	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN02 - 0.0-0.5m	MAR01993.009	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN02 - 0.5-1.0m	MAR01993.010	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN02 - 1.0-1.5m	MAR01993.011	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN03 - 0.0m	MAR01993.012	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Nist 1941b(% Recovery)			63	104	100	102	100	91	113
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 MAR01993
Issue Version 1
Customer Reference Ballintoy Harbour - Sediment Analysis

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR01993.001-012	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMS-MWSED*	MAR01993.001-012	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPOES-MWSED*	MAR01993.001-012	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR01993.001-012	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/303/304	MAR01993.006-008	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	MAR01993.006-008, 0.11-012	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

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

Test Report ID	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

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.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried and ground <2mm	Microwave assisted HF/Boric extraction followed by ICP analysis.
Organotins	Wet Sediment <2mm	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment <2mm	Solvent extraction and clean up followed by GC-MS 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		

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Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	23-26491-1
Initial Date of Issue:	15-Aug-2023
Re-Issue Details:	
Client	Geotechnical Environmental Services Limited
Client Address:	The Old Mill 22A Kilmoyle Road Ballybogey County Antrim BT53 6NR
Contact(s):	Caitlin Shiels Robert Barry
Project	22103NI Ballintoy Harbour Dredging SI, Ballintoy

Quotation No.:	Q23-31872	**Date Received:**	07-Aug-2023
Order No.:		**Date Instructed:**	07-Aug-2023
No. of Samples:	8		
Turnaround (Wkdays):	5	**Results Due:**	11-Aug-2023
Date Approved:	15-Aug-2023		

Approved By:

[redacted]

Details: [redacted], Technical Manager

Results - Soil

Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

Client: Geotechnical Environmental Services Limited		**Chemtest Job No.:**			23-26491	23-26491	23-26491	23-26491	23-26491	23-26491	23-26491	23-26491
Quotation No.: Q23-31872		**Chemtest Sample ID.:**			1684671	1684673	1684675	1684677	1684678	1684680	1684681	1684682
Order No.:		Client Sample Ref.:			ES1	ES3	ES5	ES7	ES1	ES3	ES4	ES1
		Client Sample ID.:			BN01	BN01	BN01	BN01	BN02	BN02	BN02	BN03
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.00	0.50	1.50	2.50	0.00	0.50	1.00	0.00
		Bottom Depth (m):				1.00	2.00	3.00		1.00	1.50	
		Date Sampled:			03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023
		Asbestos Lab:			NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	5.6	14	25	23	23	24	23	26
Chromatogram (AA Split)	N			N/A	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached
Chromatogram VPH	N			N/A	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached
pH	U	2010		4.0	8.5	8.2	8.4	8.0	8.0	8.4	8.2	8.2
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.20	0.78	0.45	1.0	0.87	0.37	0.88	0.94
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phosphorus (Total)	N	2430	mg/kg	10	230	320	290	190	230	220	240	290
Phosphate (Total)	N	2430	mg/kg	10	690	960	870	570	700	670	730	890
Sulphate (Total)	U	2430	%	0.010	0.25	0.60	0.62	0.54	0.47	0.59	0.58	0.59
Arsenic	U	2455	mg/kg	0.5	2.8	5.3	2.8	2.9	3.2	5.0	3.3	4.5
Barium	U	2455	mg/kg	0	7	8	7	6	7	8	8	8
Cadmium	U	2455	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chromium	U	2455	mg/kg	0.5	6.1	6.0	5.8	3.7	4.5	6.2	4.7	5.8
Molybdenum	U	2455	mg/kg	0.5	< 0.5	0.6	< 0.5	< 0.5	< 0.5	0.5	< 0.5	0.7
Antimony	N	2455	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	U	2455	mg/kg	0.50	2.1	2.2	3.7	1.4	1.7	2.3	1.7	2.4
Mercury	U	2455	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	7.6	7.5	7.5	3.9	4.7	7.3	4.7	6.9
Lead	U	2455	mg/kg	0.50	2.4	3.1	4.9	2.2	2.4	3.1	2.9	3.0
Selenium	U	2455	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Zinc	U	2455	mg/kg	0.50	10	12	12	7.3	9.0	12	9.5	12
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12	U	2690	mg/kg	2.00	4.0	5.5	4.9	4.5	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C12-C16	U	2690	mg/kg	1.00	5.1	6.9	1.7	3.7	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic EPH >C16-C21	U	2690	mg/kg	2.00	2.9	3.1	< 2.0	4.2	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C21-C35	U	2690	mg/kg	3.00	4.3	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0

Results - Soil

Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

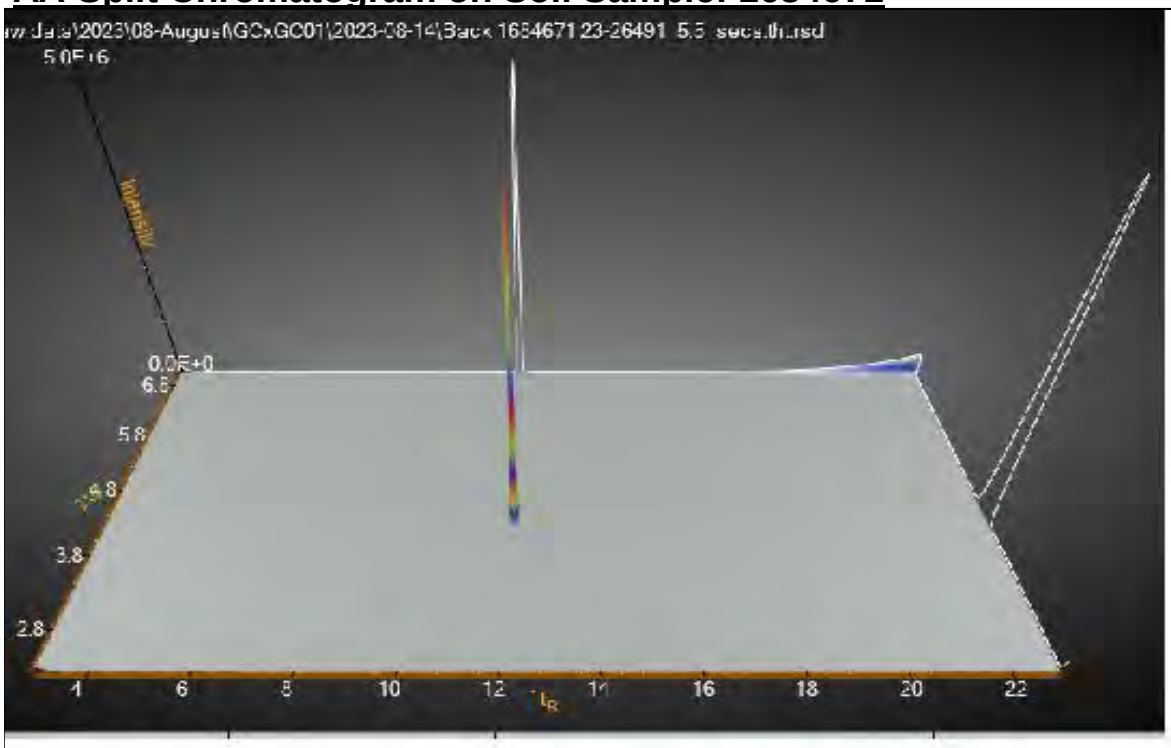
Client: Geotechnical Environmental Services Limited		**Chemtest Job No.:**			23-26491	23-26491	23-26491	23-26491	23-26491	23-26491	23-26491	23-26491
Quotation No.: Q23-31872		**Chemtest Sample ID.:**			1684671	1684673	1684675	1684677	1684678	1684680	1684681	1684682
Order No.:		Client Sample Ref.:			ES1	ES3	ES5	ES7	ES1	ES3	ES4	ES1
		Client Sample ID.:			BN01	BN01	BN01	BN01	BN02	BN02	BN02	BN03
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.00	0.50	1.50	2.50	0.00	0.50	1.00	0.00
		Bottom Depth (m):				1.00	2.00	3.00		1.00	1.50	
		Date Sampled:			03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023
		Asbestos Lab:			NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35	U	2690	mg/kg	5.00	16	16	8.7	13	< 5.0	< 5.0	< 5.0	< 5.0
Total Aliphatic EPH >C10-C40	N	2690	mg/kg	10.00	16	16	< 10	13	< 10	< 10	< 10	< 10
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0	4.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00	< 2.0	< 2.0	2.0	< 2.0	19	21	18	24
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	4.2	< 2.0	3.8	9.9	6.3	6.4	5.3	7.4
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	4.1	3.2	2.5	9.0	6.6	< 1.0	< 1.0	< 1.0
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	5.2	8.0	5.9	11	25	27	24	31
Total Aromatic EPH >C10-C40	N	2690	mg/kg	10.00	< 10	11	< 10	20	32	27	24	31
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35	U	2690	mg/kg	10.00	21	24	15	24	28	29	24	31
Total EPH >C10-C40	N	2690	mg/kg	10.00	26	27	17	33	35	29	24	31
Florisil Cleanup	N		-	N/A	Done	Done	Done	Done	Done	Done	Done	Done
Diesel Present	N	2670		N/A	False	False	False	False	False	False	False	False
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

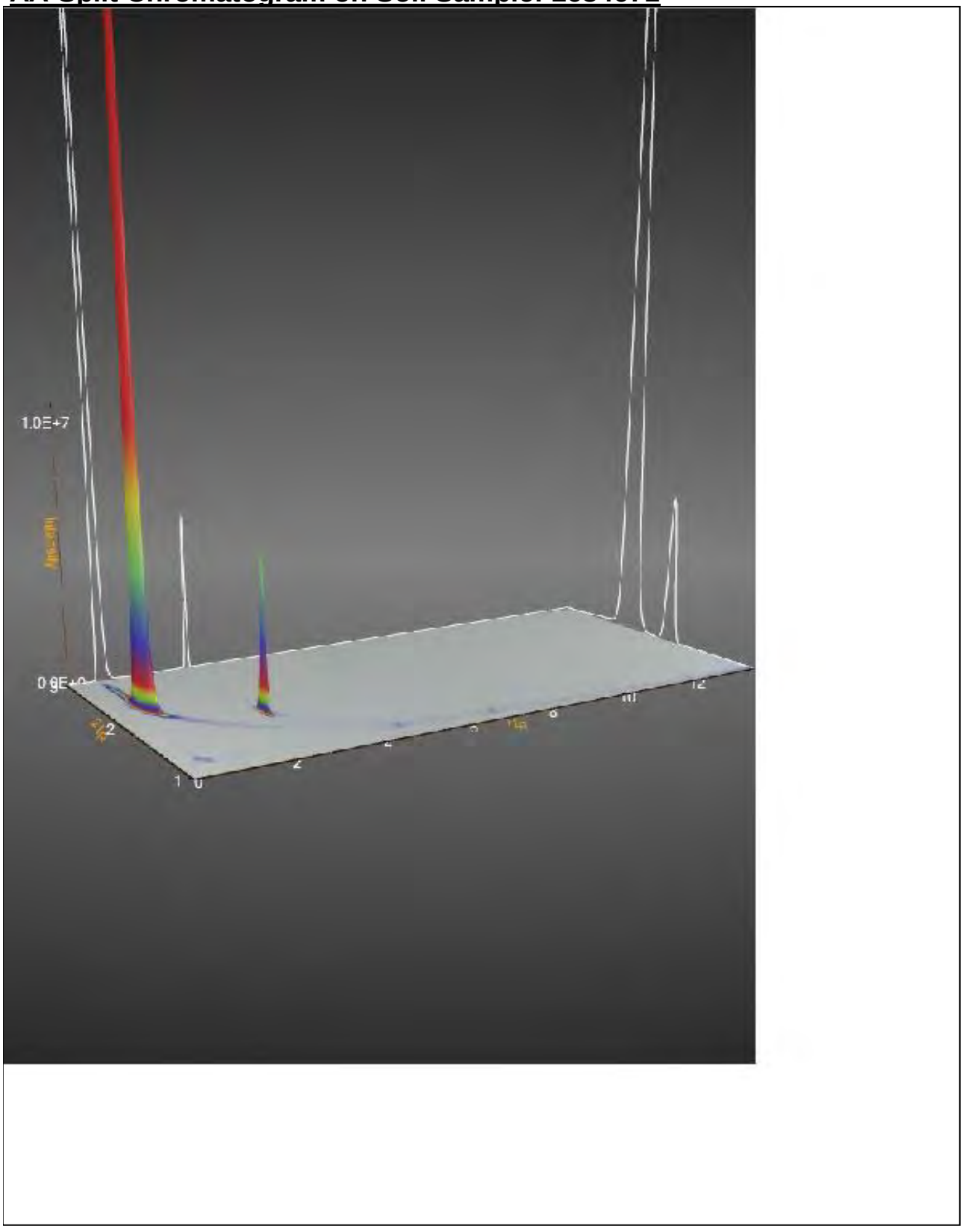
Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

Client: Geotechnical Environmental Services Limited		**Chemtest Job No.:**			23-26491	23-26491	23-26491	23-26491	23-26491	23-26491	23-26491	23-26491
Quotation No.: Q23-31872		**Chemtest Sample ID.:**			1684671	1684673	1684675	1684677	1684678	1684680	1684681	1684682
Order No.:		Client Sample Ref.:			ES1	ES3	ES5	ES7	ES1	ES3	ES4	ES1
		Client Sample ID.:			BN01	BN01	BN01	BN01	BN02	BN02	BN02	BN03
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.00	0.50	1.50	2.50	0.00	0.50	1.00	0.00
		Bottom Depth (m):				1.00	2.00	3.00		1.00	1.50	
		Date Sampled:			03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023	03-Aug-2023
		Asbestos Lab:			NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

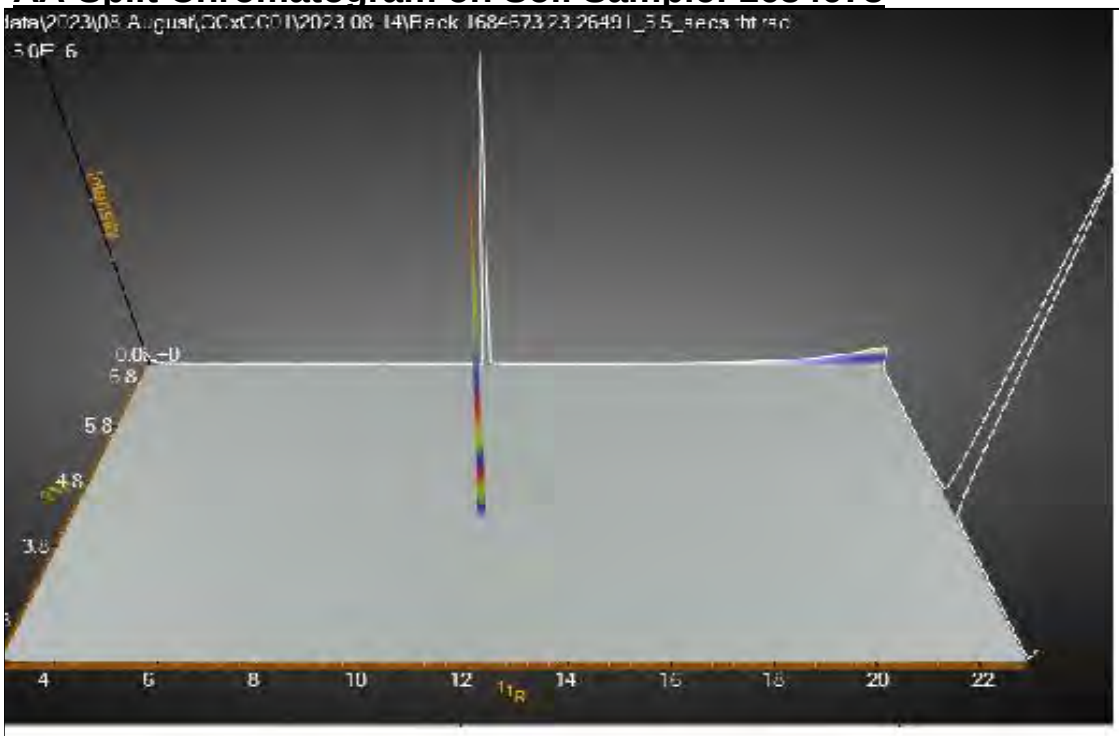
AA-Split Chromatogram on Soil Sample: 1684671



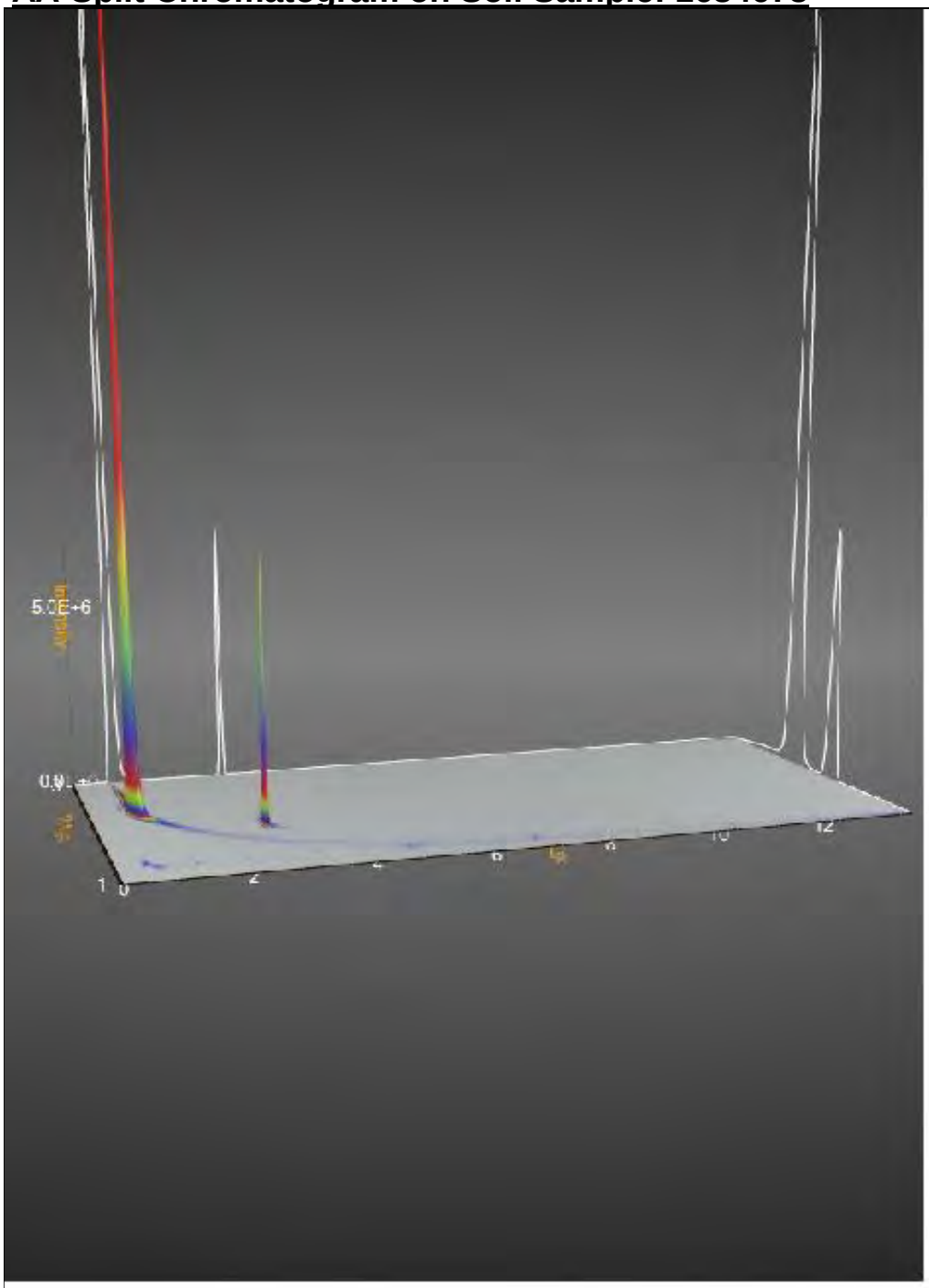
AA-Split Chromatogram on Soil Sample: 1684671



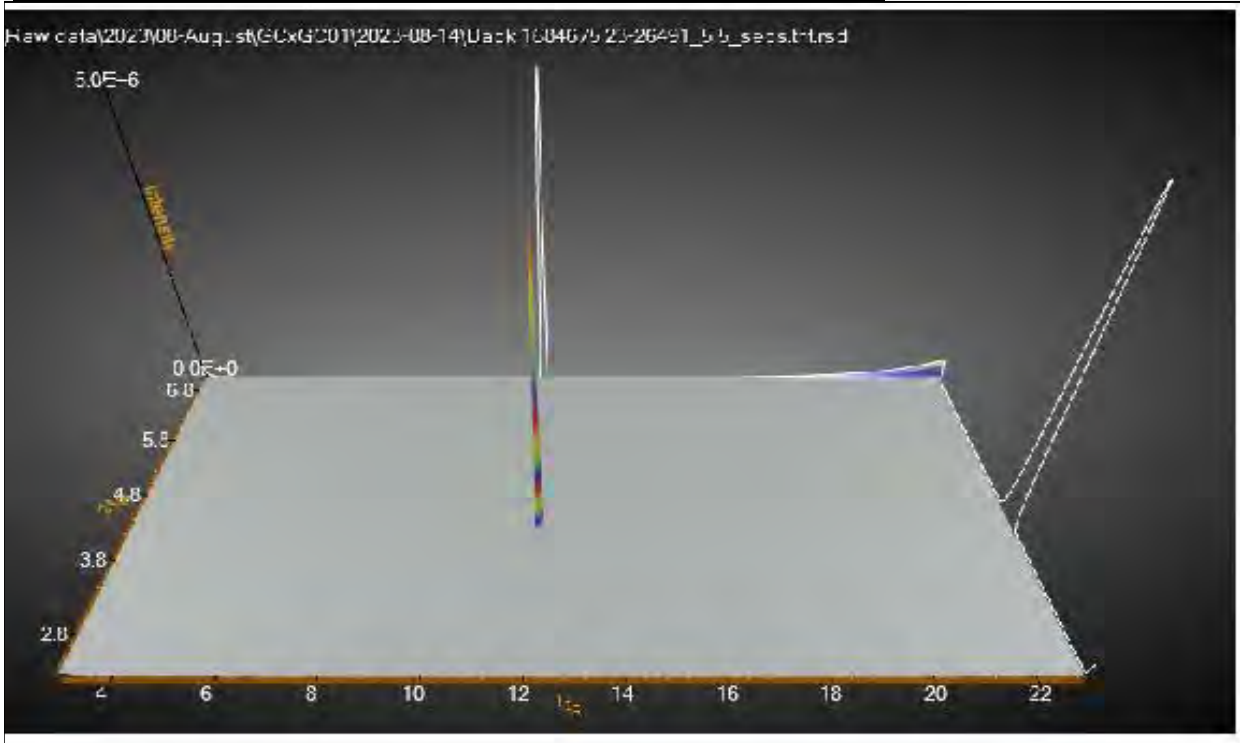
AA-Split Chromatogram on Soil Sample: 1684673



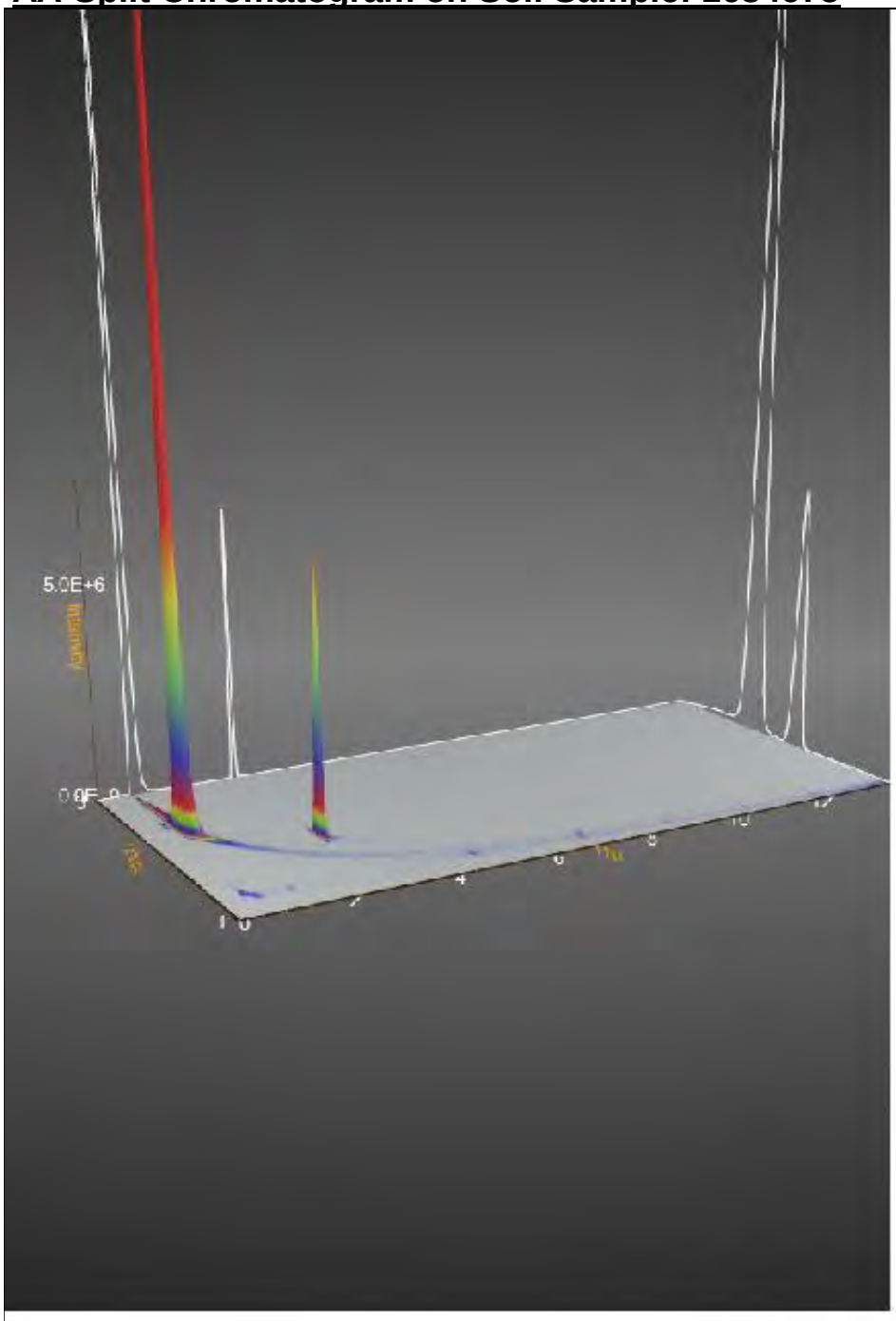
AA-Split Chromatogram on Soil Sample: 1684673



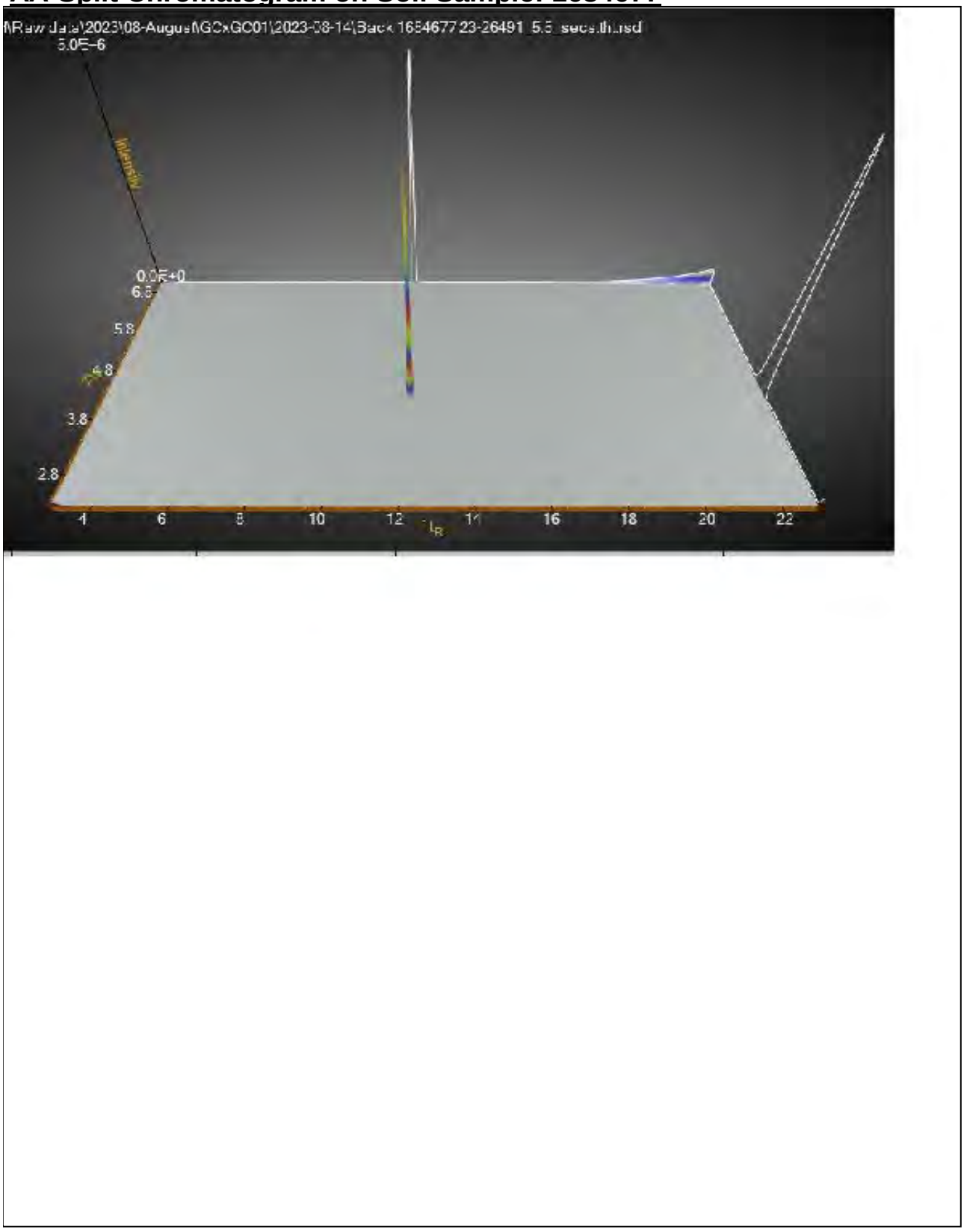
AA-Split Chromatogram on Soil Sample: 1684675



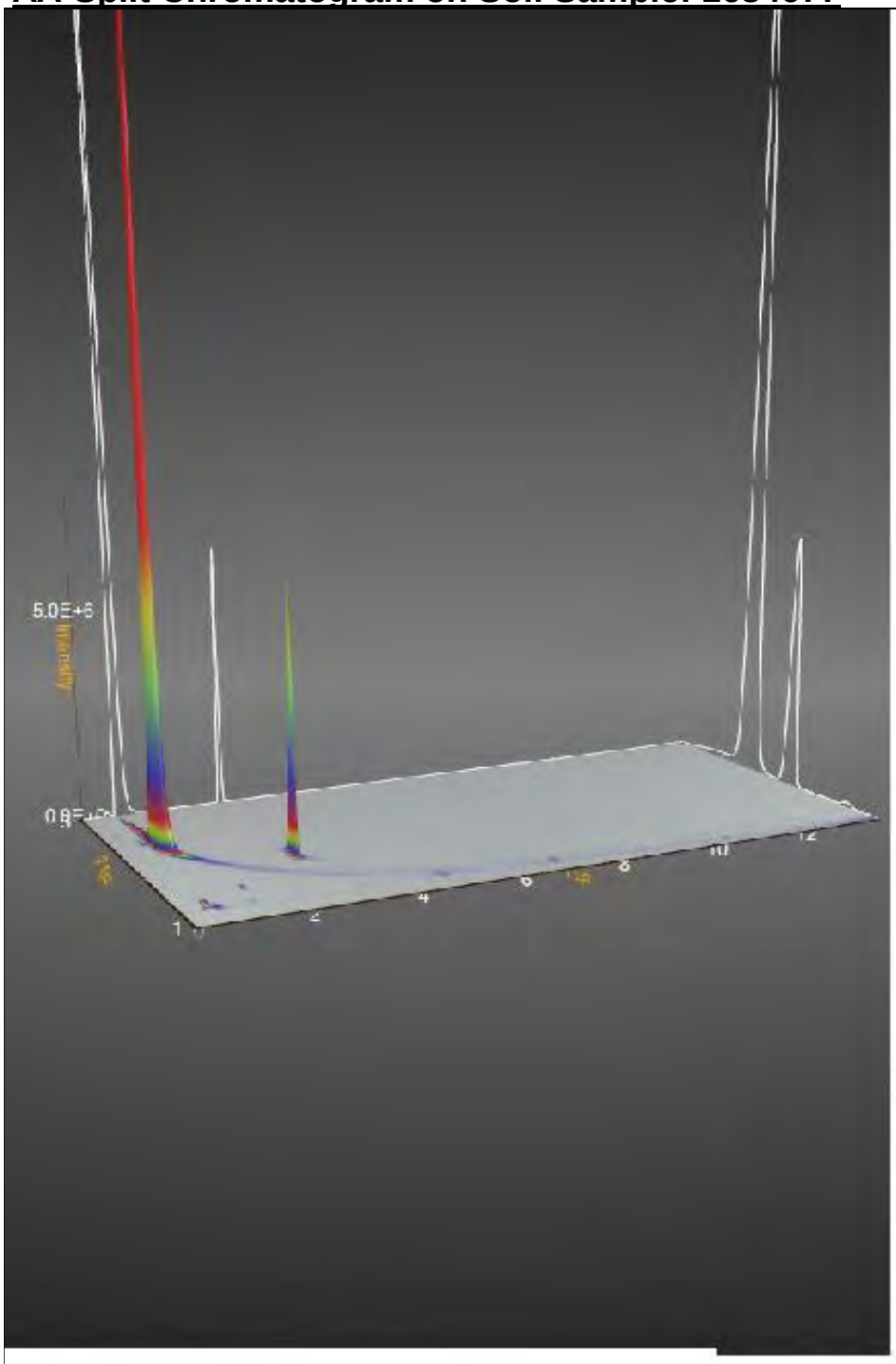
AA-Split Chromatogram on Soil Sample: 1684675



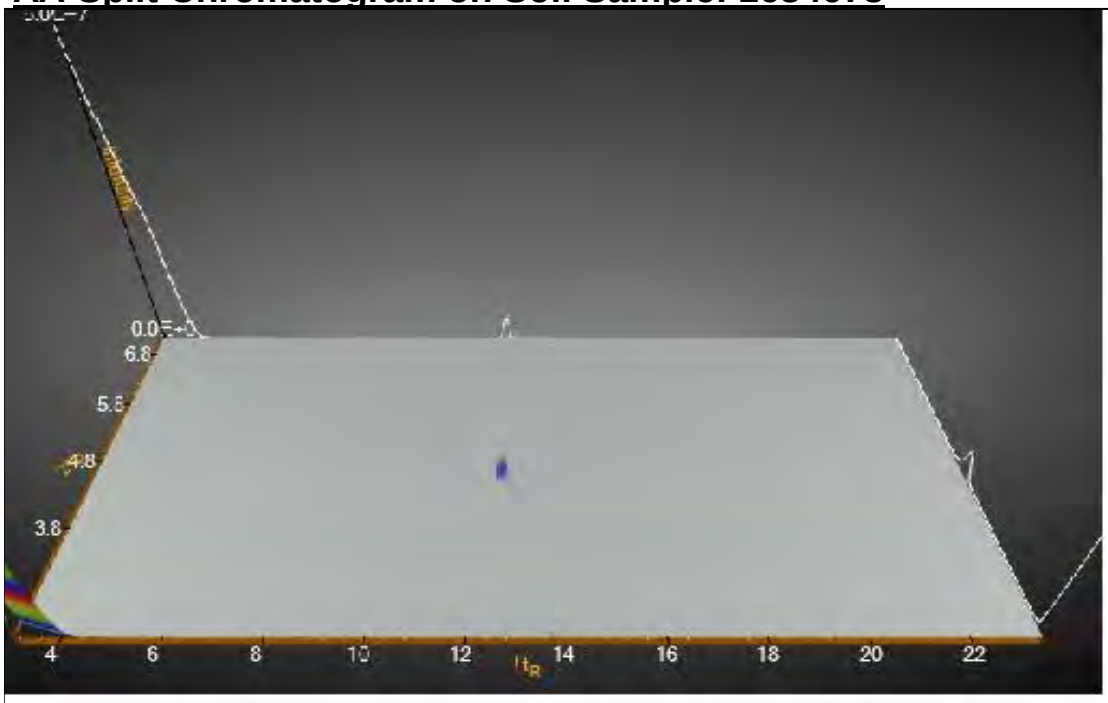
AA-Split Chromatogram on Soil Sample: 1684677



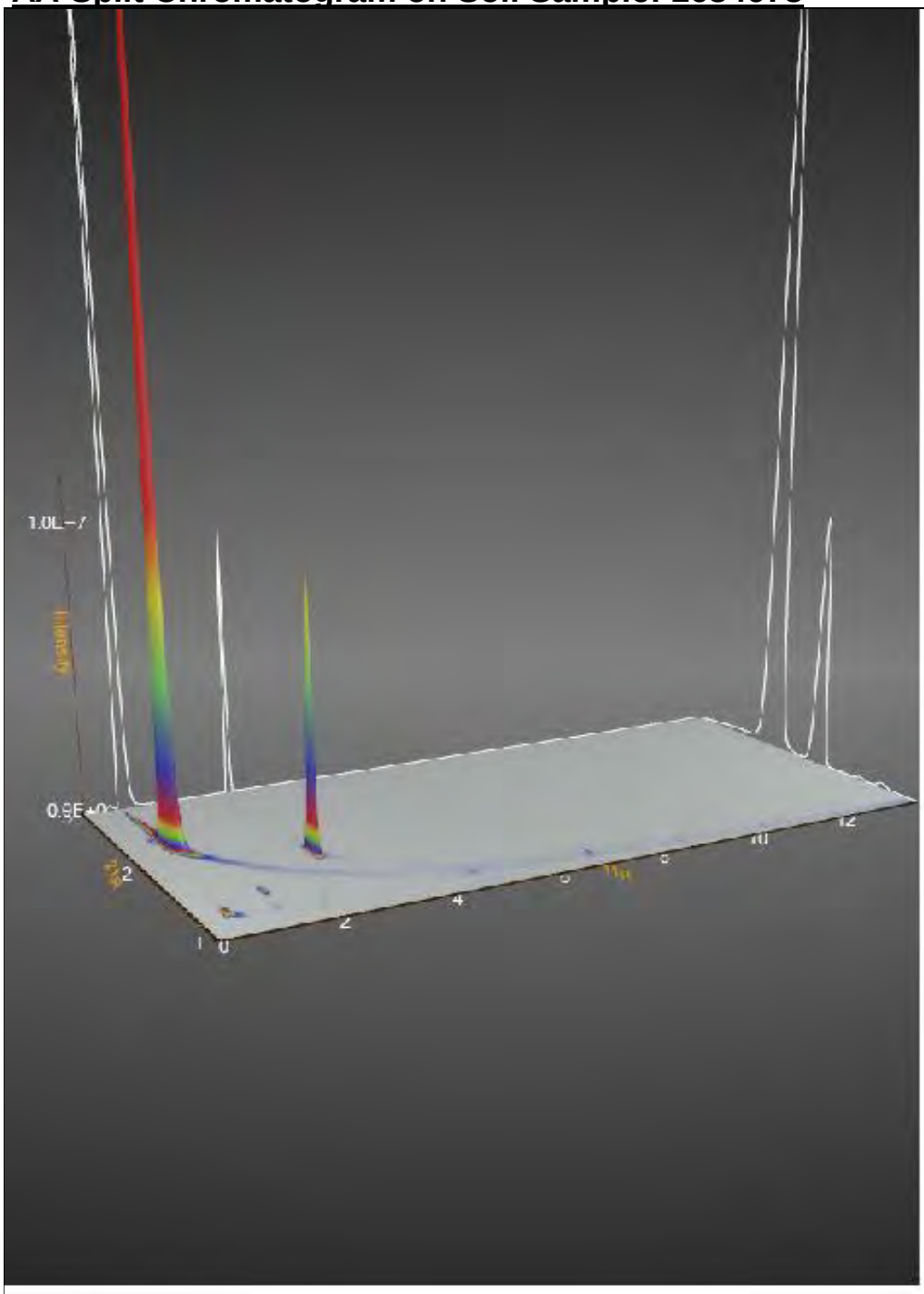
AA-Split Chromatogram on Soil Sample: 1684677



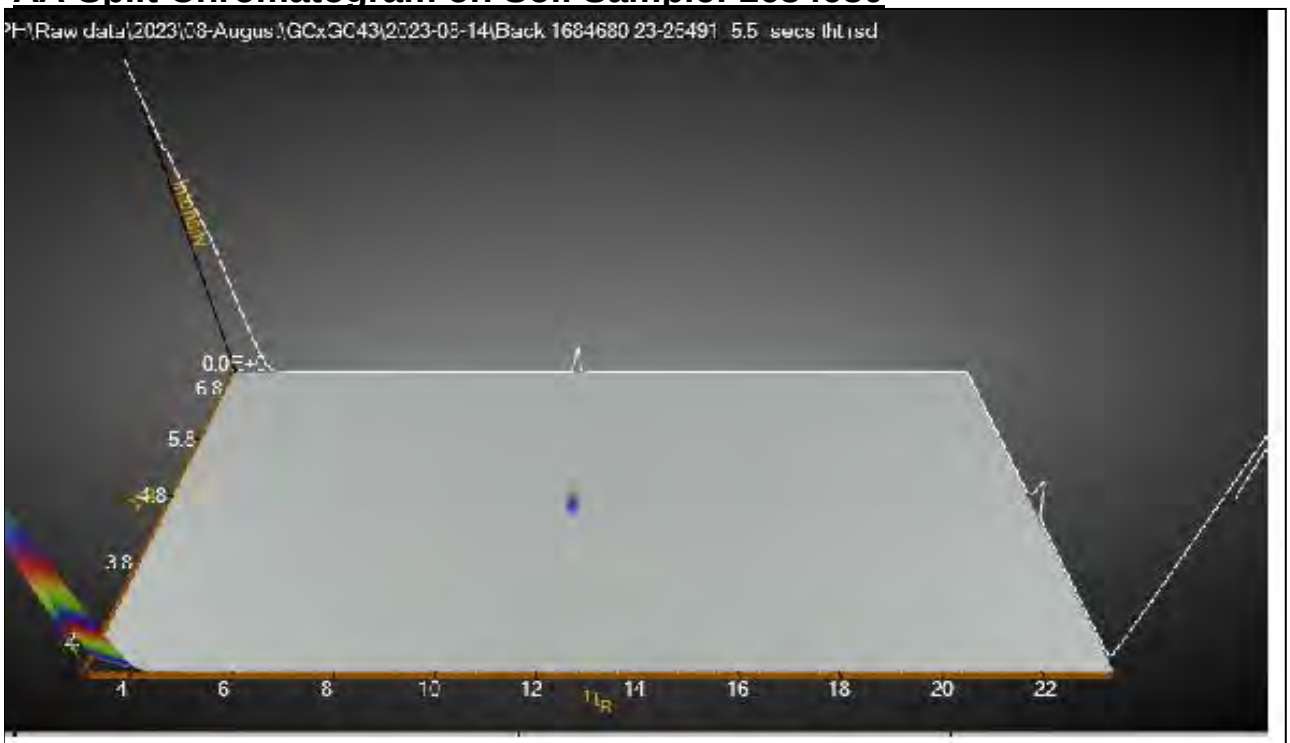
AA-Split Chromatogram on Soil Sample: 1684678



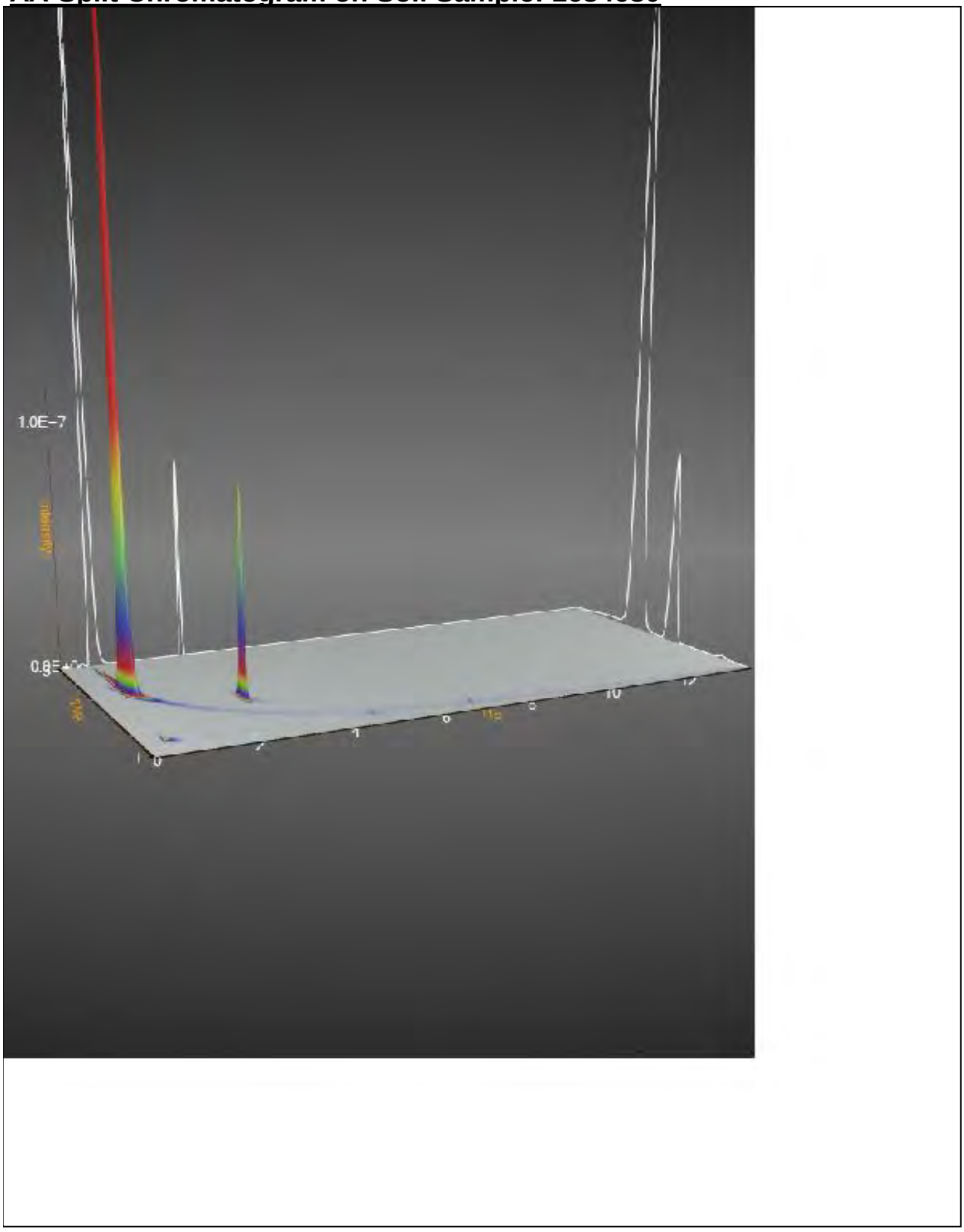
AA-Split Chromatogram on Soil Sample: 1684678



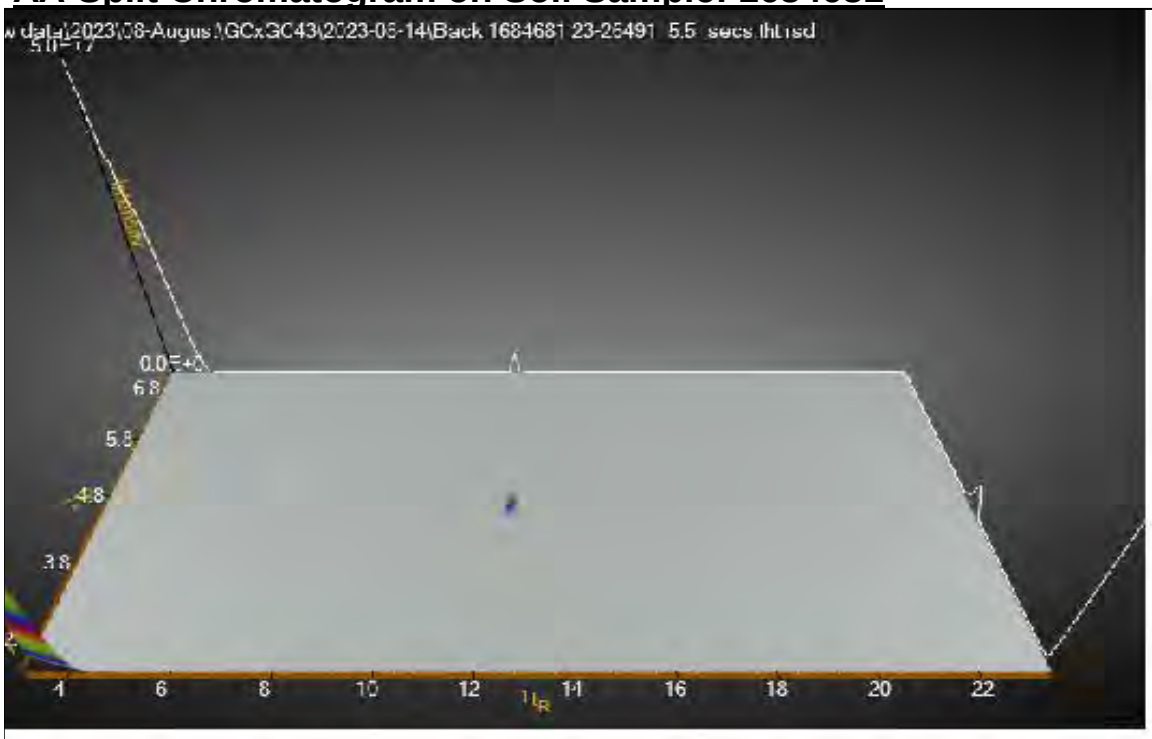
AA-Split Chromatogram on Soil Sample: 1684680



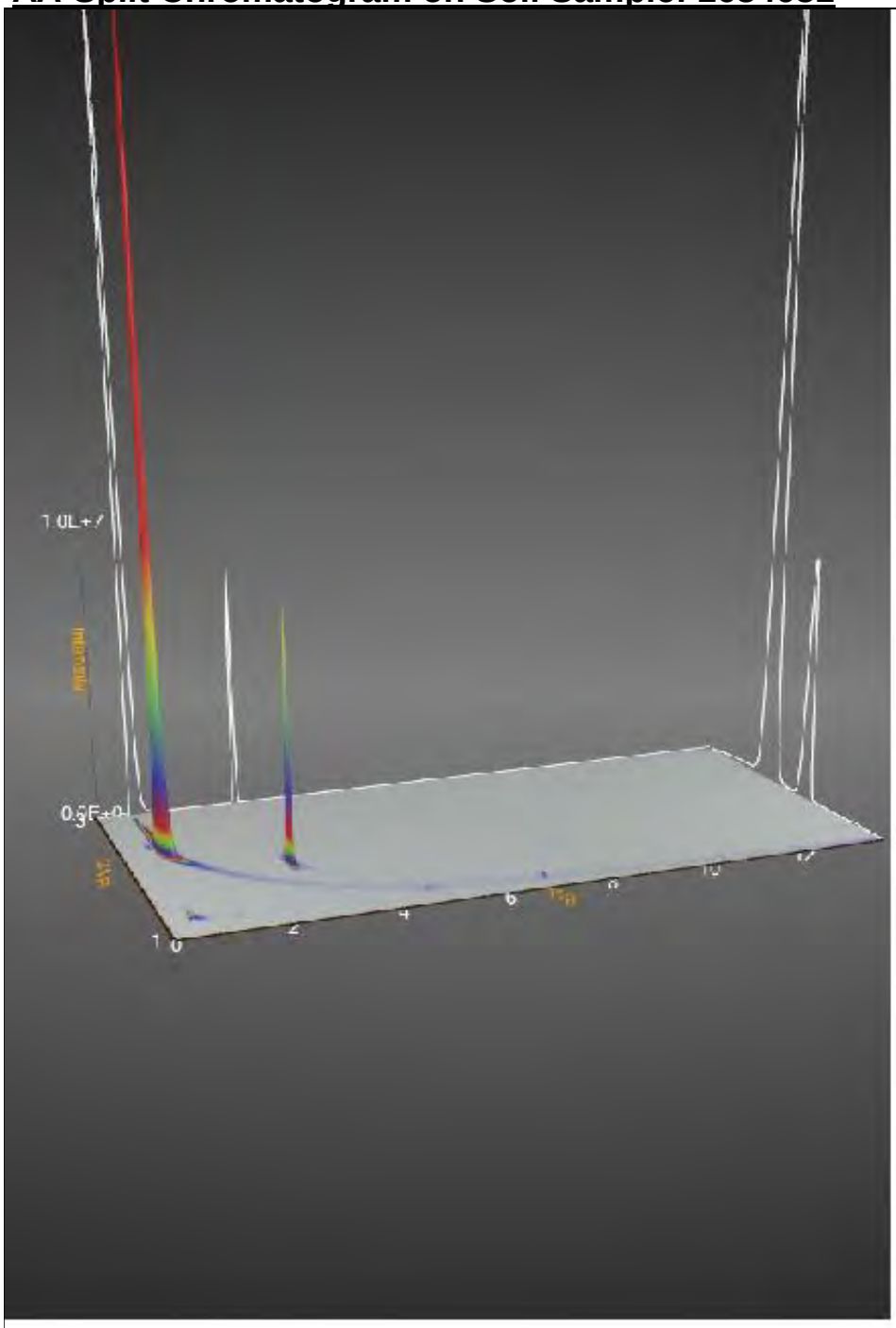
AA-Split Chromatogram on Soil Sample: 1684680



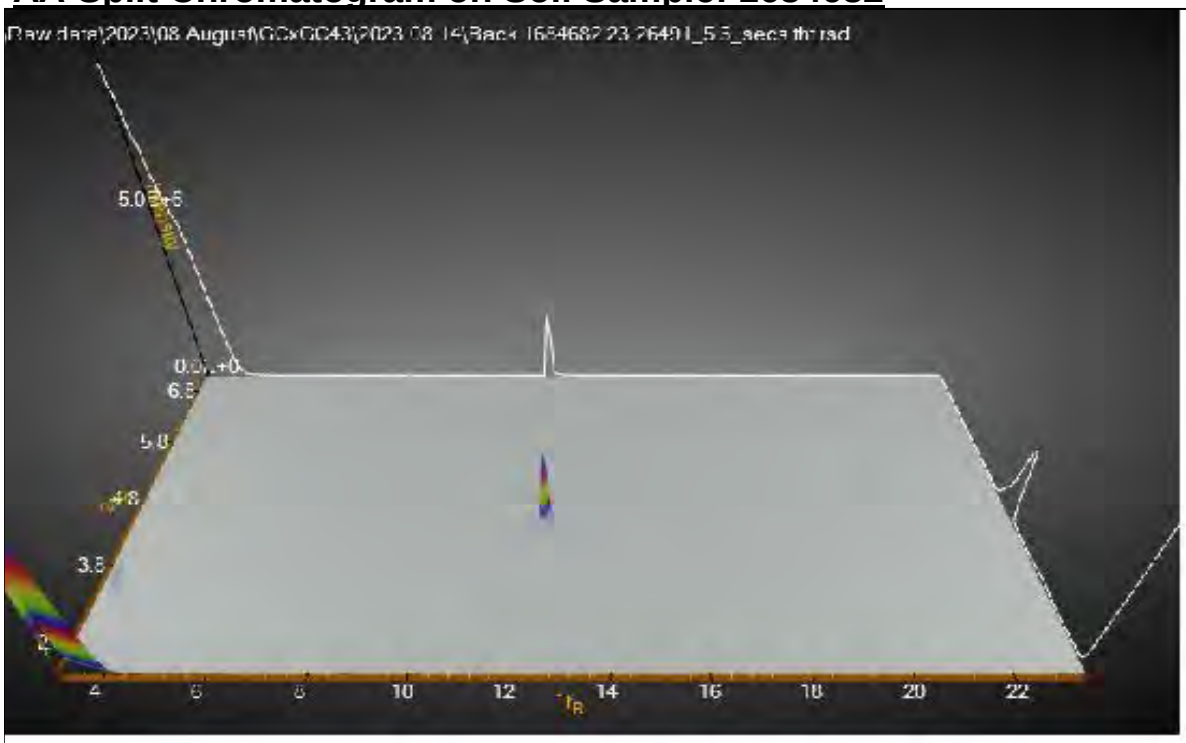
AA-Split Chromatogram on Soil Sample: 1684681



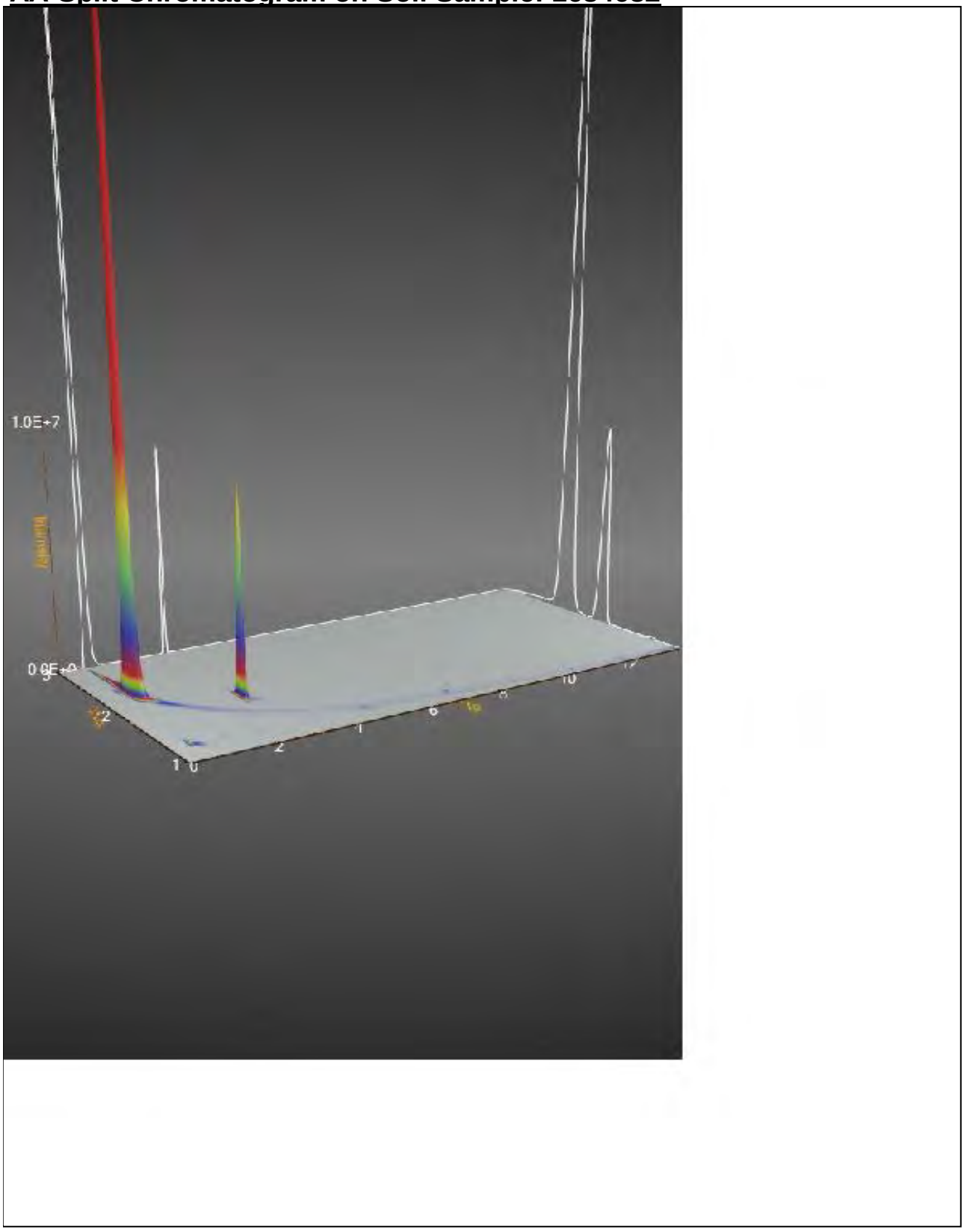
AA-Split Chromatogram on Soil Sample: 1684681



AA-Split Chromatogram on Soil Sample: 1684682



AA-Split Chromatogram on Soil Sample: 1684682



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
23-26491	1684671	S		ES1	BN01	0.00	No	N/A
23-26491	1684673	S		ES3	BN01	0.50	No	N/A
23-26491	1684675	S		ES5	BN01	1.50	No	N/A
23-26491	1684677	S		ES7	BN01	2.50	No	N/A
23-26491	1684678	S		ES1	BN02	0.00	No	N/A
23-26491	1684680	S		ES3	BN02	0.50	No	N/A
23-26491	1684681	S		ES4	BN02	1.00	No	N/A
23-26491	1684682	S		ES1	BN03	0.00	No	N/A

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-26499-1
Initial Date of Issue:	15-Aug-2023
Re-Issue Details:	
Client	Geotechnical Environmental Services Limited
Client Address:	The Old Mill 22A Kilmoyle Road Ballybogey County Antrim BT53 6NR
Contact(s):	Caitlin Shiels Robert Barry
Project	22103NI Ballintoy Harbour Dredging SI, Ballintoy
Quotation No.:	Q23-31872
Date Received:	07-Aug-2023
Order No.:	
Date Instructed:	07-Aug-2023
No. of Samples:	8
Turnaround (Wkdays):	7
Results Due:	15-Aug-2023
Date Approved:	15-Aug-2023
Approved By:	
[redacted]	
Details:	S[redacted] Technical Manager

Results - 2 Stage WAC

Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26499								
Chemtest Sample ID:	1684704								
Sample Ref:	ES1								
Sample ID:	BN01						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):									
Sampling Date:	03-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			1.2	3	5	6
Loss On Ignition	2610	M	%			0.76	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.011	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0029	0.0014	0.0059	0.016	0.5	2	25
Barium	1455	U	< 0.005	< 0.005	< 0.0005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0013	0.0005	0.0026	0.0022	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0007	< 0.0002	0.0014	0.0012	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0005	< 0.0005	0.0010	0.0009	0.1	0.5	7
Zinc	1455	U	0.010	0.011	0.020	0.11	4	50	200
Chloride	1220	U	510	31	1000	1100	800	15000	25000
Fluoride	1220	U	0.33	0.12	< 1.0	1.6	10	150	500
Sulphate	1220	U	110	8.6	220	260	1000	20000	50000
Total Dissolved Solids	1020	N	1200	100	2400	2900	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	2.6	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	5.6

Leachate Test Information	
Leachant volume 1st extract/l	0.340
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.301

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26499								
Chemtest Sample ID:	1684705								
Sample Ref:	ES3								
Sample ID:	BN01						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	0.50								
Bottom Depth(m):	1.00								
Sampling Date:	03-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			1.9	3	5	6
Loss On Ignition	2610	M	%			1.1	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.012	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0049	0.0022	0.0096	0.027	0.5	2	25
Barium	1455	U	0.014	< 0.005	0.027	0.022	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0013	0.0006	0.0025	0.0021	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0085	0.0020	0.017	0.031	0.5	10	30
Nickel	1455	U	0.0006	< 0.0005	0.0013	0.0010	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0007	< 0.0005	0.0013	0.0011	0.1	0.5	7
Zinc	1455	U	0.016	0.016	0.032	0.16	4	50	200
Chloride	1220	U	2100	230	4200	5400	800	15000	25000
Fluoride	1220	U	0.58	0.22	1.1	2.8	10	150	500
Sulphate	1220	U	470	53	940	1200	1000	20000	50000
Total Dissolved Solids	1020	N	4300	570	8400	12000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	3.1	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	14

Leachate Test Information	
Leachant volume 1st extract/l	0.321
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.287

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26499								
Chemtest Sample ID:	1684706								
Sample Ref:	ES5								
Sample ID:	BN01						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	1.50								
Bottom Depth(m):	2.00								
Sampling Date:	03-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			1.9	3	5	6
Loss On Ignition	2610	M	%			2.4	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0070	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0032	0.0018	0.0062	0.020	0.5	2	25
Barium	1455	U	0.010	< 0.005	0.020	0.016	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0089	0.0019	0.017	0.030	0.5	10	30
Nickel	1455	U	0.0006	< 0.0005	0.0012	0.0010	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0007	0.0017	0.0014	0.015	0.1	0.5	7
Zinc	1455	U	0.012	0.014	0.022	0.14	4	50	200
Chloride	1220	U	2200	160	4300	4900	800	15000	25000
Fluoride	1220	U	0.82	0.27	1.6	3.6	10	150	500
Sulphate	1220	U	550	44	1100	1200	1000	20000	50000
Total Dissolved Solids	1020	N	4600	400	8800	11000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.9	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	25

Leachate Test Information	
Leachant volume 1st extract/l	0.293
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.277

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26499								
Chemtest Sample ID:	1684707								
Sample Ref:	ES7								
Sample ID:	BN01						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	2.50								
Bottom Depth(m):	3.00								
Sampling Date:	03-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			2.3	3	5	6
Loss On Ignition	2610	M	%			1.8	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0050	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0035	0.0021	0.0068	0.023	0.5	2	25
Barium	1455	U	0.017	0.005	0.032	0.066	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0039	0.0010	0.0075	0.014	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0007	< 0.0005	0.0013	0.0009	0.06	0.7	5
Selenium	1455	U	0.0015	0.0009	0.0028	0.010	0.1	0.5	7
Zinc	1455	U	0.012	0.015	0.023	0.15	4	50	200
Chloride	1220	U	2800	380	5500	7200	800	15000	25000
Fluoride	1220	U	0.58	0.22	1.1	2.7	10	150	500
Sulphate	1220	U	660	80	1300	1600	1000	20000	50000
Total Dissolved Solids	1020	N	3600	920	7000	13000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	4.1	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	23

Leachate Test Information	
Leachant volume 1st extract/l	0.299
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.247

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26499								
Chemtest Sample ID:	1684708								
Sample Ref:	ES1								
Sample ID:	BN02						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):									
Sampling Date:	03-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			2.8	3	5	6
Loss On Ignition	2610	M	%			1.2	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.010	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0083	0.0033	0.016	0.041	0.5	2	25
Barium	1455	U	0.010	< 0.005	0.018	0.016	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	0.0006	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0089	0.0019	0.017	0.030	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0006	< 0.0005	0.0011	0.0009	0.06	0.7	5
Selenium	1455	U	0.0009	0.0006	0.0017	0.0062	0.1	0.5	7
Zinc	1455	U	0.010	0.013	0.020	0.12	4	50	200
Chloride	1220	U	1700	88	3300	3600	800	15000	25000
Fluoride	1220	U	0.47	0.16	< 1.0	2.1	10	150	500
Sulphate	1220	U	280	20	530	620	1000	20000	50000
Total Dissolved Solids	1020	N	3400	250	6600	7600	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	3.1	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	23

Leachate Test Information	
Leachant volume 1st extract/l	0.297
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.286

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26499								
Chemtest Sample ID:	1684709								
Sample Ref:	ES3								
Sample ID:	BN02						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	0.50								
Bottom Depth(m):	1.00								
Sampling Date:	03-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			2.3	3	5	6
Loss On Ignition	2610	M	%			1.9	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0060	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.010	0.0029	0.020	0.041	0.5	2	25
Barium	1455	U	0.014	< 0.005	0.027	0.024	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0066	0.0011	0.013	0.020	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0011	0.0006	0.0020	0.0068	0.1	0.5	7
Zinc	1455	U	0.012	0.014	0.022	0.13	4	50	200
Chloride	1220	U	2300	120	4300	4800	800	15000	25000
Fluoride	1220	U	0.47	0.13	< 1.0	1.9	10	150	500
Sulphate	1220	U	350	23	680	780	1000	20000	50000
Total Dissolved Solids	1020	N	4400	250	8500	9400	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	3.0	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	24

Leachate Test Information	
Leachant volume 1st extract/l	0.294
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.294

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26499								
Chemtest Sample ID:	1684710								
Sample Ref:	ES4								
Sample ID:	BN02						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	1.00								
Bottom Depth(m):	1.50								
Sampling Date:	03-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			2.3	3	5	6
Loss On Ignition	2610	M	%			2.0	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.011	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0056	0.0017	0.011	0.023	0.5	2	25
Barium	1455	U	0.009	< 0.005	0.018	0.014	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0020	0.0005	0.0038	0.0071	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0006	0.0005	0.0012	0.0055	0.1	0.5	7
Zinc	1455	U	0.014	0.013	0.028	0.13	4	50	200
Chloride	1220	U	1500	99	2800	3000	800	15000	25000
Fluoride	1220	U	0.35	0.13	< 1.0	1.6	10	150	500
Sulphate	1220	U	260	22	510	570	1000	20000	50000
Total Dissolved Solids	1020	N	2800	220	5400	6000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	2.9	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	23

Leachate Test Information	
Leachant volume 1st extract/l	0.298
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.257

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 22103NI Ballintoy Harbour Dredging SI, Ballintoy

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-26499								
Chemtest Sample ID:	1684711								
Sample Ref:	ES1								
Sample ID:	BN03						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:									
Top Depth(m):	0.00								
Bottom Depth(m):									
Sampling Date:	03-Aug-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			2.8	3	5	6
Loss On Ignition	2610	M	%			1.8	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.013	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.053	0.0082	0.10	0.14	0.5	2	25
Barium	1455	U	0.029	< 0.005	0.055	0.036	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.022	0.0057	0.042	0.077	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0009	< 0.0005	0.0017	0.0011	0.06	0.7	5
Selenium	1455	U	0.0006	< 0.0005	0.0011	0.0007	0.1	0.5	7
Zinc	1455	U	0.013	0.014	0.025	0.14	4	50	200
Chloride	1220	U	2600	120	5000	4300	800	15000	25000
Fluoride	1220	U	0.52	0.14	< 1.0	1.9	10	150	500
Sulphate	1220	U	340	19	650	590	1000	20000	50000
Total Dissolved Solids	1020	N	5000	280	9600	8700	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	3.3	< 2.5	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	26

Leachate Test Information	
Leachant volume 1st extract/l	0.289
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.217

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

GEOTECHNICAL ENVIRONMENTAL SERVICES LIMITED
THE OLD MILL | 22A KILMOYLE ROAD | BALLYBOGEY | CO. ANTRIM | BT53 6NR
TEL: 0044 (0)28 2074 2066 | EMAIL: info@geospecialists.co.uk | WEB: www.geospecialists.co.uk

C LABORATORY 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

Test Report ID MAR01993

Issue Version: 1

Customer: Geotechnical Environmental Services Ltd, The Old Mill, 22A Kilmoyle Road, Ballybogey, Country Antrim, BT53 6NR

Customer Reference: Ballintoy Harbour - Sediment Analysis

Date Sampled: 03-Aug-23

Date Samples Received: 09-Aug-23

Test Report Date: 31-Aug-23

Condition of samples: Cold Satisfactory

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

[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	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		Units	%	%	Mg/m3	% M/M
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_03*	WSLM59*
		Limit of Detection	0.2	0.2	N/A	0.02
		Accreditation	UKAS	UKAS	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Particle Density**	**TOC**
BN01 - 0.0m	MAR01993.001	Sediment	5.14	94.9	2.68	0.06
BN01 - 0.0-0.5m	MAR01993.002	Sediment	6.51	93.5	2.67	0.07
BN01 - 0.5-1.0m	MAR01993.003	Sediment	13.9	86.1	2.67	0.12
BN01 - 1.0-1.5m	MAR01993.004	Sediment	22.7	77.3	2.68	0.19
BN01 - 1.5-2.0m	MAR01993.005	Sediment	29.0	71.0	2.67	0.44
BN01 - 2.0-2.5m	MAR01993.006	Sediment	25.3	74.7	2.67	0.55
BN01 - 2.3-3.0m	MAR01993.007	Sediment	25.8	74.2	2.68	0.52
BN02 - 0.0m	MAR01993.008	Sediment	23.9	76.1	2.74	0.23
BN02 - 0.0-0.5m	MAR01993.009	Sediment	26.6	73.4	2.68	0.30
BN02 - 0.5-1.0m	MAR01993.010	Sediment	19.4	80.6	2.70	0.36
BN02 - 1.0-1.5m	MAR01993.011	Sediment	27.1	72.9	2.69	0.31
BN03 - 0.0m	MAR01993.012	Sediment	23.4	76.6	2.68	0.31
		Reference Material (% Recovery)	N/A	N/A	N/A	100
		QC Blank	N/A	N/A	N/A	<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	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	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
		Accreditation	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**
BN01 - 0.0m	MAR01993.001	Sediment	4.6	<0.03	31.2	4.7	6.6	<0.01	13.4
BN01 - 0.0-0.5m	MAR01993.002	Sediment	4.5	<0.03	21.6	3.1	5.5	<0.01	10.5
BN01 - 0.5-1.0m	MAR01993.003	Sediment	5.9	<0.03	17.4	3.2	5.0	<0.01	9.4
BN01 - 1.0-1.5m	MAR01993.004	Sediment	6.0	0.03	25.0	5.2	6.6	<0.01	10.2
BN01 - 1.5-2.0m	MAR01993.005	Sediment	6.0	0.07	18.0	4.0	5.8	<0.01	8.5
BN01 - 2.0-2.5m	MAR01993.006	Sediment	5.7	0.09	14.4	4.7	5.8	<0.01	7.9
BN01 - 2.3-3.0m	MAR01993.007	Sediment	6.3	0.07	16.5	4.0	6.3	<0.01	8.9
BN02 - 0.0m	MAR01993.008	Sediment	5.5	<0.03	13.0	3.0	5.4	<0.01	7.0
BN02 - 0.0-0.5m	MAR01993.009	Sediment	4.2	0.04	18.0	4.0	4.4	0.04	7.4
BN02 - 0.5-1.0m	MAR01993.010	Sediment	5.4	0.06	16.7	4.1	5.8	<0.01	10.3
BN02 - 1.0-1.5m	MAR01993.011	Sediment	5.0	0.04	18.4	3.7	4.6	<0.01	10.6
BN03 - 0.0m	MAR01993.012	Sediment	5.4	0.05	21.2	3.5	4.8	<0.01	11.1
Certified Reference Material 2702 (% Recovery)			97	92	95	98	88	119	109
QC Blank			<0.14	<0.03	<1	<0.7	<0.6	<0.01	<0.4

* 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	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	ICPMS-MWSED*	ICPOES-MWSED*
		Limit of Detection	3.5	1750
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Zinc as Zn**	**Aluminium as Al**
BN01 - 0.0m	MAR01993.001	Sediment	14.9	16000
BN01 - 0.0-0.5m	MAR01993.002	Sediment	12.6	15900
BN01 - 0.5-1.0m	MAR01993.003	Sediment	13.5	15500
BN01 - 1.0-1.5m	MAR01993.004	Sediment	16.7	16300
BN01 - 1.5-2.0m	MAR01993.005	Sediment	15.0	10800
BN01 - 2.0-2.5m	MAR01993.006	Sediment	17.3	13500
BN01 - 2.3-3.0m	MAR01993.007	Sediment	17.0	14600
BN02 - 0.0m	MAR01993.008	Sediment	13.9	13300
BN02 - 0.0-0.5m	MAR01993.009	Sediment	12.7	13000
BN02 - 0.5-1.0m	MAR01993.010	Sediment	13.3	16500
BN02 - 1.0-1.5m	MAR01993.011	Sediment	11.9	12500
BN03 - 0.0m	MAR01993.012	Sediment	14.9	14200
Certified Reference Material 2702 (% Recovery)			101	98
QC Blank			<3.5	<1750

* 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	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		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)**
BN01 - 0.0m	MAR01993.001	Sediment	<1	<1
BN01 - 0.0-0.5m	MAR01993.002	Sediment	<1	<1
BN01 - 0.5-1.0m	MAR01993.003	Sediment	<1	<1
BN01 - 1.0-1.5m	MAR01993.004	Sediment	<1	<1
BN01 - 1.5-2.0m	MAR01993.005	Sediment	<1	<1
BN01 - 2.0-2.5m	MAR01993.006	Sediment	<1	<1
BN01 - 2.3-3.0m	MAR01993.007	Sediment	<1	<1
BN02 - 0.0m	MAR01993.008	Sediment	<1	<1
BN02 - 0.0-0.5m	MAR01993.009	Sediment	<1	<1
BN02 - 0.5-1.0m	MAR01993.010	Sediment	<1	<1
BN02 - 1.0-1.5m	MAR01993.011	Sediment	<1	<1
BN03 - 0.0m	MAR01993.012	Sediment	<1	<1
Certified Reference Material BCR-646 (% Recovery)			88	76
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

SOCOTEC

Test Report ID	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		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**
BN01 - 0.0m	MAR01993.001	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 0.0-0.5m	MAR01993.002	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 0.5-1.0m	MAR01993.003	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 1.0-1.5m	MAR01993.004	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 1.5-2.0m	MAR01993.005	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 2.0-2.5m	MAR01993.006	Sediment	<1	<1	<1	<1	<1	1.37
BN01 - 2.3-3.0m	MAR01993.007	Sediment	<1	<1	<1	2.35	2.20	2.05
BN02 - 0.0m	MAR01993.008	Sediment	<1	1.16	4.05	17.2	14.6	11.2
BN02 - 0.0-0.5m	MAR01993.009	Sediment	<1	<1	<1	<1	<1	<1
BN02 - 0.5-1.0m	MAR01993.010	Sediment	<1	<1	<1	<1	<1	<1
BN02 - 1.0-1.5m	MAR01993.011	Sediment	<1	<1	<1	<1	<1	<1
BN03 - 0.0m	MAR01993.012	Sediment	<1	<1	<1	<1	<1	<1
Certified Reference Material Nist 1941b(% Recovery)			80	116	70	72	64	90
QC Blank			<1	<1	<1	<1	<1	<1

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

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	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		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**
BN01 - 0.0m	MAR01993.001	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 0.0-0.5m	MAR01993.002	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 0.5-1.0m	MAR01993.003	Sediment	<1	<1	<1	<1	<1	<1
BN01 - 1.0-1.5m	MAR01993.004	Sediment	<1	<1	<1	<1	1.80	<1
BN01 - 1.5-2.0m	MAR01993.005	Sediment	<1	<1	<1	<1	3.24	<1
BN01 - 2.0-2.5m	MAR01993.006	Sediment	<1	1.54	1.78	<1	2.36	<1
BN01 - 2.3-3.0m	MAR01993.007	Sediment	<1	2.19	2.31	<1	5.99	<1
BN02 - 0.0m	MAR01993.008	Sediment	6.62	14.0	15.4	1.97	34.1	<1
BN02 - 0.0-0.5m	MAR01993.009	Sediment	<1	<1	<1	<1	1.84	<1
BN02 - 0.5-1.0m	MAR01993.010	Sediment	<1	<1	<1	<1	<1	<1
BN02 - 1.0-1.5m	MAR01993.011	Sediment	<1	<1	1.38	<1	1.93	<1
BN03 - 0.0m	MAR01993.012	Sediment	<1	<1	1.36	<1	1.43	<1
Certified Reference Material Nist 1941b(% Recovery)			71	79	92	104	88	52
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

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*See report notes

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Test Report ID	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		Units	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
		Limit of Detection	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**
BN01 - 0.0m	MAR01993.001	Sediment	<1	<1	<1	<1
BN01 - 0.0-0.5m	MAR01993.002	Sediment	<1	<1	<1	<1
BN01 - 0.5-1.0m	MAR01993.003	Sediment	<1	<1	<1	<1
BN01 - 1.0-1.5m	MAR01993.004	Sediment	<1	<1	1.90	1.81
BN01 - 1.5-2.0m	MAR01993.005	Sediment	<1	1.89	3.71	3.33
BN01 - 2.0-2.5m	MAR01993.006	Sediment	<1	2.35	5.28	2.68
BN01 - 2.3-3.0m	MAR01993.007	Sediment	1.55	<1	1.43	4.35
BN02 - 0.0m	MAR01993.008	Sediment	8.11	<1	9.39	27.7
BN02 - 0.0-0.5m	MAR01993.009	Sediment	<1	<1	1.98	2.25
BN02 - 0.5-1.0m	MAR01993.010	Sediment	<1	<1	1.39	<1
BN02 - 1.0-1.5m	MAR01993.011	Sediment	<1	1.69	3.18	2.21
BN03 - 0.0m	MAR01993.012	Sediment	<1	1.81	2.94	2.37
Certified Reference Material Nist 1941b(% Recovery)			77	64	82	77
QC Blank			<1	<1	<1	<1

For full analyte name see method summaries

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Test Report ID	MAR01993
Issue Version	1
Customer Reference	Ballintoy Harbour - Sediment Analysis

		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**
BN01 - 0.0m	MAR01993.001	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 0.0-0.5m	MAR01993.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 0.5-1.0m	MAR01993.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 1.0-1.5m	MAR01993.004	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 1.5-2.0m	MAR01993.005	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 2.0-2.5m	MAR01993.006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN01 - 2.3-3.0m	MAR01993.007	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN02 - 0.0m	MAR01993.008	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN02 - 0.0-0.5m	MAR01993.009	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN02 - 0.5-1.0m	MAR01993.010	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN02 - 1.0-1.5m	MAR01993.011	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BN03 - 0.0m	MAR01993.012	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Nist 1941b(% Recovery)			63	104	100	102	100	91	113
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries

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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 MAR01993
Issue Version 1
Customer Reference Ballintoy Harbour - Sediment Analysis

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR01993.001-012	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMS-MWSED*	MAR01993.001-012	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPOES-MWSED*	MAR01993.001-012	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR01993.001-012	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/303/304	MAR01993.006-008	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	MAR01993.006-008, 0.11-012	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

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SOCOTEC

Test Report ID	MAR01993
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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.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried and ground <2mm	Microwave assisted HF/Boric extraction followed by ICP analysis.
Organotins	Wet Sediment <2mm	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment <2mm	Solvent extraction and clean up followed by GC-MS 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		