Appendix 10-12: NASAH South Apron – Ground Investigation

NASAH South Apron – Ground Investigation

Client:	Dublin Airport Authority
Client's Representative:	AECOM
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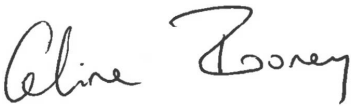
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Document Control Sheet

Report No.:		21-0403S			
Project Title:		NASAH South Apron			
Client:		Dublin Airport Authority			
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Revision:	A04	**Status:**	Final for Issue	**Issue Date:**	20th April 2023
Prepared by:		**Reviewed by:**		**Approved by:**	
					
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The works were conducted in accordance with:

British Standards Institute (2015) BS 5930:2015+A1:2020, Code of practice for ground investigations.

BS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing.

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland

Laboratory testing was conducted in accordance with:

British Standards Institute BS 1377:1990 parts 2, 4, 5, 7 and 9

METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in BS5930:2015+A1:2020, The Code of Practice for Ground Investigation.

Abbreviations used on exploratory hole logs	
U	Nominal 100mm diameter undisturbed open tube sample (thick walled sampler).
UT	Nominal 100mm diameter undisturbed open tube sample (thin walled sampler).
P	Nominal 100mm diameter undisturbed piston sample.
B	Bulk disturbed sample.
LB	Large bulk disturbed sample.
D	Small disturbed sample.
C	Core sub-sample (displayed in the Field Records column on the logs).
L	Liner sample from dynamic sampled borehole.
W	Water sample.
ES / EW	Soil sample for environmental testing / Water sample for environmental testing.
SPT (s)	Standard penetration test using a split spoon sampler (small disturbed sample obtained).
SPT (c)	Standard penetration test using 60 degree solid cone.
(x,x/x,x,x,x)	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length.
(Y for Z/ Y for Z)	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given seating or test length 'Z' (mm).
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm).
HVP / HVR	In situ hand vane test result (HVP) and vane test residual result (HVR). Results presented in kPa.
V VR	Shear vane test (borehole). Shear strength stated in kPa. V: undisturbed vane shear strength VR: remoulded vane shear strength
Soil consistency description	In cohesive soils, where samples are disturbed and there are no suitable laboratory tests, N values may be used to indicate consistency on borehole logs – a median relationship of Nx5=Cu is used (as set out in Stroud & Butler 1975).
dd-mm-yyyy	Date at the end and start of shifts, shown at the relevant borehole depth. Corresponding casing and water depths shown in the adjacent columns.
▽	Water strike: initial depth of strike.
▼	Water strike: depth water rose to.
Abbreviations relating to rock core – reference Clause 36.4.4 of BS 5930: 2015+A1:2020	
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing.
NI	Non Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.
AZCL	Assessed zone of core loss: The estimated depth range where core was not recovered.
DIF	Drilling induced fracture: A fracture of non-geological origin brought about by the rock coring.
(xxx/xxx/xxx)	Spacing between discontinuities (minimum/average/maximum) measured in millimetres.

NASAH South Apron

1 AUTHORITY

On the instructions of AECOM, ("the Client's Representative"), acting on the behalf of Dublin Airport Authority ("the Client"), a ground investigation was undertaken at the above location to provide geotechnical and environmental information for input to the design and construction of the proposed South Apron Hub at Dublin Airport.

This report details the work carried out both on site and in the geotechnical and chemical testing laboratories; it contains a description of the site and the works undertaken, the exploratory hole logs and the laboratory test results.

All information given in this report is based upon the ground conditions encountered during the ground investigation works, and on the results of the laboratory and field tests performed. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those recorded during the investigation. No responsibility can be taken for conditions not encountered through the scope of work commissioned, for example between exploratory hole points, or beneath the termination depths achieved.

This report was prepared by Causeway Geotech Ltd for the use of the Client and the Client's Representative in response to a particular set of instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

2 SCOPE

The extent of the investigation, as instructed by the Client's Representative, included boreholes, trial pits, pavement cores, groundwater monitoring, soil sampling, in-situ and laboratory testing, and the preparation of a factual report on the findings.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted on the site of Dublin Airport, south-east of Terminal 2. The site is bordered by the Old Airport Road and Dardistown Cemetery to the south, Corballis Road South to the north, airport runways to the west, and the M1 to the east.

Elevations vary across the site, with a slight rise in elevation to the west.

4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between the 15th of June 2022 and the 3rd of February 2023, comprised:

- Twenty-six boreholes
  - three light cable percussion boreholes
  - twenty-three boreholes by rotary drilling
- a standpipe installation in four boreholes
- forty machine dug trial pits
- plate load tests at sixteen locations
- an indirect CBR test at one location; and
- five pavement cores.

The exploratory holes and in-situ tests were located as instructed by the Client's Representative, as shown on the exploratory hole location plan in Appendix A.

4.2 Boreholes

A total of twenty-six boreholes were put down in a minimum diameter of 150mm through soils and rock strata to their completion depths by a combination of methods, including light cable percussion boring by Dando 3000 rigs, and rotary drilling by Beretta T44 and Comacchio 601 rotary drilling rigs.

The borehole logs state the methodology and plant used for each location, as well as the appropriate depth ranges.

A summary of the boreholes, subdivided by category in accordance with the methods employed for their completion, is presented in the following sub-sections.

4.2.1 Light cable percussion boreholes

Three boreholes (BH03-BH04A) were put down to completion in minimum 200mm diameter using Dando 3000 light cable percussion boring rigs. All boreholes were terminated on encountering virtual refusal on obstructions.

Hand dug inspection pits were carried out between ground level and 1.20m depth to ensure boreholes were

put down at locations clear of services or subsurface obstructions.
Disturbed (bulk and small bag) samples were taken within the encountered strata. Undisturbed (U100) samples were taken where appropriate and as directed within fine soils. Environmental samples were taken at standard intervals, as directed by the Client's Representative.

Standard penetration tests were carried out in accordance with BS EN 22476-3:2005+A1:2011 at standard depth intervals using the split spoon sampler ($SPT_{(s)}$) or solid cone attachment ($SPT_{(c)}$). The penetrations are stated for those tests for which the full 150mm seating drive or 300mm test drive was not possible. The N-values provided on the borehole logs are uncorrected and no allowance has been made for energy ratio corrections. The SPT hammer energy measurement report is provided in Appendix J.

Any water strikes encountered during boring were recorded along with any changes in their levels as the borehole proceeded.

Where water was added to assist with boring, a note has been added to the log to account for same.

Appendix B presents the borehole logs.

4.2.2 Rotary drilled boreholes

Nineteen boreholes (RC01-TC04, RC05A-RC13, RC19-22, RC25 and RC27-RC31) were put to their completion by rotary drilling techniques only. The boreholes were completed using either a Beretta T44 or a Comacchio 601 rotary drilling rig.

Standard penetration tests were carried out in accordance with BS EN 22476-3:2005+A1:2011 at standard depth intervals throughout the overburden using the split spoon sampler ($SPT_{(s)}$) or solid cone attachment ($SPT_{(c)}$). The penetrations are stated for those tests for which the full 150mm seating drive or 300mm test drive was not possible. The N-values provided on the borehole logs are uncorrected and no allowance has been made for energy ratio corrections. The SPT hammer energy measurement report is provided in Appendix J.

Rotary coring was employed to recover core samples of the overburden. SPTs were carried out at standard intervals throughout the overburden, with small and bulk disturbed samples obtained where possible through the soils strata.

Where coring was carried out, Geobor S Coring was used. The core was extracted in up to 1.5m lengths using an SK6L core barrel, which produced core of nominal 102mm diameter, and was placed in single channel wooden core boxes.

The core was subsequently photographed and examined by a qualified and experienced Engineering Geologist, thus enabling the production of an engineering log in accordance with *BS 5930: 2015+A1:2020: Code of practice for ground investigations*.

Appendix B presents the borehole logs, with core photographs presented in Appendix C.

4.3 Standpipe installations

A groundwater monitoring standpipe was installed in RC09, RC10, RC25 and RC30.

Details of the installations, including the depth range of the response zone, are provided in Appendix B on the individual borehole logs.

4.4 Trial Pits

Forty trial pits (TP01–TP10, TP12-TP13, TP15-TP19, TP21-TP25, TP39-TP50, TP53-54 and TP56-TP59) were excavated using a 6t or a 8t tracked excavator fitted with a 600mm wide bucket, to depths ranging between 1.20-3.50m.

Environmental samples were taken in each trial pit. Samples were also taken to allow for PFAS testing as instructed by the Client's Representative. Appendix K presents the PFAS soil sampling methodology.

Disturbed (small jar and bulk bag) samples were taken at standard depth intervals and at change of strata.

Any water strikes encountered during excavation were recorded along with any changes in their levels as the excavation proceeded. The stability of the trial pit walls was noted on completion.

Appendix D presents the trial pit logs with photographs of the pits and arising provided in Appendix E.

4.5 PID tests

PID (Photo ionizing detection) testing was undertaken on small, disturbed samples recovered from all light cable percussion boreholes and trial pits using a hand-held PID meter, to determine if any volatile organic compound contamination was present in the overburden.

Results of the PID tests are presented on the individual borehole logs in Appendix B.

4.6 Plate load tests

Plate load tests were carried out at sixteen locations PLT04, PLT09-PLT10, PLT13, PLT15, PLT16, PLT22-PLT24, PLT43-PLT44, PLT53 and PLT57-PLT59 in similarly numbered trial pits.

The plate load tests were conducted as incremental loading tests in accordance with Clause 4.1 of BS1377: Part 9: 1990 (British Standards Institute, 1990). A 762mm diameter bearing plate was used with five equal loadings to a maximum pressure of approximately 200kPa, followed by unloading. The testing was conducted using a wireless plate load testing system, PLATEMAN, which utilises Bluetooth technology with a remotely-operated rugged PDA system.

Plate movements were measured using three strain gauges fitted to a remotely fixed tripod frame. Each loading increment was maintained until the plate movement had essentially stopped.
The test results provided in Appendix F are as follows:

- plots of the plate settlements, average of the three gauges, against pressure.
- plots of average settlement against time during the loading increments/decrement.

The Modulus of Subgrade Reaction, *k*, is estimated by applying a "best fit" to the settlement-pressure plots, and is reported in MPa/m. The numerical value represents the pressure, in kPa, on the bearing plate that induces 1.25mm of settlement.

An approximate CBR value was estimated using the guidance provided in the Interim Advice Note 73/06 (Revision 1, 2009) of the Design Guidance for Road Pavement Foundations (Draft HD25). The document provides methods to convert the measured k value to the equivalent for a 762mm diameter plate and the consequent relationship with CBR. This method of estimating an equivalent CBR value is relatively conservative.

4.7 Indirect CBR test (DCP)

An indirect CBR test was conducted at one location (TP08) using a Dynamic Cone Penetrometer (DCP). The equipment was developed in conjunction with the UK Transport Research Laboratory, is used widely throughout the world, and is referred to in the UK Highway Agency Interim Advice Note 73/06.

The test results are presented in Appendix G in the form of plots of the variation with depth of the penetration per blow. Straight lines have been fitted to the plots and the CBR for each depth range estimated using the following relationship, which is derived from Kleyn & Van Heerden (1983):

$$\text{Log CBR} = 2.48 - 1.057 \text{ Log (mm/blow)}$$

4.8 Pavement cores

Five cores (CRC01, CRC03 and PRC01-PRC03) were carried out at locations as directed by the Client's Representative to establish the pavement make-up. The cores were taken using hand-held diamond coring equipment. Core thicknesses and compositions are outlined in Table 1.

Table 1. Road core thickness and composition

Location	Thickness (mm)	Composition
CRC01	250	Concrete
CRC03	185	Reinforced concrete
PRC01	70	Dense fill bitmac
PRC02	75	Dense fill bitmac
PRC03	220	Dense fill bitmac

Appendix B presents the core logs, with photographs of the road cores presented in Appendix C.

4.9 Surveying

The as-built exploratory hole positions were surveyed following completion of site operations by a Site Engineer from Causeway Geotech. Surveying was carried out using a Trimble R10 GPS system employing VRS and real time kinetic (RTK) techniques.

The plan coordinates (Irish Transverse Mercator) and ground elevation (mOD Malin) at each location are recorded on the individual exploratory hole logs. The exploratory hole location plan presented in Appendix A shows these as-built positions.

4.10 Groundwater monitoring

Following completion of site works, groundwater monitoring was conducted over one round. Ground water monitoring was carried out using a water interface probe.

5 LABORATORY WORK

Upon their receipt in the laboratory, all disturbed samples were carefully examined and accurately described, and their descriptions incorporated into the borehole logs.

5.1 Geotechnical laboratory testing of soils

Laboratory testing of soils comprised:

- **soil classification:** moisture content measurement, Atterberg Limit tests and particle size distribution analysis.
- **shear strength** (total stress): unconsolidated undrained triaxial tests

- **compaction related:** California bearing ratio tests

Laboratory testing of soils samples was carried out in accordance with British Standards Institute: *BS 1377, Methods of test for soils for civil engineering purposes; Part 1 (2016), and Parts 2-9 (1990).*

The test results are presented in Appendix H.

5.2 Environmental laboratory testing of soils

Environmental testing, as specified by the Client's Representative was conducted on selected environmental soil samples by Chemtest at its laboratory in Newmarket, Suffolk.
Testing was carried out for a range of determinants, including:

- Metals
- Speciated total petroleum hydrocarbons (TPH)
- Speciated polycyclic aromatic hydrocarbons (PAH)
- BTEX compounds
- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Polychlorinated biphenyls (PCBs)
- Phenols
- Organic matter
- Total Organic Carbon (TOC)
- Cyanides
- Asbestos screen
- Sulphate and sulphide
- Sulphur
- Phosphate
- Calcium
- pH
- Waste acceptance criteria (WAC)

Results of environmental laboratory testing are presented in Appendix I.

6 GROUND CONDITIONS

6.1 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise glacial till. These deposits are underlain by calcareous shale, limestone and conglomerate of the Tober Colleen Formation.

6.2 Ground types encountered during investigation of the site

A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:

- **Paved surface:** approximately 200mm of concrete surfacing was encountered in BH04-04A, RC06, RC31, TP07, TP01-TP03, TP09-10 and TP16. Bitmac/tarmac surfacing typically 100mm thick was encountered in RC10-11, RC13, TP05-06, TP04, TP13, TP15, TP19, TP22-25, TP54 and TP57-59. In addition, concrete was encountered beneath the bitmac surface in RC11, RC13 and TP25 down to about 700mm. Tarmac surfacing was encountered in approximately 10mm thickness in RC05A, RC09, RC12 and TP21.

- **Topsoil:** encountered typically in 200mm thickness in BH03, RC07-08, RC19-22, RC25, RC27-30, TP08, TP12, TP17-18, TP40-50, TP53 and TP56.

- **Made Ground (sub-base):** approximately 500mm of aggregate fill beneath the paved surface in BH04, RC05A-06, RC09-13, TP01-07, TP09-10, TP13, TP15-16, TP19, TP21-TP24, TP54 and TP57-59.

- **Made Ground (fill):** reworked sandy gravelly clay fill and sandy silty gravely fill with varying fragments of timber, plastic, rubber, wires, steel, rebar, tarmac, ceramics, concrete and red brick was encountered across the site, extending to a depth of 0.60-3.00m.

- **Glacial Till:** sandy gravelly clay, frequently with low cobble content and occasional sand horizons, typically firm or stiff in upper horizons, becoming very stiff with increasing depth.

6.3 Groundwater

Details of the individual groundwater strikes, along with any relative changes in levels as works proceeded, are presented on the exploratory hole logs for each location.

Groundwater was encountered during drilling and trial pitting through soil as water strikes seen in Table 2 below.

Table 2. Groundwater strikes encountered during the ground investigations.

Location	Depth (mbgl)	Comments
BH04	0.60	Water level rose from 0.60m to 0.50m over 20 minutes.
RC05A	0.55	Heavy flow
RC06	1.30	-
RC07	1.70	-
TP02	1.80	-
TP03	1.50	-
TP04	2.50	Slow seepage
TP05	0.55	-
TP07	1.80	Heavy flow. Sewage smell at 1.80m.
TP08	1.70	Moderate flow
TP09	1.30	Fast flow
TP16	0.40	Moderate flow
TP17	2.70	Slow seepage
TP19	0.40	Moderate flow
TP21	0.50	Moderate flow
TP22	2.40	Slow seepage
TP24	3.00	-
TP44	2.70	Moderate flow
TP54	0.45	Slow seepage
TP57	1.30	Slow seepage
TP58	2.10	Slow seepage
TP59	1.55	Slow seepage

Subsequent groundwater monitoring of the standpipe installations recorded water levels as shown in Table 3.

Table 3. Groundwater monitoring.

Date	Water Level (mbgl)		
	RC10	RC25	RC30
23/01/23	Dry	1.55	3.26

Continued monitoring of the four installed standpipes will give an indication of the seasonal variation in groundwater level which should be factored into design considerations.

7 REFERENCES

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland.

IS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. National Standards Authority of Ireland.

BS 5930: 2015+A1:2020: Code of practice for ground investigations. British Standards Institution.

BS EN ISO 14688-1:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 1 Identification and description.

BS EN ISO 14688-2:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 2 Principles for a classification.

BS 1377: 1990: Methods of test for soils for civil engineering purposes. British Standards Institution.

BS EN ISO 22476-3:2005+A1:2011: Geotechnical investigation and testing. Field testing. Standard penetration test.

CAUSEWAY GEOTECH

APPENDIX A

SITE AND EXPLORATORY HOLE LOCATION PLANS



CAUSEWAY GEOTECH

Project No.:	21-0403S	**Client:**	Dublin Airport Authority
Project Name:	NASAH North Apron & South Apron GI Kilwex	**Client's Representative:**	AECOM

Legend Key



Title:

Site Location Plan

Last Revised:	**Scale:**
09/03/2023	1:20000

D18362-01-CWG-SAH-XX-XXX-RP-X-XXXX-0001-Rev2-S1

CAUSEWAY GEOTECH

Project No.:	21-0403S	**Client:**	Dublin Airport Authority
Project Name:	NASAH North Apron & South Apron GI Kilwex	**Client's Representative:**	AECOM

Legend Key

- Locations By Type - CP
- Locations By Type - DP
- Locations By Type - PC
- Locations By Type - RC
- Locations By Type - TP



Title:
Exploratory Hole Location Plan - 1

Last Revised:	**Scale:**
12/04/2023	1:2500

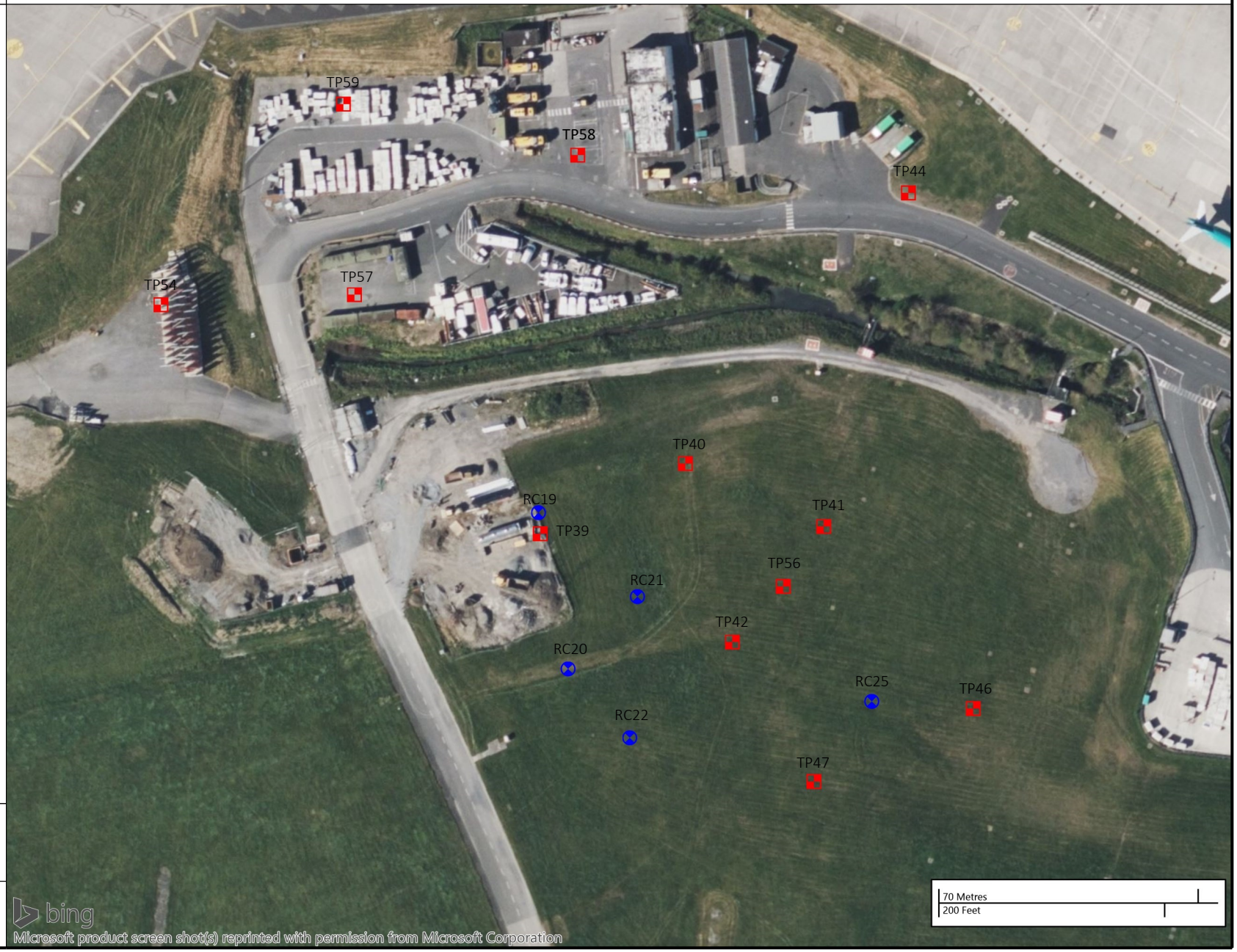
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CAUSEWAY GEOTECH

Project No.:	21-0403S	**Client:**	Dublin Airport Authority
Project Name:	NASAH North Apron & South Apron GI Kilwex	**Client's Representative:**	AECOM

Legend Key

- Locations By Type - CP
- Locations By Type - DP
- Locations By Type - PC
- Locations By Type - RC
- Locations By Type - TP



Title:
Exploratory Hole Location Plan - 2

Last Revised:	**Scale:**
12/04/2023	1:1500

CAUSEWAY GEOTECH

Project No.:	21-0403S	**Client:**	Dublin Airport Authority
Project Name:	NASAH North Apron & South Apron GI Kilwex	**Client's Representative:**	AECOM

Legend Key

- Locations By Type - CP
- Locations By Type - DP
- Locations By Type - PC
- Locations By Type - RC
- Locations By Type - TP



Title:
Exploratory Hole Location Plan - 3

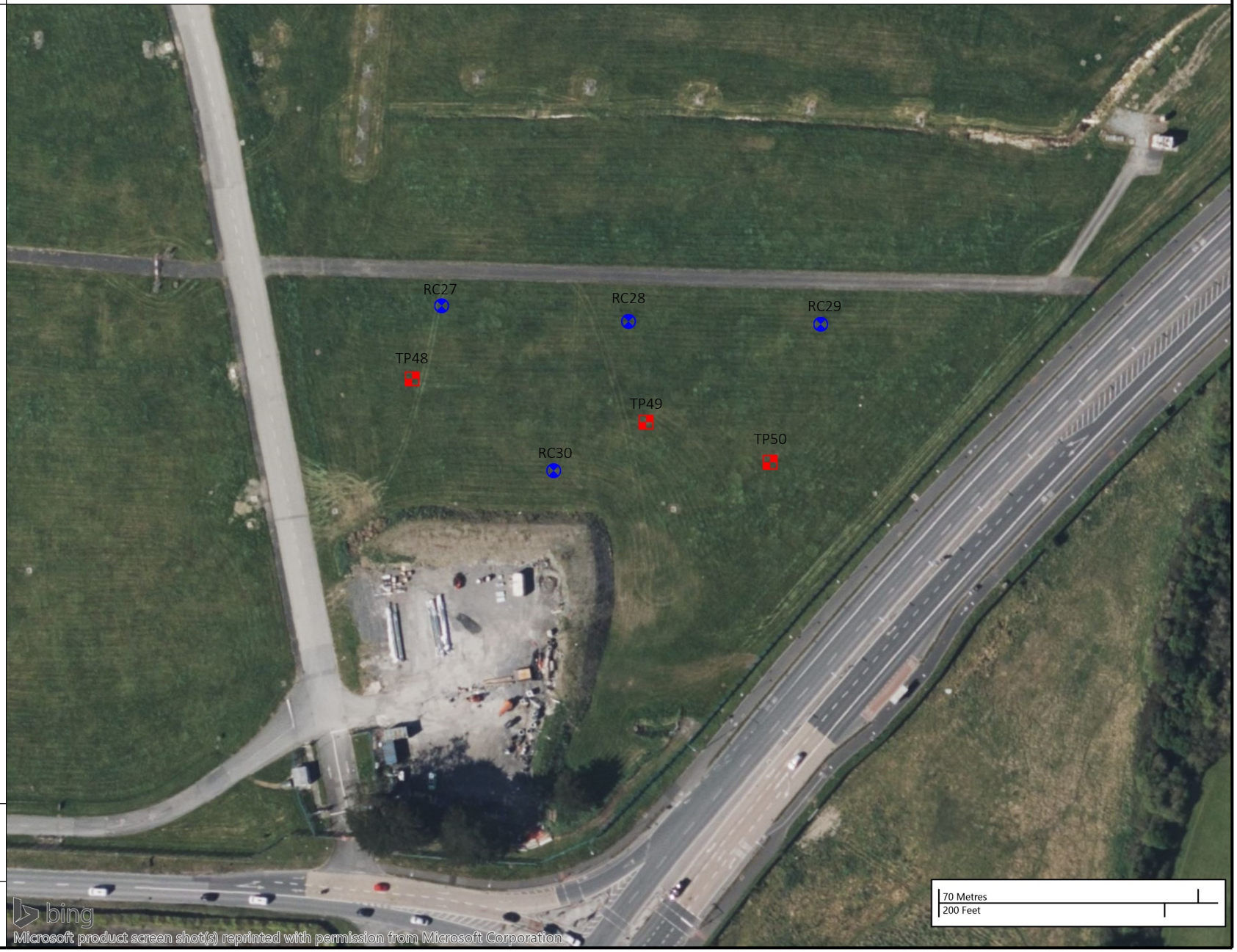
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CAUSEWAY GEOTECH

Project No.:	21-0403S	**Client:**	Dublin Airport Authority
Project Name:	NASAH North Apron & South Apron GI Kilwex	**Client's Representative:**	AECOM

Legend Key

- Locations By Type - CP
- Locations By Type - DP
- Locations By Type - PC
- Locations By Type - RC
- Locations By Type - TP



Title:
Exploratory Hole Location Plan - 4

Last Revised:	**Scale:**
12/04/2023	1:1500

CAUSEWAY GEOTECH

APPENDIX B
BOREHOLE LOGS



CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	BH03
	Client: Dublin Airport Authority	
	Client's Rep: AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Cable Percussion	Dando 3000	0.00	4.50	717325.58 E 742837.38 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1 Scale: 1:40
4.50 m	15/06/2022	CC	
Elevation: 58.96 mOD	**End Date:** 15/06/2022	**Logger:** CH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 1.20	B5				58.76	0.20		TOPSOIL		
0.30	ES1							MADE GROUND: Stiff brown slightly sandy slightly gravelly CLAY with low cobble content and fragments of red brick and sheets of plastic. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies predominantly limestone. Cobbles are subrounded of limestone.		
0.50	ES									
0.50	ES2									
0.50		PID = 0.60ppm								
1.20 - 1.65	U14	Ublow=37 100% Recovery	1.20	Dry						
1.40 - 2.00	B7				57.56	1.40		Firm becoming stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies predominantly limestone.		
1.50	ES3									
1.50		PID = 1.80ppm								
1.70	D6									
2.00	D8									
2.00 - 2.45	SPT (S)	N=14 (2,3/3,3,4,4)	2.00	Dry						
2.50	ES4				56.46	2.50		Very stiff dark grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.		
2.50 - 3.50	B9									
2.50		PID = 1.60ppm								
3.00 - 3.45	U15	Ublow=151 100% Recovery	3.00	Dry						
3.50	D10									
3.50 - 4.50	B11									
3.50		PID = 1.50ppm								
4.00	D12									
4.00 - 4.30	SPT (S)	N=50 (9,15/50 for 150mm)	4.00	Dry						
4.50	D13				54.46	4.50		End of Borehole at 4.50m		
4.50 - 4.70	SPT (S)	N=50 (25 for 50mm/50 for 150mm)	4.50	Dry						
4.50		PID = 1.20ppm								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
4.50	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	BH04
	Client: Dublin Airport Authority	
	Client's Rep: AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Cable Percussion	Dando 3000	0.00	1.30	717307.85 E 742799.08 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
1.30 m	15/06/2022	CC	Scale: 1:40
Elevation: 57.02 mOD	**End Date:** 16/06/2022	**Logger:** CH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					56.82	0.20		Reinforced CONCRETE		
0.20 - 1.20 0.30 0.30 0.50 0.55	B3 ES ES1 ES2 EW	Seepage at 0.60m			56.42	0.60		MADE GROUND: Grey slightly sandy silty subangular fine to coarse GRAVEL of limestone with low cobble content. Sand is fine to coarse. Cobbles are subangular fine to coarse of limestone. MADE GROUND: Firm becoming stiff greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies predominantly limestone. Cobbles are subrounded of limestone.		
					55.72	1.30		End of Borehole at 1.30m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
0.60	0.60	20	0.50

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m.

Termination Reason

Terminated on concrete and instructed to move by Client.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: NASAH North Apron & South Apron GI Kilwex	Borehole ID
21-0403S	Client: Dublin Airport Authority	BH04A
	Client's Rep: AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Cable Perussion	Dando 3000	0.00	3.40	717303.73 E 742797.98 N

Final Depth:	3.40 m	Start Date:	16/06/2022	Driller:	CC	Sheet 1 of 1 Scale: 1:40
Elevation:	56.96 mOD	End Date:	16/06/2022	Logger:	CH	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					56.76	0.20		Reinforced CONCRETE		
					56.36	0.60		MADE GROUND: Dark grey slightly sandy silty subangular fine to coarse GRAVEL of limestone with low cobble content. Sand is fine to coarse. Cobbles are of limestone.		
1.20	D3							MADE GROUND: Stiff becoming very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies predominantly limestone. Cobbles are subrounded of limestone.		
1.20 - 1.65	SPT (S)	N=33 (4,5/7,7,9,10) Hammer SN = 0197	1.20	Dry	55.56	1.40				
1.30 - 2.00	B4							Very stiff dark grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded fine to coarse of limestone.		
1.50	ES1									
1.50		PID = 0.50ppm								
2.00	D5									
2.00 - 3.00	B6									
2.00 - 2.38	SPT (S)	N=50 (8,11/50 for 225mm) Hammer SN = 0197	2.00	Dry						
2.50	ES2									
2.50		PID = 0.70ppm								
3.00	D7									
3.00 - 3.30	SPT (S)	N=50 (17,8/50 for 150mm) Hammer SN = 0197	3.00	Dry						
					53.56	3.40		End of Borehole at 3.40m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter
3.40	200

Water Added

From (m)	To (m)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC01
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Rotary Drilling	Comacchio 601	0.00	2.50
Rotary Coring	Comacchio 601	2.50	10.00

Coordinates: 716890.89 E, 743043.97 N

Final Depth: 10.00 m | Start Date: 23/01/2023 | Driller: JG

Elevation: 63.93 mOD | End Date: 23/01/2023 | Logger: DM

Sheet 1 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.		
								61.93	2.00		Firm gravelly CLAY (Driller's description)		
2.50 - 2.95	SPT(C) N=19 (2,3/3,5,5,6) Hammer SN = 1387	85						61.43	2.50		Firm greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel subangular to subrounded fine to coarse.		
4.00 - 4.45	SPT(C) N=31 (3,5/5,8,8,10) Hammer SN = 1387	95						59.93	4.00		Very stiff dark brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
5.50 - 5.72	SPT(C) N=24 (10,18/24 for 75mm) Hammer SN = 1387	95											
7.00													
		TCR	SCR	RQD	FI								

Backfill: 0.5 m

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.50	200
10.00	150

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC01
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Rotary Drilling	Comacchio 601	0.00	2.50
Rotary Coring	Comacchio 601	2.50	10.00

Coordinates: 716890.89 E, 743043.97 N

Final Depth: 10.00 m | Start Date: 23/01/2023 | Driller: JG

Elevation: 63.93 mOD | End Date: 23/01/2023 | Logger: DM

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100									Very stiff dark brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
8.50 - 8.95 8.50	SPT(C) N=46 (6,8/8,10,13,15) Hammer SN = 1387	100											
10.00 - 10.45 10.00	SPT(C) N=41 (4,7/9,9,11,12) Hammer SN = 1387							53.93	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.50	200
10.00	150

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC02
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 2
Rotary Drilling	Comacchio 601	0.00	2.50	716907.01 E	10.00 m	20/01/2023	JG	Scale: 1:40
Rotary Coring	Comacchio 601	2.50	10.00	743056.67 N	Elevation: 63.95 mOD	End Date: 20/01/2023	Logger: DM	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											Backfill (Driller's description)		
1.50 - 2.50	B1							62.45	1.50		Firm dark gravelly CLAY (Driller's description)		
2.50 - 2.95	SPT(C) N=26 (3,4/4,7,7,8) Hammer SN = 1387	70						61.45	2.50		Stiff dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
4.00 - 4.27 4.00	SPT(C) N=43 (5,10/43 for 120mm) Hammer SN = 1387	100						59.95	4.00		Very stiff dark greyish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
5.50 - 5.95 5.50	SPT(C) N=48 (5,8/10,12,12,14) Hammer SN = 1387	80											
7.00 - 7.30 7.00	SPT(C) N=34 (6,9/34 for 150mm) Hammer SN = 1387												
		TCR	SCR	RQD	FI								

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
2.50	200
10.00	150

Core Barrel

SK6L

Flush Type

Water

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC02
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Rotary Drilling	Comacchio 601	0.00	2.50
Rotary Coring	Comacchio 601	2.50	10.00

Coordinates: 716907.01 E, 743056.67 N

Final Depth: 10.00 m | Start Date: 20/01/2023 | Driller: JG

Elevation: 63.95 mOD | End Date: 20/01/2023 | Logger: DM

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		90									Very stiff dark greyish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
8.50 - 8.95 8.50	SPT(C) N=44 (4,7/7,11,13,13) Hammer SN = 1387	100											
10.00 - 10.29 10.00	SPT() N=35 (5,10/35 for 140mm) Hammer SN = 1387							53.95	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
2.50	200
10.00	150

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC03
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Rotary Drilling	Comacchio 601	0.00	2.50
Rotary Coring	Comacchio 601	2.50	10.00

Coordinates: 716923.48 E, 743030.67 N

Final Depth: 10.00 m | Start Date: 24/01/2023 | Driller: JG

Elevation: 63.62 mOD | End Date: 24/01/2023 | Logger: DM

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.		
								62.12	1.50		Firm to stiff dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
2.50 - 2.95	SPT(C) N=26 (3,4/4,6,8,8) Hammer SN = 1387	60											
4.00 - 4.45 4.00	SPT(C) N=41 (5,7/9,10,11,11) Hammer SN = 1387	95						59.62	4.00		Very stiff dark greyish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
5.50 - 5.80 5.50	SPT(C) N=40 (2,8/40 for 150mm) Hammer SN = 1387	95											
7.00 - 7.34 7.00	SPT(C) N=49 (5,9/49 for 185mm) Hammer SN = 1387												
		TCR	SCR	RQD	FI								

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
2.50	200
10.00	150

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC03
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Rotary Drilling	Comacchio 601	0.00	2.50
Rotary Coring	Comacchio 601	2.50	10.00

Coordinates: 716923.48 E, 743030.67 N

Final Depth: 10.00 m | Start Date: 24/01/2023 | Driller: JG

Elevation: 63.62 mOD | End Date: 24/01/2023 | Logger: DM

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		95									Very stiff dark greyish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
8.50 - 8.93 8.50	SPT(C) N=50 (9,10/50 for 275mm) Hammer SN = 1387	95											
10.00 - 10.44 10.00	SPT(C) N=50 (6,10/50 for 295mm) Hammer SN = 1387							53.62	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
2.50	200
10.00	150

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC04
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Rotary Drilling	Comacchio 601	0.00	2.50
Rotary Coring	Comacchio 601	2.50	10.00

Coordinates: 716955.76 E, 743057.62 N

Final Depth: 10.00 m | Start Date: 19/01/2023 | Driller: JG

Elevation: 63.59 mOD | End Date: 19/01/2023 | Logger: DM

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											Backfill (Driller's description)		
								62.09	1.50		Firm to stiff dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
2.50 - 2.95	SPT(C) N=39 (3,5/7,10,10,12) Hammer SN = 1387	100											
4.00 - 4.45	SPT(C) N=43 (4,6/6,11,13,13) Hammer SN = 1387	95						59.59	4.00		Very stiff dark greyish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
5.50 - 5.95	SPT(C) N=43 (4,7/7,10,12,14) Hammer SN = 1387	100											
7.00													
		TCR	SCR	RQD	FI								

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type:

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC04
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Rotary Drilling	Comacchio 601	0.00	2.50
Rotary Coring	Comacchio 601	2.50	10.00

Coordinates: 716955.76 E, 743057.62 N

Final Depth: 10.00 m | Start Date: 19/01/2023 | Driller: JG

Elevation: 63.59 mOD | End Date: 19/01/2023 | Logger: DM

Sheet 2 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
		100									Very stiff dark greyish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
8.50 - 8.95 8.50	SPT(C) N=47 (6,8/10,12,12,13) Hammer SN = 1387	100											
10.00 - 10.45 10.00	SPT(C) N=47 (4,7/9,13,12,13) Hammer SN = 1387							53.59	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type:

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC05A
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Tracked Excavator	0.00	2.50	716992.47 E
Rotary Coring	T44	2.50	10.00	743076.46 N

Final Depth:	10.00 m	Start Date:	22/08/2022	Driller:	GT	Sheet 1 of 2
Elevation:	62.33 mOD	End Date:	24/08/2022	Logger:	MRG +CM	Scale: 1:40
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								62.13	0.20		TARMAC
0.30	ES2										MADE GROUND: Dark greyish brown slightly silty sandy subangular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.
0.40	B1							61.88	0.45		
0.50	B3							61.78	0.55		MADE GROUND: Dark grey slightly sandy slightly silty subangular fine to coarse GRAVEL of limestone. Sand is fine to coarse.
0.50	ES4							61.76	0.57		MADE GROUND: TERRAM
	Heavy flow at 0.55m							61.53	0.80		MADE GROUND: Firm greenish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.
0.70	B5										
0.70	ES6										
1.00	B7							61.23	1.10		MADE GROUND: Firm dark greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded.
1.00	ES8										
											Firm greyish brown slighty sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.
2.00	ES10										
2.10	B9										
2.50 - 2.94	SPT(C) N=50 (8,10/50 for 290mm)					2.50	Dry	59.83	2.50		Very stiff dark greyish brown gravelly slightly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of predominantly limestone and sandstone. Cobbles are subangular to subrounded of limestone and sandstone.
2.90	B11										
2.90	ES12	95									
4.00 - 4.12	SPT(C) N=50 (25 for 35mm/50 for 88mm)					2.50	Dry				
4.00		100									
5.50 - 5.88	SPT(C) N=50 (10,14/50 for 230mm)					2.50	Dry				
5.50		100						56.18	6.15		Very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies.
7.00 - 7.16	SPT(C) N=50 (25 for 72mm/50 for 87mm)					2.50	Dry	55.33	7.00		Very stiff dark greyish brown gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.
7.00											
		TCR	SCR	RQD	FI						

Water: ▼ 0.55

Backfill: solid

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
0.55			

Remarks

Hand dug inspection pit excavated to 2.50m.

Casing Details	
To (m)	Diam (mm)
2.50	200

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC05A
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Tracked Excavator	0.00	2.50	716992.47 E
Rotary Coring	T44	2.50	10.00	743076.46 N

Final Depth:	10.00 m	Start Date:	22/08/2022	Driller:	GT	Sheet 2 of 2
Elevation:	62.33 mOD	End Date:	24/08/2022	Logger:	MRG +CM	Scale: 1:40
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								54.83	7.50		Very stiff dark greyish brown gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.		
		100						54.43	7.90		Very stiff brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of various lithologies.		
8.50 - 8.94 8.50	SPT(C) N=50 (10,14/50 for 285mm)	100				2.50	Dry				Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subrounded of various lithologies. Cobbles are subangular to subrounded of predominantly limestone.		
10.00								52.33	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
0.55			

Casing Details

To (m)	Diam (mm)
2.50	200

Core Barrel

SK6L

Flush Type

Water

Remarks

Hand dug inspection pit excavated to 2.50m.

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: NASAH North Apron & South Apron GI Kilwex	Borehole ID
21-0403S	Client: Dublin Airport Authority	RC06
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 10.00 m	Start Date: 09/08/2022	Driller: GT	Sheet 1 of 2
Inspection Pit	8T Tracked Excavator	0.00	1.50	717022.70 E				Scale: 1:40
Rotary Coring	T44 Beretta	1.50	10.00	743119.02 N	Elevation: 64.39 mOD	End Date: 10/08/2022	Logger: MRG +CM	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								64.19	0.20		CONCRETE with rebar.		
								63.94	0.45		MADE GROUND: Grey slightly sandy subangular to subrounded fine to coarse GRAVEL of limestone. Sand is fine to coarse.		
								63.93			MADE GROUND: TERRAM		
0.80	B1										MADE GROUND: Very stiff greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobblese are subangular to subrounded of mixed lithologies.		
	Slow seepage at 1.30m											▼	
1.50 - 1.95	SPT(C) N=44 (8,10/10,10,12,12)					1.50		62.89	1.50		Very stiff greyish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine.		
2.35 - 2.80	B2	100											
3.00 - 3.14	SPT(C) N=50 (25 for 60mm/50 for 75mm)					3.00							
3.00								60.99	3.40		Very stiff greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
		100											
4.50 - 4.58	SPT(C) N=50 (0 for 0mm/50 for 75mm)					4.50							
4.50											*4.50-4.70m: Bed of greyish brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is subangular fine.*		
5.10 - 5.70	B3	100											
6.00 - 6.45	SPT(C) N=50 (10,12/12,14,14,10)					6.00		58.39	6.00		Very dense greyish brown gravelly very clayey fine to coarse SAND. Gravel is subangular fine.		
6.00		100											
								57.49	6.90		Very stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.30			

Remarks

Hand dug inspection pit to 1.50m.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	150

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated on scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC06
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Tracked Excavator	0.00	1.50	717022.70 E
Rotary Coring	T44 Beretta	1.50	10.00	743119.02 N

Final Depth:	10.00 m	Start Date:	09/08/2022	Driller:	GT	Sheet 2 of 2
Elevation:	64.39 mOD	End Date:	10/08/2022	Logger:	MRG +CM	Scale: 1:40
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.74 7.50	SPT(C) N=50 (10,15/50 for 92mm)					7.50					Very stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
8.30 - 8.60	U5	92											
9.00 - 9.50 9.00 - 9.45 9.00	B4 SPT(C) N=60 (10,12/14,14,16,16)					9.00							
		100											
								54.69	9.70		Very dense greyish brown slightly gravelly clayey fine to coarse SAND. Gravel is subangular fine.		
10.00								54.39	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.30			

Remarks

Hand dug inspection pit to 1.50m.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	150

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated on scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC07
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	2.60
Rotary Drilling	Beretta T44	2.60	3.00
Rotary Coring	Beretta T44	3.00	10.00

Coordinates: 717110.02 E, 743060.43 N

Final Depth: 10.00 m | Start Date: 18/08/2022 | Driller: GT

Elevation: 63.14 mOD | End Date: 18/08/2022 | Logger: MRG +RW

Sheet 1 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								63.12	0.02		Brown slightly sandy gravelly TOPSOIL with fragments of plastic. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.		
0.30	ES2												
0.50	B1										MADE GROUND: Dark grey slightly sandy slightly clayey subangular fine to coarse GRAVEL of mixed lithologies with fragments of red brick, concrete, timber and plastic. Sand is fine to coarse.		
								62.44	0.70		Firm greenish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.		
0.90	B3												
0.90	ES4												
								61.94	1.20		Firm light brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.		
1.50	B5												
1.50	ES6 Medium flow at 1.70m							61.44	1.70		Light brownish grey slightly sandy clayey subangular to subrounded fine to coarse GRAVEL of limestone. Sand is fine to coarse.	▼	
2.40	B7							60.74	2.40		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.		
2.50	ES8							60.54	2.60		Very stiff dark grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
3.00 - 3.40	SPT(C) N=50 (12,12/50 for 250mm) Hammer SN = 0208	100						60.14	3.00		Very stiff dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies.		
								59.64	3.50		Very stiff dark brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of limestone.		
4.20 - 4.50	B9												
4.50 - 4.63	SPT(C) N=50 (25 for 55mm/50 for 75mm) Hammer SN = 0208	100						58.64	4.50		Dense dark greyish brown slightly gravelly silty fine to coarse SAND. Gravel is subangular fine to medium.		
4.50													
4.90 - 5.40	B10												
								57.64	5.50		Very stiff dark greyish brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of limestone.		
6.00 - 6.42	SPT(C) N=50 (8,11/50 for 275mm) Hammer SN = 0208	90											
6.00													
7.10 - 7.50	B11												
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.70			

Casing Details

To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type: Water

Remarks: Hand dug inspection pit excavated to 2.60m.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC07
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	2.60
Rotary Drilling	Beretta T44	2.60	3.00
Rotary Coring	Beretta T44	3.00	10.00

Coordinates: 717110.02 E, 743060.43 N

Final Depth: 10.00 m | Start Date: 18/08/2022 | Driller: GT

Elevation: 63.14 mOD | End Date: 18/08/2022 | Logger: MRG +RW

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50											Very stiff dark greyish brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of limestone.		
		100						55.04	8.10		Very stiff light brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
8.70 - 9.00	C12												
9.00 - 9.15	SPT(C) N=50 (25 for 75mm/50 for 75mm) Hammer SN = 0208												
9.00		100											
9.70 - 10.00	B13												
10.00								53.14	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.70			

Casing Details

To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type: Water

Remarks: Hand dug inspection pit excavated to 2.60m.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC08
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Excavator	0.00	1.50	
Rotary Coring	Beretta T44	1.50	10.00	717203.03 E
				743026.36 N

Final Depth:	10.00 m	Start Date:	17/08/2022	Driller:	MW
Elevation:	61.30 mOD	End Date:	17/08/2022	Logger:	RW +MRG

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								61.20	0.10		TOPSOIL with rootlets.		
0.30	B1							60.90	0.40		MADE GROUND: Firm greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse, Cobbles are subangular to subrounded.		
0.70	B2							60.50	0.80		MADE GROUND: Firm light brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.		
1.00	B3							60.00	1.30		MADE GROUND: Firm greyish brown slightly sandy gravelly CLAY with medium cobble content and fragments of clay pipe. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.		
1.50	B4							59.80	1.50		Firm greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.		
1.50 - 1.95	SPT(C) N=9 (1,2/2,2,3,2) Hammer SN = 0208												
2.00 - 2.50	B5	90									Very stiff dark brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.		
3.00 - 3.44	SPT(C) N=50 (7,7/50 for 285mm) Hammer SN = 0208												
3.00													
3.70 - 4.00	C6	100						57.60	3.70		Very stiff dark grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subangular of limestone.		
4.50 - 4.62	SPT(C) N=50 (25 for 55mm/50 for 60mm) Hammer SN = 0208												
4.50													
5.00 - 5.50	B7	100						56.40	4.90		Very stiff dark grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Grave is subangular to subrounded fine to coarse. Cobbles are subangular of limestone.		
6.00 - 6.44	SPT(C) N=50 (9,10/50 for 285mm) Hammer SN = 0208												
6.00								54.90	6.40		Dark brownish grey slightly sandy slightly clayey subrounded fine to coarse GRAVEL. Sand is fine to coarse.		
		100						54.60	6.70		Very stiff dark brownish grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
7.00 - 7.50	B8												
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel

SK6L

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC08
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Excavator	0.00	1.50	
Rotary Coring	Beretta T44	1.50	10.00	717203.03 E
				743026.36 N

Final Depth:	10.00 m	Start Date:	17/08/2022	Driller:	MW
Elevation:	61.30 mOD	End Date:	17/08/2022	Logger:	RW +MRG

Sheet 2 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.94 7.50	SPT(C) N=50 (10,10/50 for 285mm) Hammer SN = 0208							53.70	7.60		Very stiff dark brownish grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
8.40 - 8.70	C9	100									Very stiff brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.		
9.00 - 9.14 9.00	SPT(C) N=50 (25 for 75mm/50 for 60mm) Hammer SN = 0208												
10.00								51.30	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks
Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Casing Details	
To (m)	Diam (mm)

Core Barrel
SK6L

Flush Type
Water

Termination Reason
Terminated at scheduled depth.

Last Updated
09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: NASAH North Apron & South Apron GI Kilwex	Borehole ID
21-0403S	Client: Dublin Airport Authority	RC09
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 10.00 m	Start Date: 25/08/2022	Driller: GT	Sheet 1 of 2
Inspection Pit	8T Tracked Excavator	0.00	1.50	717231.72 E				Scale: 1:40
Rotary Coring	Beretta T44	1.50	10.00	743007.23 N	Elevation: 60.64 mOD	End Date: 25/08/2022	Logger: RW +MRG	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								60.56	0.08		TARMAC
0.20	B1							60.39	0.25		MADE GROUND: Grey sandy slightly silty subangular fine to coarse GRAVEL of limestone. Sand is fine to coarse.
0.50	B2							59.94	0.70		MADE GROUND: Soft to firm greyish brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular fine to coarse of various lithologies.
1.00	B3							59.24	1.40		Firm greyish brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded.
1.50	B4					1.50	Dry	59.14	1.50		Firm dark greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded.
1.50 - 1.95	SPT(C) N=48 (10,14/12,12,10,14)	100									Very stiff dark greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone.
3.00 - 3.50	B6					1.50	Dry				
3.00 - 3.17	SPT(C) N=50 (25 for 75mm/50 for 98mm)	100									
4.00 - 4.30	C9										
4.50 - 4.50	SPT(C) N=50 (25 for 0mm/50 for 0mm)	100				1.50	Dry	56.14	4.50		Very stiff dark greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of limestone.
6.00 - 6.50	B5					1.50	Dry	54.64	6.00		Dense dark greyish brown very clayey fine to coarse SAND.
6.00 - 6.13	SPT(C) N=50 (25 for 67mm/50 for 59mm)	100									
								53.44	7.20		Grey subrounded COBBLES with much clay.
		TCR	SCR	RQD	FI						

Water | Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC09
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Tracked Excavator	0.00	1.50	717231.72 E
Rotary Coring	Beretta T44	1.50	10.00	743007.23 N

Final Depth:	10.00 m	Start Date:	25/08/2022	Driller:	GT	Sheet 2 of 2
Elevation:	60.64 mOD	End Date:	25/08/2022	Logger:	RW +MRG	Scale: 1:40
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50								52.94	7.70		Grey subrounded COBBLES with much clay.		
		100									Very stiff light greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of various lithologies.		
8.70 - 9.00	C8												
9.00 - 9.50	B7												
9.00		100											
10.00								50.64	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC10
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	1.50
Rotary Coring	Beretta T44	1.50	10.00

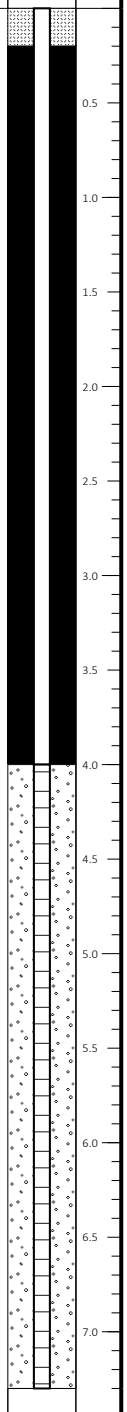
Coordinates: 717086.52 E, 742967.79 N

Final Depth: 10.00 m | Start Date: 24/08/2022 | Driller: GT | Logger: RW+CH | Elevation: 61.17 mOD | End Date: 24/08/2022

Sheet 1 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								60.87	0.30		BITMAC
								60.82	0.35		MADE GROUND: Grey slightly sandy silty subangular to subrounded fine to coarse GRAVEL of limestone with rootlets. Sand is fine to coarse.
											MADE GROUND: Soft dark grey slightly sandy slightly gravelly CLAY with low cobble content and rotten rootlets. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subangular to angular of mixed lithologies.
								60.07	1.10		MADE GROUND: Soft to firm greenish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded of mixed lithologies. Cobbles are subangular to subrounded of mixed lithologies.
1.50 - 2.00	B1							59.67	1.50		Firm greyish brown slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subangular fine to coarse.
1.50 - 1.95	SPT(C) N=9 (2,2/2,3,2,2) Hammer SN = 0208	100									
								58.37	2.80		Very stiff dark brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of limestone.
3.00 - 3.44	SPT(C) N=50 (10,12/50 for 290mm) Hammer SN = 0208										
3.00											
3.70 - 4.00	C5	100									
4.50 - 5.00	B2										
4.50 - 4.66	SPT(C) N=50 (25 for 80mm/50 for 75mm) Hammer SN = 0208										
4.50		100									
6.00		100									
		TCR	SCR	RQD	FI						

Water: Backfill



Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	150

Core Barrel: SK6L

Flush Type: Water

Termination Reason: Terminated at scheduled depth

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC10
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	1.50
Rotary Coring	Beretta T44	1.50	10.00

Coordinates
717086.52 E
742967.79 N

Final Depth: 10.00 m | **Start Date:** 24/08/2022 | **Driller:** GT
Elevation: 61.17 mOD | **End Date:** 24/08/2022 | **Logger:** RW+CH

Sheet 2 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.95 7.50	SPT(C) N=53 (8,10/12,14,14,13) Hammer SN = 0208										Very stiff dark brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of limestone.		
8.50 - 9.00	B3	100						53.07	8.10		Very stiff light greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
9.00 - 9.45 9.00	SPT(C) N=54 (10,14/15,13,14,12) Hammer SN = 0208												
9.60 - 10.00	C4	100											
10.00								51.17	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks
Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	150

Core Barrel
SK6L

Flush Type
Water

Termination Reason
Terminated at scheduled depth

Last Updated
09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC11
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Tracked Excavator	0.00	1.50	717194.90 E
Rotary Coring	Beretta T44	1.50	10.00	742827.52 N

Final Depth:	10.00 m	Start Date:	22/08/2022	Driller:	MRG +GT	Sheet 1 of 2
Elevation:	59.82 mOD	End Date:	23/08/2022	Logger:	CH+RW	Scale: 1:40
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								59.74	0.08		BITMAC CONCRETE with rebar		
								59.47	0.35		MADE GROUND: Dark greyish brown gravelly clayey medium to coarse SAND. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subangular to subrounded of various lithologies.		
1.50 - 1.95	SPT(C) N=12 (7,5/4,3,3,2) Hammer SN = 0208	67						58.32	1.50		Medium dense brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is subangular fine to coarse.		
2.40 - 2.90	B4												
3.00 - 3.45 3.00	SPT(C) N=16 (7,5/5,4,4,3) Hammer SN = 0208	100						56.92	2.90		Grey subrounded COBBLES of limestone with much gravel. Gravel is subrounded medium to coarse.		
								56.42	3.40		Very stiff dark greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of limestone.		
4.50 - 4.90	B3												
4.50 - 4.94 4.50	SPT(C) N=50 (12,14/50 for 290mm) Hammer SN = 0208												
4.95 - 6.15	C2	100											
6.00 - 6.15 6.00	SPT(C) N=50 (25 for 75mm/50 for 75mm) Hammer SN = 0208												
		100											
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	150

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC11
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Tracked Excavator	0.00	1.50
Rotary Coring	Beretta T44	1.50	10.00

Coordinates: 717194.90 E, 742827.52 N

Final Depth: 10.00 m | Start Date: 22/08/2022 | Driller: MRG +GT

Elevation: 59.82 mOD | End Date: 23/08/2022 | Logger: CH+RW

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50											Very stiff dark greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of limestone.		
		100						51.82	8.00		Very stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
8.70 - 9.00	B5												
9.00 - 9.44	SPT(C) N=50 (13,14/50 for 290mm) Hammer SN = 0208												
9.00													
9.20 - 9.60	C1	90											
10.00								49.82	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	150

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC12
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Tracked Excavator	0.00	1.50	717292.79 E
Rotary Coring	Beretta T44	1.50	10.00	742835.54 N

Final Depth:	10.00 m	Start Date:	23/08/2022	Driller:	GT	Sheet 1 of 2
Elevation:	59.40 mOD	End Date:	23/08/2022	Logger:	MRG +RW	Scale: 1:40
						FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								59.34	0.06		TARMAC		
0.20	B1							59.28	0.12		MADE GROUND: Grey slightly sandy subangular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		
0.40	B2							59.10	0.30		MADE GROUND: Dark grey sandy slightly silty subangular fine to coarse GRAVEL of limestone. Sand is fine to coarse.		
								58.95	0.45		MADE GROUND: Light greyish brown sandy slightly silty subangular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		
1.00	B3										MADE GROUND: Dark brown gravelly slightly silty fine to coarse SAND with medium cobble content. Gravel is subangular fine to coarse of various lithologies.		
1.50 - 2.00	B4	100						57.90	1.50		Dense dark brown gravelly clayey fine to coarse SAND. Gravel is subrounded fine to coarse.		
3.00		100						56.60	2.80		Very stiff dark greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of limestone.		
4.50 - 5.00	B5							54.90	4.50		Dark greyish brown slightly gravelly clayey fine to coarse SAND. Gravel is subangular fine to coarse.		
4.50		100						54.30	5.10		Dark greyish brown sandy clayey subangular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		
								53.90	5.50		Very stiff dark greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.		
6.00 - 6.40	C7	100											
6.00													
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC12
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Tracked Excavator	0.00	1.50
Rotary Coring	Beretta T44	1.50	10.00

Coordinates: 717292.79 E, 742835.54 N

Final Depth: 10.00 m | Start Date: 23/08/2022 | Driller: GT

Elevation: 59.40 mOD | End Date: 23/08/2022 | Logger: MRG +RW

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.90	B6												
7.50		100						51.10	8.30		Very stiff dark greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.		
9.00		100									Very stiff light greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of limestone.		
9.60 - 9.90	C8												
10.00								49.40	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
1.50	200

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC13
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	1.50
Rotary Coring	Beretta T44	1.50	10.00

Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 2
717244.99 E	10.00 m	18/08/2022	GT	Scale: 1:40
742793.57 N	Elevation: 59.64 mOD	End Date: 22/08/2022	Logger: CH+RW	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											BITMAC		
								59.29	0.35		CONCRETE with 2 inch rebar		
								58.94	0.70		MADE GROUND: Dark greyish brown gravelly clayey medium to coarse SAND. Gravel is subangular to subrounded fine to coarse of various lithologies. Cobbles are subangular to subrounded of various lithologies.		
1.50 - 1.95	SPT(C) N=9 (2,2/2,3,2,2) Hammer SN = 0208							58.14	1.50		Medium dense greyish brown gravelly very clayey fine to coarse SAND. Gravel is subangular fine to coarse of various lithologies.		
2.00 - 2.50	C4	83											
3.00 - 3.45 3.00	SPT(C) N=54 (10,12/14,14,12,14) Hammer SN = 0208	77											
4.50 - 5.00 4.50 - 4.64 4.50	C3 SPT(C) N=50 (25 for 75mm/50 for 60mm) Hammer SN = 0208							55.14	4.50		Dense dark greyish brown very clayey fine to coarse SAND.		
		100						54.59 54.44	5.05 5.20		Stiff dark greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
								54.14	5.50		Grey subrounded COBBLES with much gravel. Gravel is subrounded fine to coarse.		
6.00		100									Very stiff dark brownish grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subangular of limestone.		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	200

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC13
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 2 of 2
Inspection Pit	8T Excavator	0.00	1.50					Scale: 1:40
Rotary Coring	Beretta T44	1.50	10.00	717244.99 E	10.00 m	18/08/2022	GT	
				742793.57 N	Elevation: 59.64 mOD	End Date: 22/08/2022	Logger: CH+RW	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.95 7.50 7.70 - 8.20	SPT(C) N=53 (8,10/12,14,14,13) Hammer SN = 0208 C2	100						51.24	8.40		Very stiff dark brownish grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subangular of limestone.		
9.00 - 9.45 9.00 9.70 - 10.00	SPT(C) N=54 (10,14/15,13,14,12) Hammer SN = 0208 C1	100									Very stiff light greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
10.00								49.64	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	200

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC19
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inpsection pit	8T Excavator	0.00	1.20
Rotary Drilling	Beretta T44	1.20	1.50
Rotary Coring	Beretta T44	1.50	10.50

Coordinates: 716980.53 E, 742634.75 N

Final Depth: 10.50 m | Start Date: 26/07/2022 | Driller: GT

Elevation: 57.50 mOD | End Date: 27/07/2022 | Logger: MRG

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								57.30	0.20		TOPSOIL with rootlets.		
											MADE GROUND: Greyish brown sandy very gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular.		
								56.74	0.75		Firm to stiff dark brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.		
								56.30	1.20		Firm brown sandy CLAY. Sand is fine to coarse.		
1.50 - 1.95	SPT(C) N=16 (3,3/3,4,4,5) Hammer SN = 0208							56.00	1.50		Light grey slightly sandy clayey subangular fine to coarse GRAVEL of various lithologies with medium cobble content. Sand is fine to coarse. Cobbles are subangular.		
								55.50	2.00		Very stiff brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangukar fine to coarse of various lithologies. Cobbles are subangular of various lithologies.		
		100											
2.50 - 3.00	B1												
3.00 - 3.45	SPT(C) N=40 (4,4/8,10,10,12) Hammer SN = 0208												
3.00		100											
4.50 - 5.00	B2												
4.50 - 4.95	SPT(C) N=48 (10,10/10,12,12,14) Hammer SN = 0208												
4.50		100											
6.00								51.50	6.00		Brown slightly gravelly clayey fine to coarse SAND. Gravel is subangular fine of various lithologies.		
		100											
								50.34	7.15		Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies predominantly limestone. Cobbles are subangular of limestone.		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC19
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inpsection pit	8T Excavator	0.00	1.20
Rotary Drilling	Beretta T44	1.20	1.50
Rotary Coring	Beretta T44	1.50	10.50

Coordinates: 716980.53 E, 742634.75 N

Final Depth: 10.50 m | Start Date: 26/07/2022 | Driller: GT

Elevation: 57.50 mOD | End Date: 27/07/2022 | Logger: MRG

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 8.10 7.50 - 7.95 7.50	B3 SPT(C) N=40 (7,8/8,10,10,12) Hammer SN = 0208	86						50.00	7.50		Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies predominantly limestone. Cobbles are subangular of limestone.		
								49.00	8.50		Brown gravelly clayey fine to coarse SAND. Gravel is subrounded fine to medium.		
9.00 - 9.15 9.00	SPT(C) N=50 (25 for 68mm/50 for 79mm) Hammer SN = 0208	100						48.50	9.00		Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies predominantly limestone. Cobbles are subrounded . Dense brown clayey fine to coarse SAND.		
10.50								47.00	10.50		End of Borehole at 10.50m		

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details	
To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC20
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	1.20
Rotary Drilling	Beretta T44	1.20	1.50
Rotary Coring	Beretta T44	1.50	10.50

Coordinates: 716989.50 E, 742592.60 N

Final Depth: 10.50 m | Start Date: 27/08/2022 | Driller: GT

Elevation: 56.32 mOD | End Date: 28/08/2022 | Logger: TH +MRG

Sheet 1 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								56.17	0.15		TOPSOIL		
											MADE GROUND: Firm to stiff greyish brown slightly sandy gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		
								55.72	0.60		Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.		
								55.32	1.00		Firm greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravels are subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.		
								55.12	1.20		Very stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
1.50 - 1.95	SPT(C) N=35 (4,7/7,8,10,10) Hammer SN = 0208	87						54.82	1.50		Very stiff dark greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.		
2.50 - 3.00	B1												
3.00 - 3.45	SPT(C) N=48 (8,10/12,12,12,12) Hammer SN = 0208	100											
3.00													
4.50								51.52	4.80		Very stiff dark greyish brown slightly sandy gravelly CLAY. Sand is fine t coarse. Gravel is subangular fine to coarse. *4.80m to 5.00m: Dark grey angular fine to coarse gravel of limestone.*		
5.50 - 6.00	B2	100											
6.00 - 6.45	SPT(C) N=48 (8,10/10,12,12,14) Hammer SN = 0208	100											
6.00								49.22	7.10		Very stiff dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200

Core Barrel: SK6L

Flush Type: Water

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC20
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	1.20
Rotary Drilling	Beretta T44	1.20	1.50
Rotary Coring	Beretta T44	1.50	10.50

Coordinates: 716989.50 E, 742592.60 N

Final Depth: 10.50 m | Start Date: 27/08/2022 | Driller: GT

Elevation: 56.32 mOD | End Date: 28/08/2022 | Logger: TH +MRG

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.95 7.50	SPT(C) N=26 (7,7/8,8,0,10) Hammer SN = 0208	100						48.47	7.85		Very stiff dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
9.00 - 9.50 9.00 - 9.45 9.00	B3 SPT(C) N=39 (6,6/9,9,11,10) Hammer SN = 0208	100						46.97	9.35		Dark greyish brown slightly clayey fine GRAVEL		
10.50								45.82	10.50		Dark greyish brown slightly clayey fine to coarse SAND. *10.35m to 10.50m: Subangular coarse gravel* End of Borehole at 10.50m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)
1.50	200

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC21
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	1.20
Rotary Drilling	Beretta T44	1.20	1.50
Rotary Coring	Beretta T44	1.50	10.50

Coordinates: 717007.87 E, 742612.66 N

Final Depth: 10.50 m | Start Date: 29/07/2022 | Driller: GT

Elevation: 57.07 mOD | End Date: 29/07/2022 | Logger: MRG +TH

Sheet 1 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								56.92	0.15		TOPSOIL		
											MADE GROUND: Firm to stiff greyish brown slightly sandy gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to angular of limestone.		
								56.27	0.80		Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.		
								55.87	1.20		Stiff brown sandy silty CLAY. Sand is fine to coarse.		
1.50 - 1.95	SPT(C) N=30 (4,4/7,7,8,8) Hammer SN = 0208							55.57	1.50		Very stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
								55.17	1.90		Dark brown slightly sandy CLAY with occasional rootlets. Sand is fine to coarse.		
2.30 - 2.80	B1	100						54.82	2.25		Very stiff dark greyish brown slightly sandy slightly gravelly CLAY with widely spaced thin beds of subangular fine to coarse GRAVEL of limestone.		
3.00 - 3.00 3.00	SPT(C) N=50 (25 for 0mm/50 for 0mm) Hammer SN = 0208	100											
								52.82	4.25		Brown slightly sandy CLAY. Sand is fine to medium.		
4.50 - 5.00	B2							52.57	4.50				
4.50 - 4.95 4.50	SPT(C) N=48 (10,10/10,12,12,14) Hammer SN = 0208										Very stiff dark greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
								52.17	4.90		Dark greyish brown sandy very clayey angular fine to coarse GRAVEL of limestone with low cobble content. Sand is fine to coarse. Cobbles are subangular of limestone.		
		93											
								51.22	5.85		Dark greyish brown sandy CLAY. Sand is fine to medium.		
6.00 - 6.45 6.00	SPT(C) N=48 (8,8/10,12,12,14) Hammer SN = 0208							51.07	6.00		Very stiff dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
6.10 - 6.60	B3	100											
								49.87	7.20		Dark greyish brown clayey fine to coarse SAND.		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC21
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	1.20
Rotary Drilling	Beretta T44	1.20	1.50
Rotary Coring	Beretta T44	1.50	10.50

Coordinates: 717007.87 E, 742612.66 N

Final Depth: 10.50 m | Start Date: 29/07/2022 | Driller: GT

Elevation: 57.07 mOD | End Date: 29/07/2022 | Logger: MRG +TH

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											Dark greyish brown clayey fine to coarse SAND.		
7.50 - 7.95 7.50	SPT(C) N=36 (4,4/8,8,10,10) Hammer SN = 0208	100						49.57	7.50		Dark grey fine to coarse SAND *7.50m to 7.70m: Subangular coarse gravel of limestone.*		
								48.47	8.60		Dark grey clayey fine to medium SAND. *8.60m to 8.80m: Dark greyish brown clayey fine to medium sand.*		
9.00 - 9.18 9.00	SPT(C) N=50 (25 for 79mm/50 for 98mm) Hammer SN = 0208	100									*9.50m to 9.60m: Subangular coarse gravel of limestone.*		
10.50								46.57	10.50		End of Borehole at 10.50m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC22
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection pit	8T Tracked Excavator	0.00	1.50
Rotary Coring	Beretta T44	1.50	10.50

Coordinates: 717006.82 E, 742574.32 N

Final Depth: 10.50 m | Start Date: 27/07/2022 | Driller: GT

Elevation: 56.97 mOD | End Date: 02/08/2022 | Logger: CH

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								56.82	0.15		TOPSOIL		
											MADE GROUND: Firm to stiff greyish brown sandy very gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular to angular of limestone. Cobbles are subangular to angular of limestone.		
								55.87	1.10		Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
1.50 - 2.00 1.50 - 1.95	B1 SPT(C) N=38 (4,4/8,10,10,10)	100						55.47	1.50		Very stiff dark greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.		
3.00 - 3.44 3.00	SPT(S) N=50 (10,10/50 for 290mm)	100											
4.50 - 5.00 4.50	B2	100						52.47	4.50		Dark greyish brown sandy CLAY. Sand is fine to medium.		
								51.87	5.10		Dark greyish brown very clayey fine to coarse SAND.		
								51.37	5.60		Dark grey subangular fine to coarse GRAVEL of limestone with much dark greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
6.00 - 6.45 6.00	SPT(C) N=50 (7,10/10,12,12,16)	100						50.97	6.00		Dark greyish brown slightly gravelly clayey fine to coarse SAND. Gravel is subrounded fine to coarse.		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC22
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection pit	8T Tracked Excavator	0.00	1.50
Rotary Coring	Beretta T44	1.50	10.50

Coordinates: 717006.82 E, 742574.32 N

Final Depth: 10.50 m | Start Date: 27/07/2022 | Driller: GT

Elevation: 56.97 mOD | End Date: 02/08/2022 | Logger: CH

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.90	B3										Dark greyish brown slightly gravelly clayey fine to coarse SAND. Gravel is subrounded fine to coarse.		
7.50											*7.30m to 7.50m: Gravel of limestone*		
		100						49.07	7.90		Dark greyish brown slightly sandy fine GRAVEL. Sand is fine to coarse.		
											8.80m to 9.00.: Subangular coarse gravel of limestone.		
9.00 - 9.14	SPT(C) N=50 (25 for 60mm/50 for 75mm)												
9.00		100						47.07	9.90		Dark grey subangular fine to corse GRAVEL with low cobble conetent. Cobbles are subrounded of limestone.		
10.50								46.47	10.50		End of Borehole at 10.50m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth

Last Updated: 09/03/2023

AGS

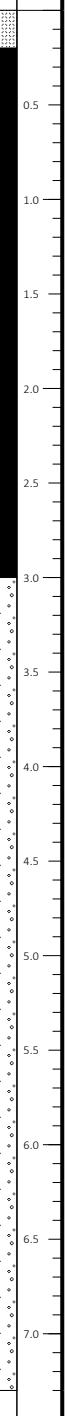
CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC25
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Trial Pitting	8T Excavator	0.00	1.50	
Rotary Coring	Beretta T44	1.50	10.50	717072.17 E
				742585.82 N

Final Depth:	10.50 m	Start Date:	27/07/2022	Driller:	GT	Sheet 1 of 2
						Scale: 1:40
Elevation:	56.55 mOD	End Date:		Logger:	EM+CH	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								56.40	0.15		TOPSOIL
											MADE GROUND: Firm to stiff greyish brown sandy very gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.
								55.55	1.00		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.
								55.15	1.40		Firm light brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.
1.50 - 2.10	B1							55.05	1.50		Firm greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.
1.50 - 1.95	SPT(C) N=50 (4,8/10,10,14,16) Hammer SN = 0208	87						54.45	2.10		Firm brown slightly sandy slightly gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies predominantly limestone. Cobbles are subrounded of limestone.
3.00 - 3.15	SPT(C) N=50 (25 for 75mm/50 for 75mm) Hammer SN = 0208							53.55	3.00		Firm greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine of various lithologies predominantly limestone.
3.00		100						53.00	3.55		Stiff brownish grey sandy very gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies predominantly limestone. Cobbles are subangular of limestone.
4.50 - 5.00	B2							52.05	4.50		Soft greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine of various lithologies predominantly limestone.
4.50		100						51.55	5.00		Very stiff brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies predominantly limestone. Cobbles are subangular of limestone.
6.00								50.55	6.00		Soft greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of various lithologies predominantly limestone.
		100						50.30	6.25		Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies predominantly limestone.
		TCR	SCR	RQD	FI						



Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.5m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Services cleared. Rotary Drilling to follow.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC25
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 10.50 m	Start Date: 27/07/2022	Driller: GT	Sheet 2 of 2
Trial Pitting	8T Excavator	0.00	1.50					Scale: 1:40
Rotary Coring	Beretta T44	1.50	10.50	717072.17 E				
				742585.82 N	Elevation: 56.55 mOD	End Date:	Logger: EM+CH	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								49.05	7.50		Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies predominantly limestone.		
7.50 - 8.00	B3										Brown very clayey fine to medium SAND.		
7.50 - 7.93	SPT(C) N=50 (10,10/50 for 280mm) Hammer SN = 0208	100											
7.50								48.05	8.50		Brown sandy very clayey subangular fine to coarse GRAVEL of various lithologies with medium cobble content. Sand is fine to coarse. Cobbles are subangular.		
9.00 - 9.44	SPT(C) N=50 (10,10/50 for 290mm) Hammer SN = 0208							47.55	9.00		Soft brown very sandy CLAY. Sand is fine to medium.		
9.00		100						47.25	9.30		Brown slightly clayey gravelly fine to coarse SAND. Gravel is angular fine to medium of various lithologies.		
								46.45	10.10		Grey slightly clayey subrounded to subangular COBBLES of various lithologies.		
10.50								46.05	10.50		End of Borehole at 10.50m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.5m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Services cleared. Rotary Drilling to follow.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC27
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	1.20
Rotary Drilling	Beretta T44	1.20	1.50
Rotary Coring	Beretta T44	1.50	10.00

Coordinates: 717051.29 E, 742439.22 N

Final Depth: 10.50 m | Start Date: 03/08/2022 | Driller: GT | Elevation: 56.76 mOD | End Date: 04/08/2022 | Logger: MRG

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								56.56	0.20		TOPSOIL		
0.50	B1										MADE GROUND: Firm light brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.		
								55.96	0.80				
1.00	B2										MADE GROUND: Firm to stiff brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.		
								55.56	1.20		Stiff greyish brown sandy gravelly CLAY (Driller's description)		
1.50 - 1.95	SPT(C) N=28 (4,4/5,6,8,9)						Dry	55.26	1.50		Greyish brown slightly gravelly very clayey fine to coarse SAND. Gravel is subangular to angular fine to medium of various lithologies.		
								54.91	1.85		Very stiff slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.		
		100											
2.50 - 3.00	B3												
3.00 - 3.12	SPT(C) N=50 (25 for 47mm/50 for 69mm)						Dry						
3.00													
		100											
4.50 - 5.00	B4						Dry						
4.50 - 4.95	SPT(C) N=50 (10,12/10,12,14,14)												
4.50													
		100											
6.00 - 6.00	SPT(C) N=50 (25 for 0mm/50 for 0mm)						Dry	50.76	6.00		Greyish brown slightly gravelly very clayey fine to coarse SAND. Gravel is subangular fine of various lithologies.		
6.00													
								50.41	6.35		Very stiff greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone and sandstone.		
		100									*6.35-6.55m: Bed of coarse gravel and cobbles of limestone.*		
7.00 - 7.50	B5												
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC27
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	1.20
Rotary Drilling	Beretta T44	1.20	1.50
Rotary Coring	Beretta T44	1.50	10.00

Coordinates: 717051.29 E, 742439.22 N

Final Depth: 10.50 m | Start Date: 03/08/2022 | Driller: GT | Logger: MRG | Elevation: 56.76 mOD | End Date: 04/08/2022

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.95 7.50	SPT(C) N=48 (8,10/10,12,12,14)	100					Dry	49.26	7.50		Very stiff greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone and sandstone.		
								48.36	8.40		Greyish brown very clayey fine to coarse SAND.		
								48.01	8.75		Grey subangular coarse GRAVEL with low cobble content. Cobbles are subangular of limestone.		
9.00 - 9.17 9.00	SPT(C) N=50 (25 for 75mm/50 for 98mm)	100					Dry	47.76	9.00		Very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.		
								46.46	10.30		Greyish brown slightly gravelly very clayey fine to coarse SAND. Gravel is subangular fine of various lithologies.		
10.50								46.26	10.50		Grey slightly clayey subangular coarse GRAVEL of various lithologies with low cobble content. Cobbles are subrounded limestone.		
											End of Borehole at 10.50m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel: SK6L

Flush Type: Water

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Termination Reason: Terminated at scheduled depth.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC28
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection pit	8T Excavator	0.00	1.20
Rotary Drilling	Beretta T44	1.20	1.50
Rotary Coring	Beretta T44	1.50	10.50

Coordinates: 717102.07 E, 742436.23 N

Final Depth: 10.50 m | Start Date: 05/08/2022 | Driller: GT

Elevation: 56.37 mOD | End Date: 05/08/2022 | Logger: MRG

Sheet 1 of 2
Scale: 1:40
FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								56.17	0.20		TOPSOIL		
											MADE GROUND: Firm light brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded.		
								55.17	1.20		Brown gravelly CLAY (Driller's description)		
1.50 - 1.95	SPT(C) N=39 (4,7/8,9,10,12)							54.87	1.50		Brown gravelly very clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse of various lithologies. Cobbles are subrounded.		
2.10 - 2.60	B1	100						54.27	2.10		Very stiff sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subangular of limestone.		
3.00 - 3.45 3.00	SPT(C) N=50 (10,10/12,14,12,12)												
4.00 - 4.50	B2	100											
4.50 - 4.63 4.50	SPT(C) N=50 (25 for 58mm/50 for 75mm)							51.87	4.50		Greyish brown gravelly clayey fine to coarse SAND. Gravel is angular fine of various lithologies.		
								51.52	4.85		Very stiff brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies . Cobbles are subangular of various lithologies.		
6.00 - 6.22 6.00	SPT(C) N=50 (10,15/50 for 69mm)	100						50.37	6.00		Greyish brown gravelly very clayey fine to coarse SAND. Gravel is angular fine of various lithologies.		
								50.12	6.25		Very stiff greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subanguar to angular fine to coarse of various lithologies. Cobbles are subangular of limestone and sandstone. *6.25-6.45m: Bed of coarse gravel and cobbles of limestone.*		
7.00 - 7.50	B3	100											
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200

Core Barrel: SK6L

Flush Type: Water

Termination Reason: Terminated at scheduled depth

Last Updated: 09/03/2023

AGS

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC28
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection pit	8T Excavator	0.00	1.20
Rotary Drilling	Beretta T44	1.20	1.50
Rotary Coring	Beretta T44	1.50	10.50

Coordinates	Final Depth:	Start Date:	Driller:	Sheet 2 of 2
717102.07 E	10.50 m	05/08/2022	GT	Scale: 1:40
742436.23 N	Elevation: 56.37 mOD	End Date: 05/08/2022	Logger: MRG	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.95 7.50	SPT(C) N=46 (8,10/10,10,12,14)	100						48.87	7.50		Very stiff greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subanguar to angular fine to coarse of various lithologies. Cobbles are subangular of limestone and sandstone. Greyish brown gravelly very clayey fine to coarse SAND. Gravel is subangular fine of various lithologies.		
9.00 - 9.08 9.00	SPT(C) N=50 (25 for 5mm/50 for 75mm)	100											
10.50								45.87	10.50		End of Borehole at 10.50m		

Water Strikes			
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.20m.
No groundwater encountered.

Casing Details	
To (m)	Diam (mm)
1.50	200

Core Barrel: SK6L

Flush Type: Water

Termination Reason: Terminated at scheduled depth

Last Updated: 09/03/2023

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC29
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Excavator	0.00	1.60	
Rotary Coring	T44 Beretta	1.60	10.00	717154.40 E
				742436.77 N

Final Depth:	10.00 m	Start Date:	04/08/2022	Driller:	GT	Sheet 1 of 2
						Scale: 1:40
Elevation:	56.09 mOD	End Date:	08/08/2022	Logger:	CM +MRG	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								55.84	0.25		TOPSOIL		
0.50	B1										Firm light brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.		
								55.24	0.85				
1.20	B2										Firm to stiff dark brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.		
1.50 - 1.95	SPT(C) N=54 (8,10/12,12,14,16) Hammer SN = 0208					1.50		54.59	1.50		Very stiff brown slightly gravelly slightly sandy CLAY with frequent rootlets. Sand is fine to coarse. Gravel is angular fine to coarse.		
1.90 - 2.30	B3	100											
								53.59	2.50		Dense greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL with high cobble content. Sand is fine to coarse.		
3.00 - 3.45	SPT(C) N=48 (7,8/10,12,12,14) Hammer SN = 0208					3.00		53.09	3.00		Firm greyish brown gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular fine.		
3.00		100											
								52.29	3.80		Very stiff greyish brown gravelly slightly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
4.50 - 4.82	SPT(C) N=50 (25 for 75mm/50 for 250mm) Hammer SN = 0208					4.50		51.59	4.50		Very stiff greyish brown gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
4.50													
4.95 - 5.35	B4	100											
											5.70-6.00m: Bed of sandy clayey subangular fine to coarse gravel with low cobble content. Sand is fine to coarse.		
6.00 - 6.30	SPT(C) N=50 (25 for 75mm/50 for 225mm) Hammer SN = 0208					6.00							
6.00		100											
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.60m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	150

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC29
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)
Inspection Pit	8T Excavator	0.00	1.60
Rotary Coring	T44 Beretta	1.60	10.00

Coordinates: 717154.40 E, 742436.77 N

Final Depth: 10.00 m | Start Date: 04/08/2022 | Driller: GT | Logger: CM +MRG | Elevation: 56.09 mOD | End Date: 08/08/2022

Sheet 2 of 2 | Scale: 1:40 | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.94 7.50	SPT(C) N=50 (4,10/50 for 290mm) Hammer SN = 0208					7.50					Very stiff greyish brown gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
8.00 - 8.40	B5	100						47.69	8.40		Very dense greyish brown sandy clayey subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.		
9.00 - 9.32 9.00	SPT(C) N=50 (25 for 75mm/50 for 250mm) Hammer SN = 0208	100				9.00		47.09 46.69	9.00 9.40		Very stiff greyish brown gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular fine. Very stiff greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
10.00								46.09	10.00		End of Borehole at 10.00m		

TCR	SCR	RQD	FI

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.60m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	150

Core Barrel: SK6L

Flush Type: Water

Termination Reason:

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC30
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Excavator	0.00	1.50	
Rotary Coring	T44 Beretta	1.50	10.00	717082.77 E
				742395.26 N

Final Depth:	10.00 m	Start Date:	04/08/2022	Driller:	GT	Sheet 1 of 2
						Scale: 1:40
Elevation:	56.16 mOD	End Date:	09/08/2022	Logger:	MRG +DM +CM	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								56.00	0.15		TOPSOIL
											MADE GROUND: Firm light brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.
								55.36	0.80		Firm to stiff dark brown slightly sandy gravelly CLAY with medium cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.
1.50 - 1.95	SPT(C) N=50 (4,8/10,10,14,16)					1.50		54.66	1.50		Very stiff greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.
2.00 - 2.50	B1	100						54.06	2.10		Very stiff greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.
3.00 - 3.19 3.00	SPT(C) N=50 (25 for 50mm/50 for 143mm)	100				3.00		53.16	3.00		Very stiff greyish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine.
								52.00	4.15		Very dense greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.
4.50 - 4.72 4.50	SPT(C) N=50 (10,15/50 for 69mm)					4.50		51.66	4.50		Very stiff greyish brown gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.
5.00 - 5.50	B2	100									
6.00 - 6.20 6.00	SPT(C) N=50 (25 for 75mm/50 for 125mm)					6.00					
		100						49.40	6.75		*6.70-6.95: Bed of subangular fine to coarse Gravel of various lithologies.* Very dense greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.
		TCR	SCR	RQD	FI						

Water: Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	150

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC30
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit	8T Excavator	0.00	1.50	
Rotary Coring	T44 Beretta	1.50	10.00	717082.77 E
				742395.26 N

Final Depth:	10.00 m	Start Date:	04/08/2022	Driller:	GT	Sheet 2 of 2
						Scale: 1:40
Elevation:	56.16 mOD	End Date:	09/08/2022	Logger:	MRG +DM +CM	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 7.94 7.50	SPT(C) N=50 (10,10/50 for 285mm)	100				7.50		48.66	7.50		Very dense greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.		
								47.50	8.65		Very dense greyish brown very clayey slightly gravelly fine to coarse SAND. Gravel is subangular fine.		
9.00 - 9.38 9.00	SPT(C) N=50 (10,10/50 for 225mm)	100				9.00		47.16	9.00		Very dense greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.		
10.00								46.16	10.00		Very dense greyish brown gravelly very clayey fine to coarse SAND with low cobble content. Gravel is subangular fine.		
											End of Borehole at 10.00m		

TCR	SCR	RQD	FI

7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Remarks

Hand dug inspection pit excavated to 1.50m.
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
1.50	200
10.00	150

Core Barrel

SK6L

Flush Type

Water

Termination Reason

Terminated at scheduled depth

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC31
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Inspection Pit		0.00	1.50	
Rotary Coring	Beretta T44	1.50	10.00	717123.28 E
				743100.75 N

Final Depth:	10.00 m	Start Date:	16/08/2022	Driller:	GT	Sheet 1 of 2
						Scale: 1:40
Elevation:	63.47 mOD	End Date:	16/08/2022	Logger:	RW +MRG	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								63.27	0.20		CONCRETE with rebar.		
0.50	B1							62.87	0.60		MADE GROUND: Greyish brown slightly sandy gravelly CLAY with medium cobble content and fragments of red brick, timber and plastic. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.		
1.00	B2										MADE GROUND: Firm greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.		
1.40	B3							62.27	1.20		Soft greenish grey slightly sandy silty CLAY with low cobble content. Sand is fine to medium.		
1.50 - 1.95	SPT(C) N=14 (2,2/3,3,4,4)	100				1.50	Dry	61.97	1.50		Firm dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
3.00 - 3.45	SPT(C) N=44 (7,8/10,12,12,10)	100				1.50	Dry	60.97	2.50		Very stiff dark brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobles are subrounded of limestone.		
3.00								60.47	3.00		Dense dark brown slightly gravelly silty fine to coarse SAND. Gravel is subangular fine to medium.		
3.80 - 4.30	B4							60.02	3.45		Very stiff dark brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.		
4.50 - 5.00	B5	100						58.97	4.50		Brownish grey slightly gravelly silty fine to coarse SAND. Gravel is subangular fine to medium.		
4.50													
6.00		100						57.47	6.00		Very stiff dark brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of fine to coarse.		
7.05 - 7.50	C7	100											
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel

SK6L

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered.

Flush Type

Water

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	RC31
	Client: Dublin Airport Authority	
	Client's Rep AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 2 of 2
Inspection Pit		0.00	1.50					Scale: 1:40
Rotary Coring	Beretta T44	1.50	10.00	717123.28 E	10.00 m	16/08/2022	GT	
				743100.75 N	Elevation: 63.47 mOD	End Date: 16/08/2022	Logger: RW +MRG	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50 - 8.00	B6							55.97	7.50		Very stiff dark brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of fine to coarse.		
7.50		100									Brownish grey slightly gravelly silty fine to coarse SAND. Gravel is subangular fine to medium.		
								54.97	8.50		Very stiff dark brownish grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
9.00													
9.50 - 10.00	C8	100											
10.00								53.47	10.00		End of Borehole at 10.00m		
		TCR	SCR	RQD	FI								

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Core Barrel

SK6L

Flush Type

Water

Remarks

Hand dug inspection pit excavated to 1.20m
No groundwater encountered.

Termination Reason

Terminated at scheduled depth.

Last Updated

09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	CRC01
	Client: Dublin Airport Authority	
	Client's Rep: AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Concrete Coring	Concrete Corer	0.00	0.25	717223.54 E 742868.31 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.25 m	22/09/2022	BB	Scale: 1:10
Elevation: 59.68 mOD	**End Date:** 23/09/2022	**Logger:** CM	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					59.43	0.25		Strong grey and dark grey CONCRETE. 40-50% aggregate of angular to rounded fine to coarse gravel of predominantly sandstone and basalt with occasional cobbles. 1-2% small to medium voids. No apparent reinforcement.		
								End of Borehole at 0.25m		

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Water Added

From (m)	To (m)

Remarks

No groundwater encountered.

Core Barrel	Flush Type	Termination Reason	Last Updated
		Terminated at scheduled depth.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	CRC03
	Client: Dublin Airport Authority	
	Client's Rep: AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Concrete Coring	Concrete Corer	0.00	0.19	717284.84 E 742784.94 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.19 m	22/09/2022	BB	Scale: 1:10
Elevation: 59.25 mOD	**End Date:** 23/09/2022	**Logger:** CM	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					59.06	0.19		Strong grey and dark grey CONCRETE. 35-45% aggregate of angular to rounded fine to coarse gravel of various lithologies. 1-2% small to medium voids. 8mm steel mesh reinforcement.		
								End of Borehole at 0.19m		

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Water Added

From (m)	To (m)

Remarks

No groundwater encountered.

Core Barrel	Flush Type	Termination Reason	Last Updated
		Terminated at scheduled depth.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	PRC01
	Client: Dublin Airport Authority	
	Client's Rep: AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Pavement Coring	Pavement Corer	0.00	0.07	717242.91 E 742983.56 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.07 m	03/10/2022	BB	Scale: 1:10
Elevation: 60.58 mOD	**End Date:**	**Logger:** CM	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					60.56	0.02		Weak black BITMAC. 40-50% aggregate of angular to subangular gravel. 5-10% small to medium voind.		
					60.51	0.07		Moderately weak black BITMAC. 25-35% aggregate of angular to subrounded fine to coarse gravel. 0-5% small to medium voids.		
								End of Borehole at 0.07m		

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Water Added

From (m)	To (m)

Remarks

No groundwater encountered.

Core Barrel	Flush Type	Termination Reason	Last Updated
		Terminated at scheduled depth.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	PRC02
	Client: Dublin Airport Authority	
	Client's Rep: AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Pavement Coring	Pavement Corer	0.00	0.08	717342.03 E 742975.18 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.08 m	03/10/2022	BB	Scale: 1:10
Elevation: 59.25 mOD	**End Date:**	**Logger:** CM	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					59.22	0.04		Moderately weak black BITMAC. 50-60% aggregate of angular to subangular fine to coarse gravel. 5-10% small to medium voids.		
					59.18	0.08		Moderately weak black BITMAC. 70-80% aggregate of angular to subangular fine to coarse gravel. 10-20% small to medium voids.		
								End of Borehole at 0.08m		

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Water Added

From (m)	To (m)

Remarks

No groundwater encountered.

Core Barrel	Flush Type	Termination Reason	Last Updated
		Terminated at scheduled depth.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	PRC03
	Client: Dublin Airport Authority	
	Client's Rep: AECOM	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Pavement Coring	Pavement Corer	0.00	0.22	717213.40 E 742876.67 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
0.22 m	22/09/2022	BB	Scale: 1:10
Elevation: 59.71 mOD	**End Date:**	**Logger:** CM	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					59.66	0.05		Moderately weak black BITMAC. 65-75% aggregate of angular to subangular fine to medium gravel. 15-25% small to medium voids.		
								Medium strong black BITMAC. 35-45% aggregate of angular to subrounded fine to coarse gravel. 5-10% small to medium voids.		
					59.49	0.22		End of Borehole at 0.22m		

0.5
1.0
1.5

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diam (mm)

Water Added

From (m)	To (m)

Remarks

No groundwater encountered.

Core Barrel	Flush Type	Termination Reason	Last Updated
		Terminated at scheduled depth.	09/03/2023

AGS

CAUSEWAY GEOTECH

APPENDIX C

CORE PHOTOGRAPHS





RC01 Box 1 (2.50-4.00m)



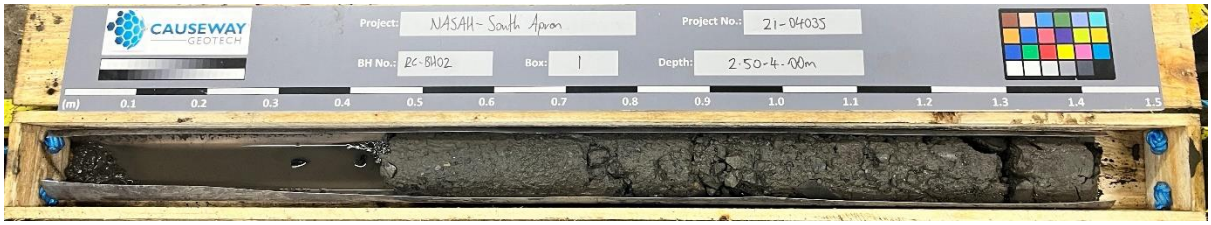
RC01 Box 2 (4.00-5.50m)



RC01 Box 4 (7.00-8.50m)



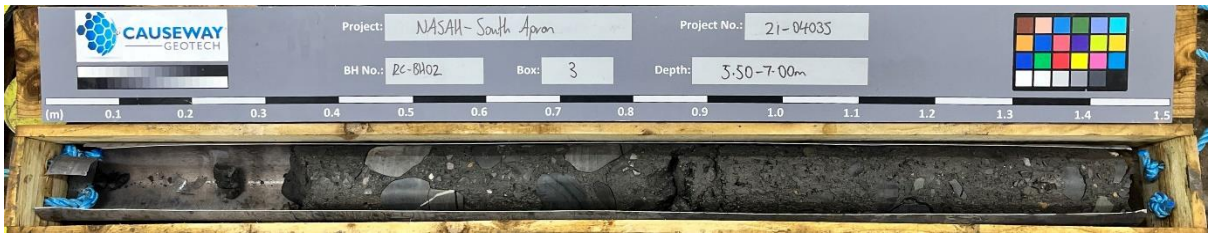
RC01 Box 4 (8.50-10.00m)



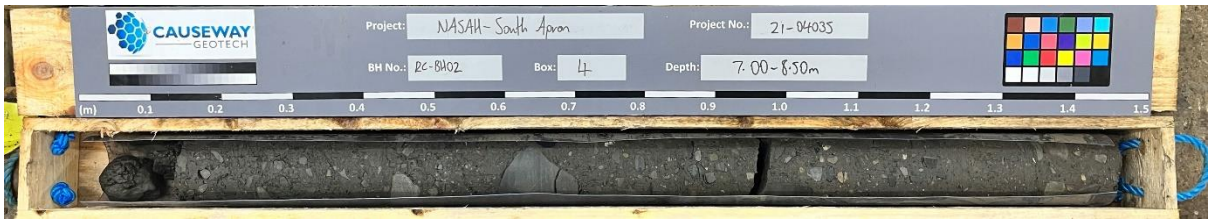
RC02 Box 1 (2.50-4.00m)



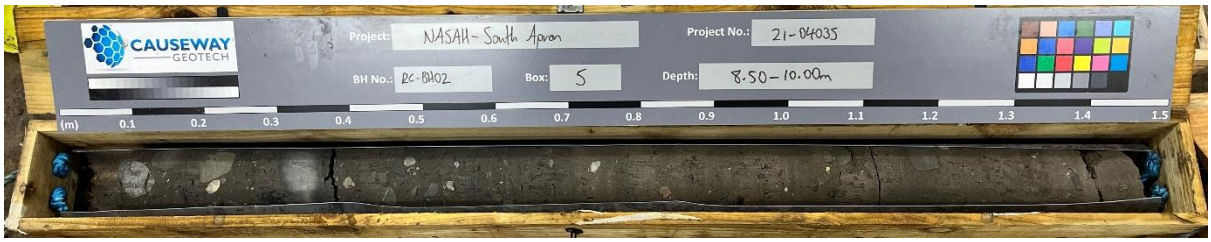
RC02 Box 2 (4.00-5.50m)



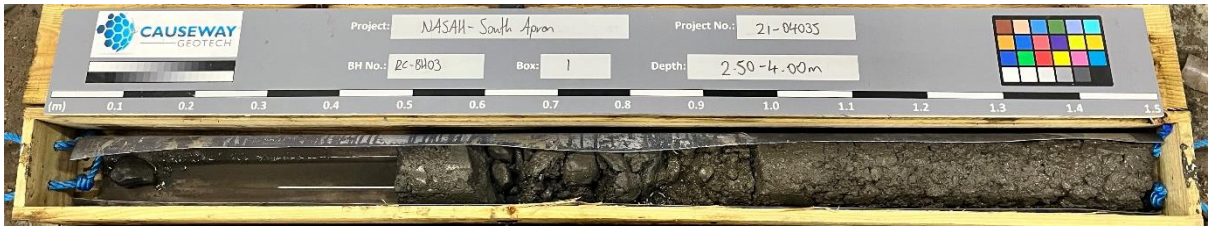
RC02 Box 3 (5.50-7.00m)



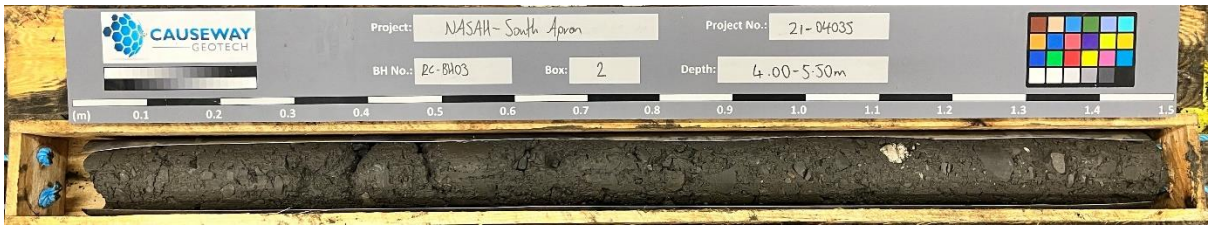
RC02 Box 4 (7.00-8.50m)



RC02 Box 5 (8.50-10.00m)



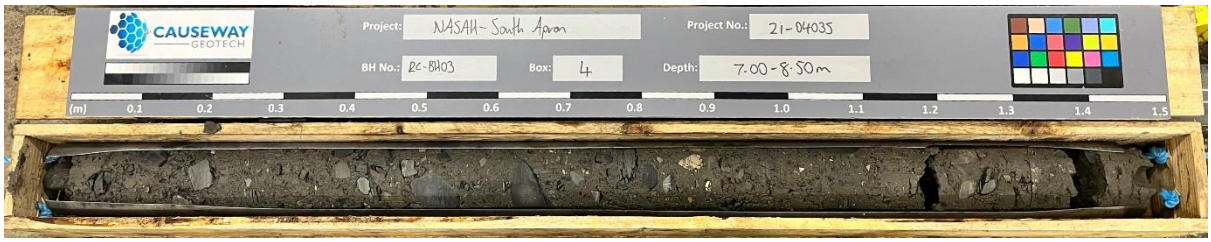
RC03 Box 1 (2.50-4.00m)



RC03 Box 2 (4.00-5.50m)



RC03 Box 3 (5.50-7.00m)



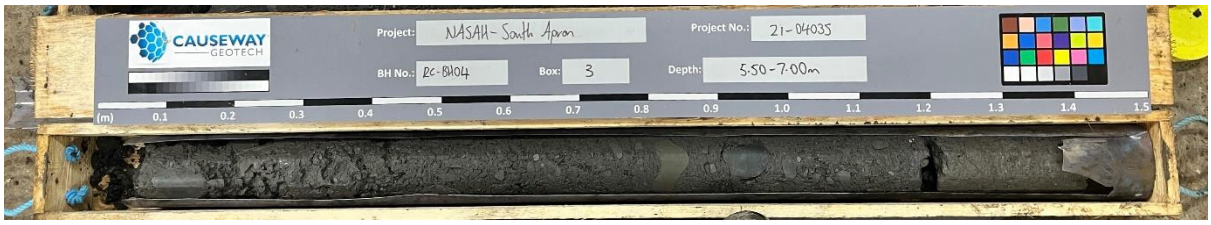
RC03 Box 4 (7.00-8.50m)



RC04 Box 1 (2.50-4.00m)



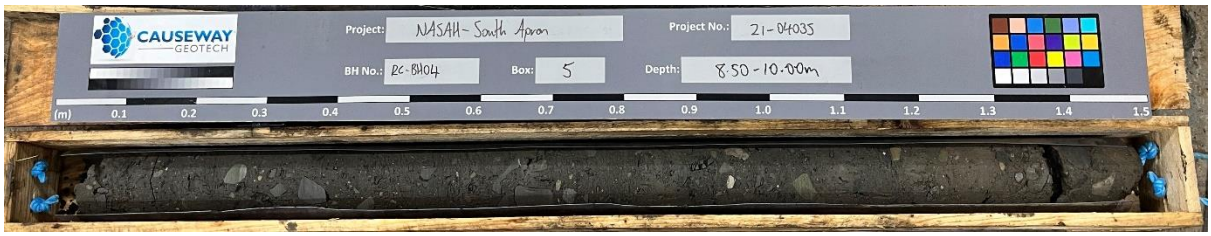
RC04 Box 2 (4.00-5.50m)



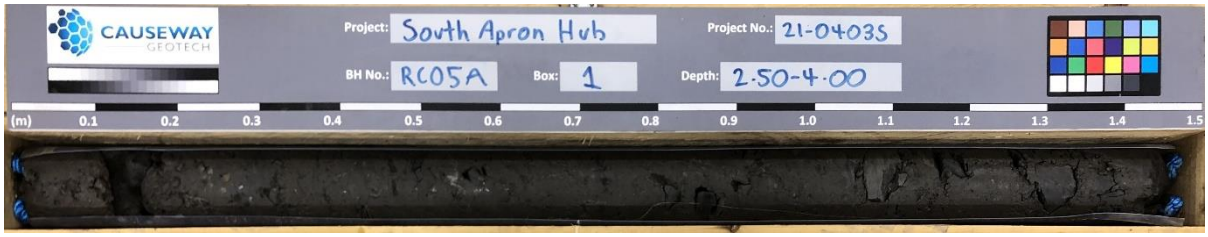
RC04 Box 3 (5.50-7.00m)



RC04 Box 4 (7.00-8.50m)



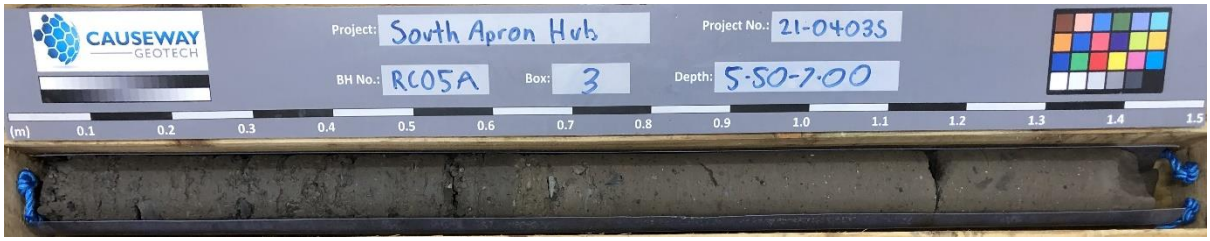
RC04 Box 5 (8.50-10.00m)



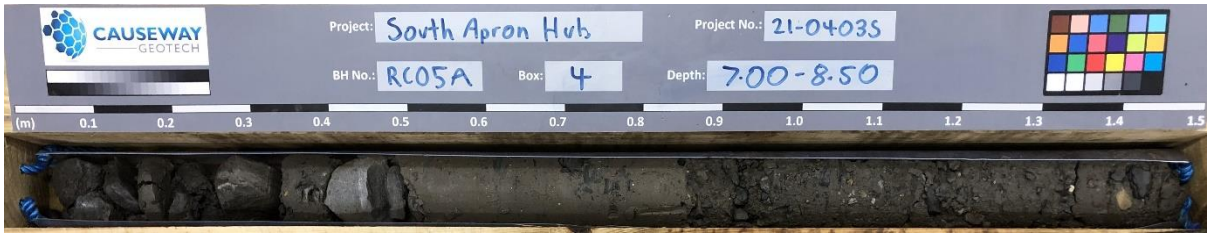
RC05A Box 1 (2.50-4.00m)



RC05A Box 2 (4.00-5.50m)



RC05A Box 3 (5.50-7.00m)



RC05A Box 4 (7.00-8.50m)



RC05A Box 5 (8.50-10.00m)



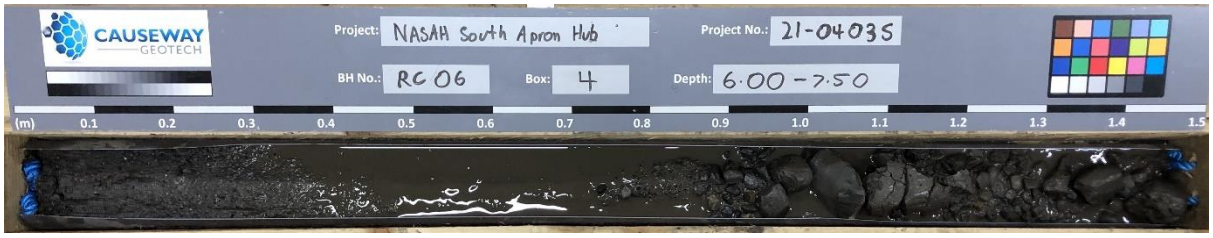
RC06 Box 1 (1.50-3.00m)



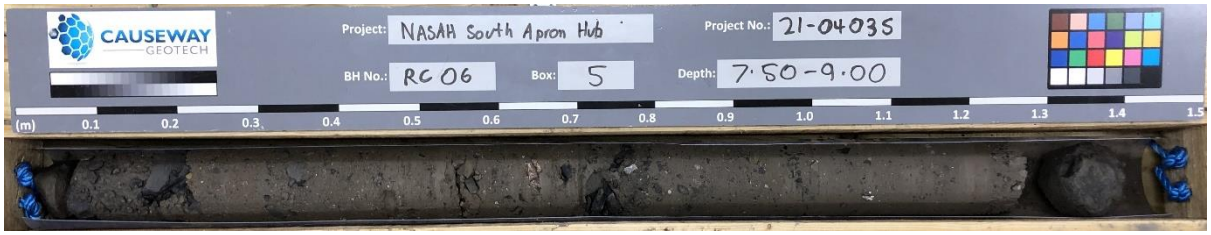
RC06 Box 2 (3.00-4.50m)



RC06 Box 3 (4.50-6.00m)



RC06 Box 4 (6.00-7.50m)



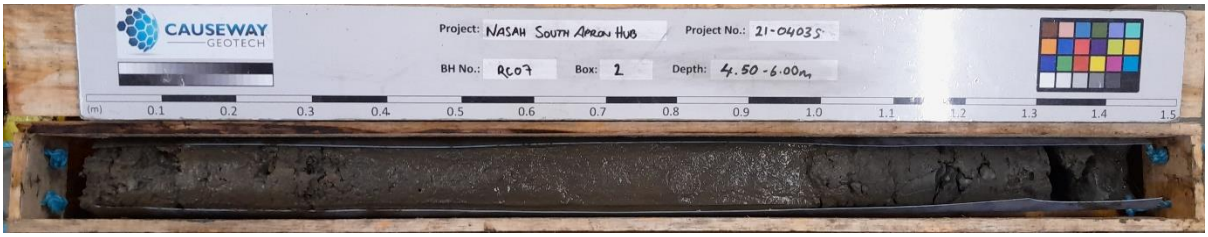
RC06 Box 5 (7.50-9.00m)



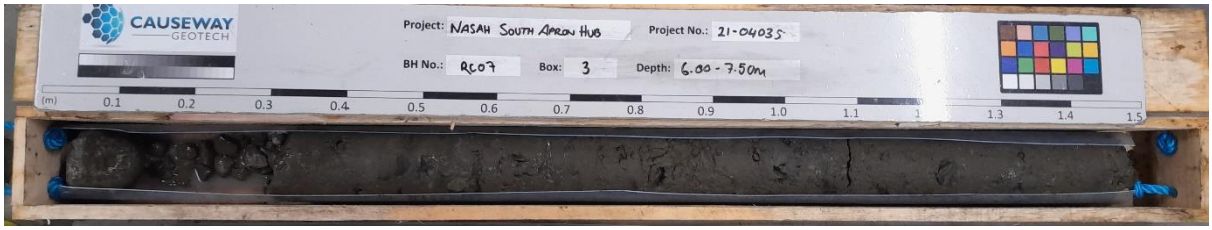
RC06 Box 6 (9.00-10.00m)



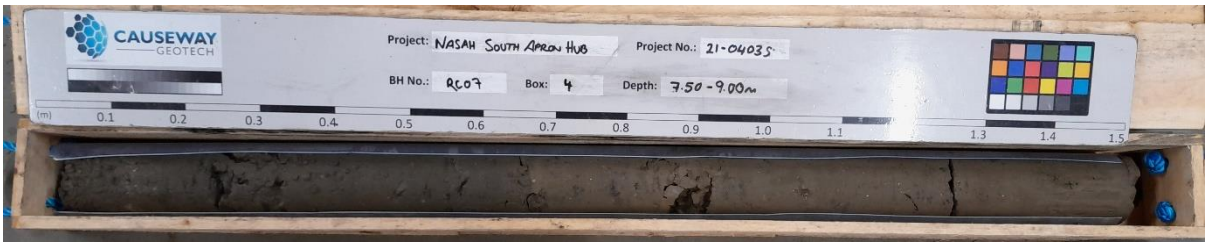
RC07 Box 1 (3.00-4.50m)



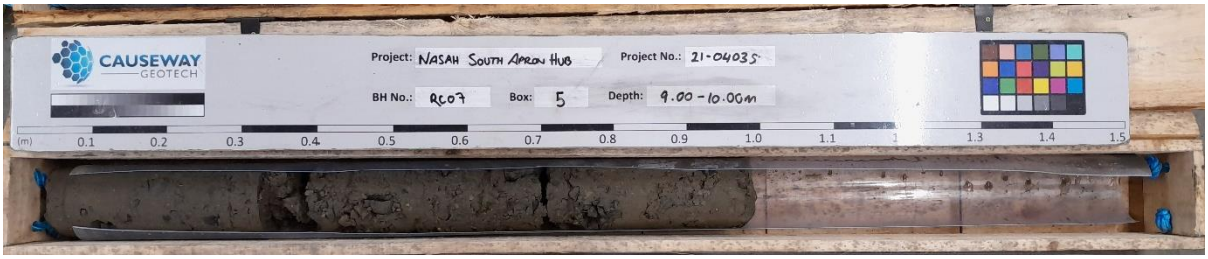
RC07 Box 2 (4.50-6.00m)



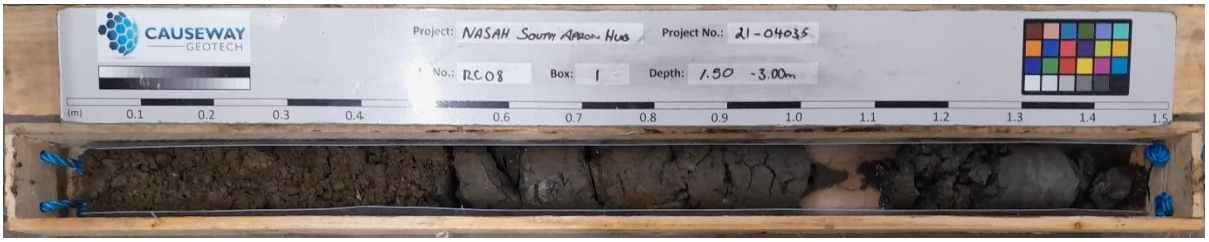
RC07 Box 3 (6.00-7.50m)



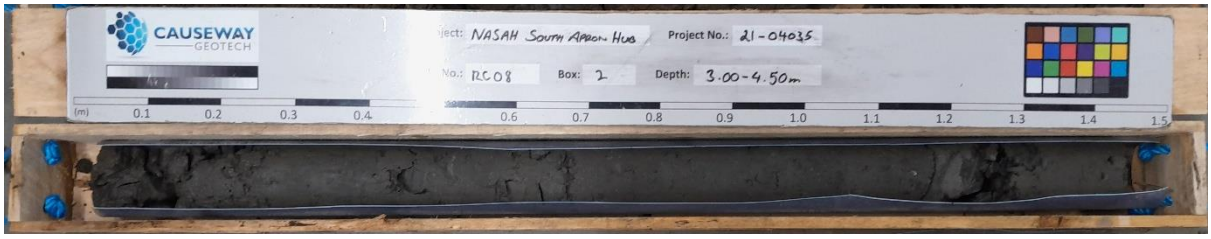
RC07 Box 4 (7.50-9.00m)



RC07 Box 5 (9.00-10.00m)



RC08 Box 1 (1.50-3.00m)



RC08 Box 2 (3.00-4.50m)



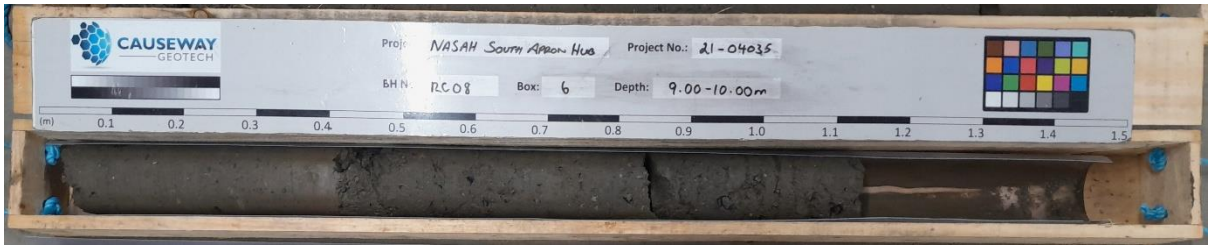
RC08 Box 3 (4.50-6.00m)



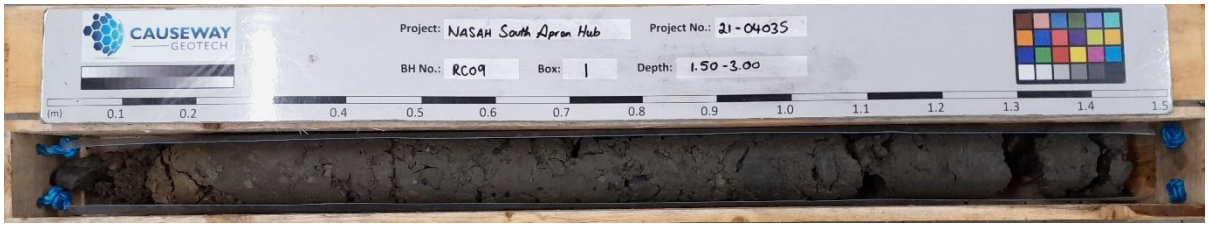
RC08 Box 4 (6.00-7.50m)



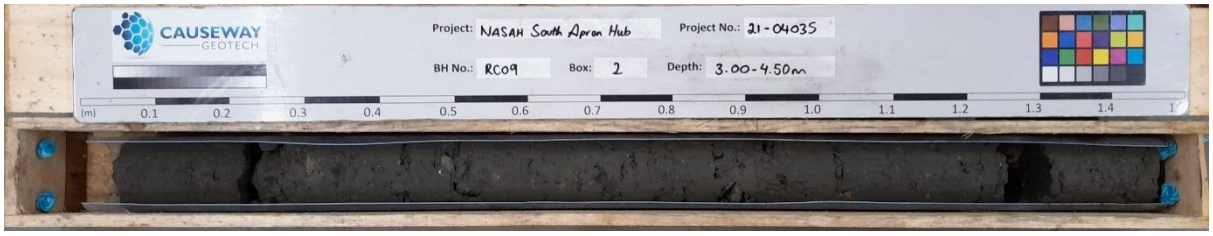
RC08 Box 5 (7.50-9.00m)



RC08 Box 6 (9.00-10.00m)



RC09 Box 1 (1.50-3.00m)



RC09 Box 2 (3.00-4.50m)



RC09 Box 3 (4.50-6.00m)



RC09 Box 4 (6.00-7.50m)



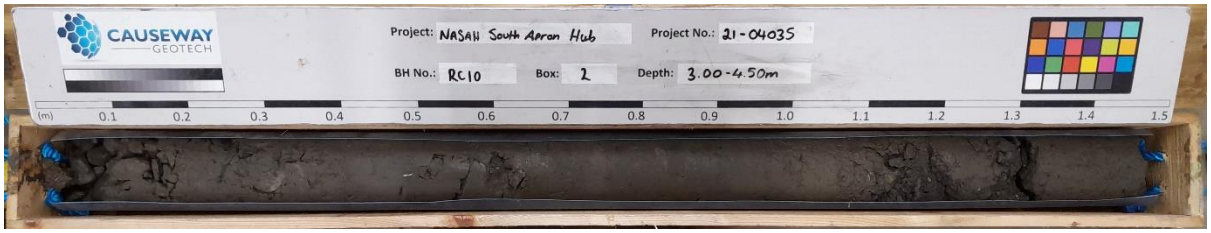
RC09 Box 5 (7.50-9.00m)



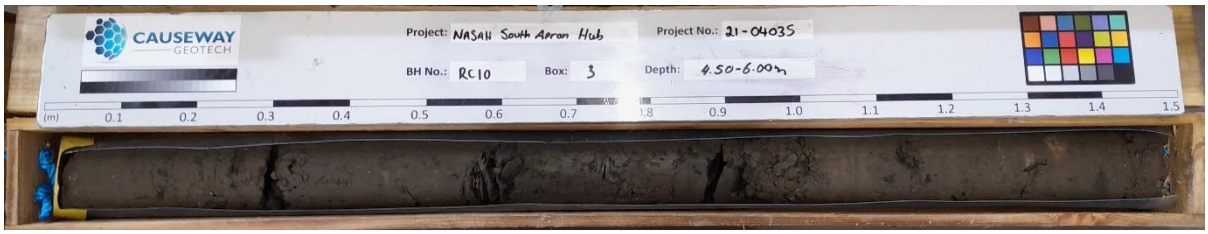
RC09 Box 6 (9.00-10.00m)



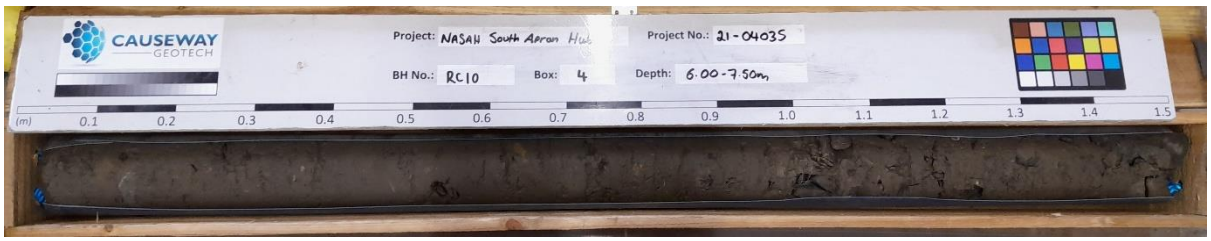
RC10 Box 1 (1.50-3.00m)



RC10 Box 2 (3.00-4.50m)



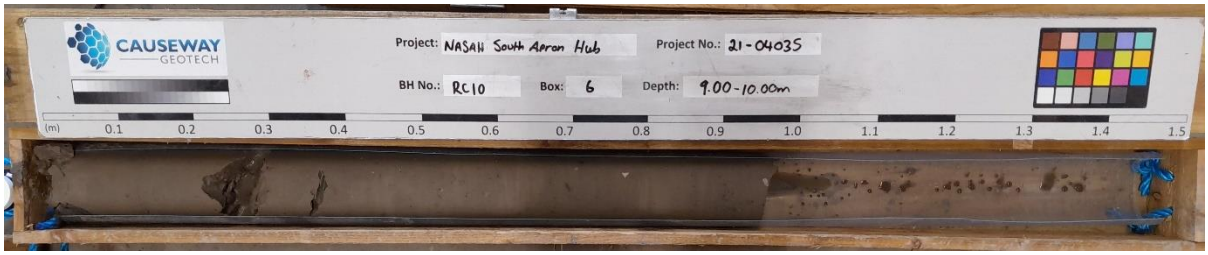
RC10 Box 3 (4.50-6.00m)



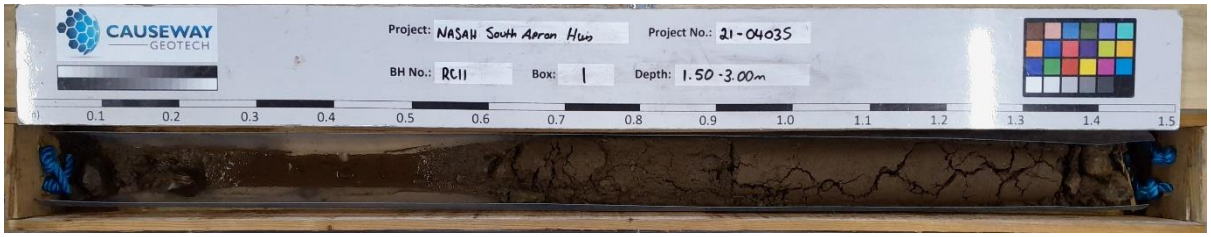
RC10 Box 4 (6.00-7.50m)



RC10 Box 5 (7.50-9.00m)



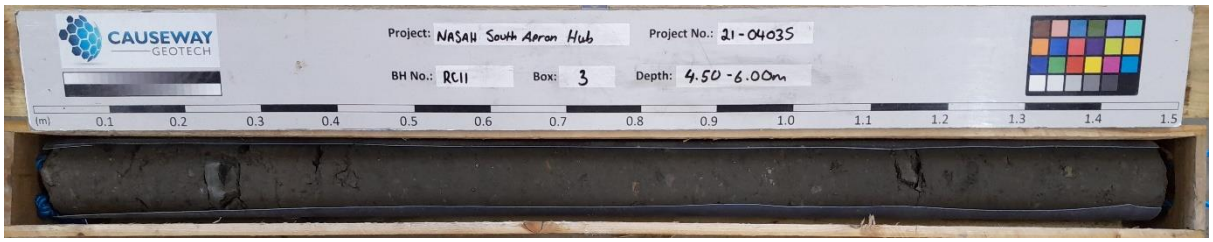
RC10 Box 6 (9.00-10.00m)



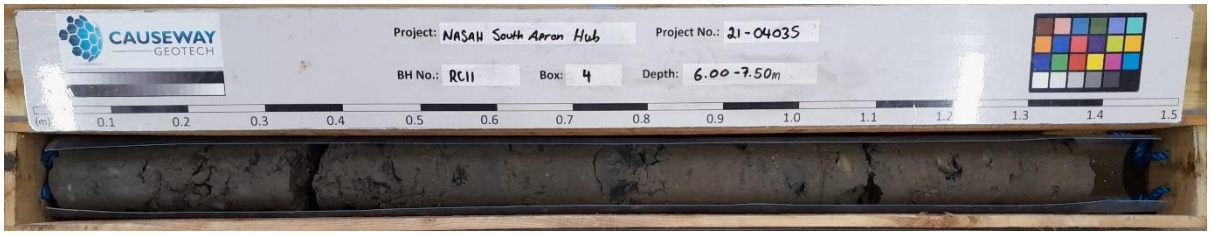
RC11 Box 1 (1.50-3.00m)



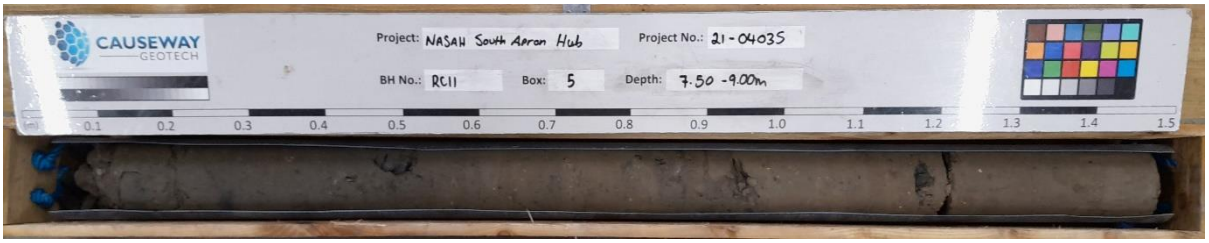
RC11 Box 2 (3.00-4.50m)



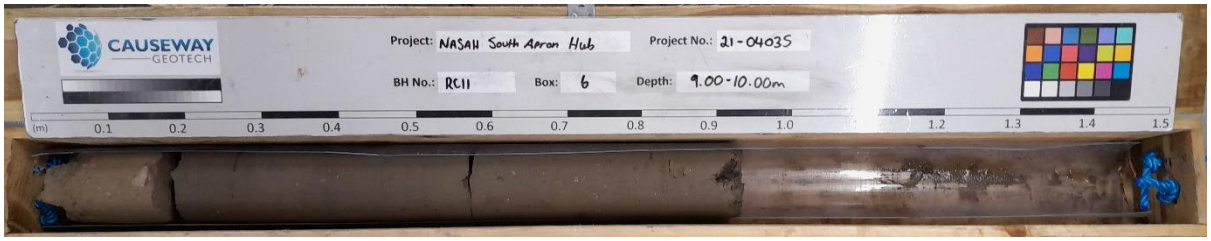
RC11 Box 3 (4.50-6.00m)



RC11 Box 4 (6.00-7.50m)



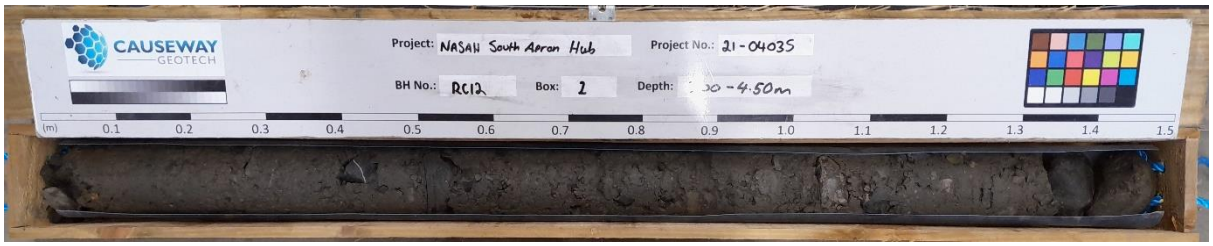
RC11 Box 5 (7.50-9.00m)



RC11 Box 6 (9.00-10.00m)



RC12 Box 1 (1.50-3.00m)



RC12 Box 2 (3.00-4.50m)



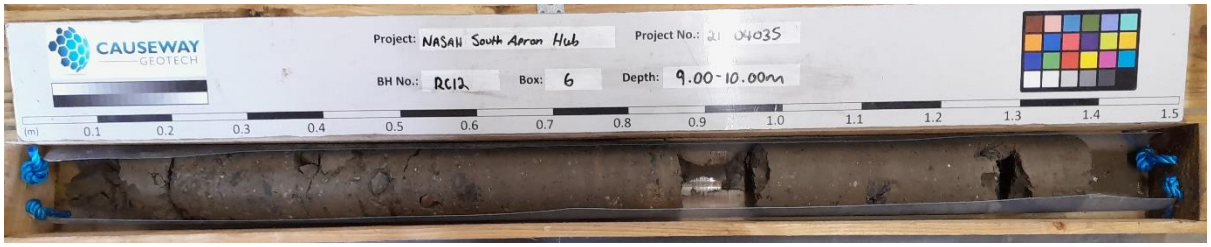
RC12 Box 3 (4.50-6.00m)



RC12 Box 4 (6.00-7.50m)



RC12 Box 5 (7.50-9.00m)



RC12 Box 6 (9.00-10.00m)



RC13 Box 1 (1.50-3.00m)



RC13 Box 2 (3.00-4.50m)



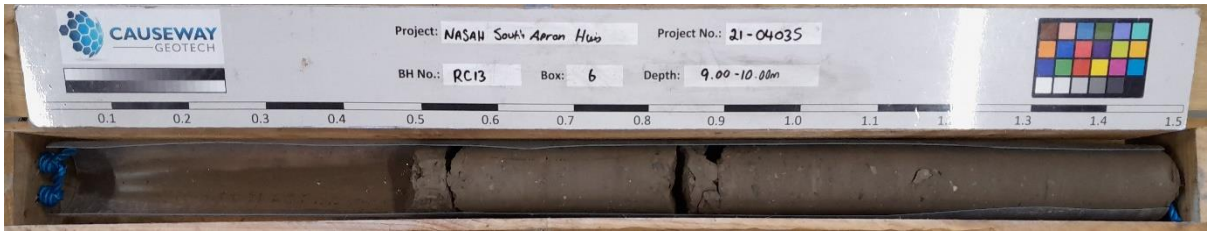
RC13 Box 3 (4.50-6.00m)



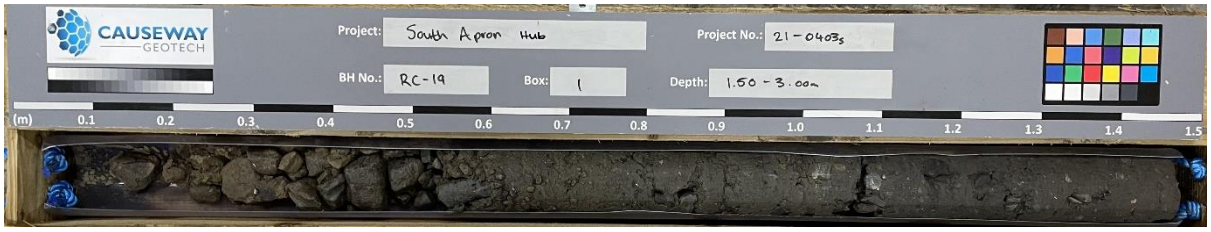
RC13 Box 4 (6.00-7.50m)



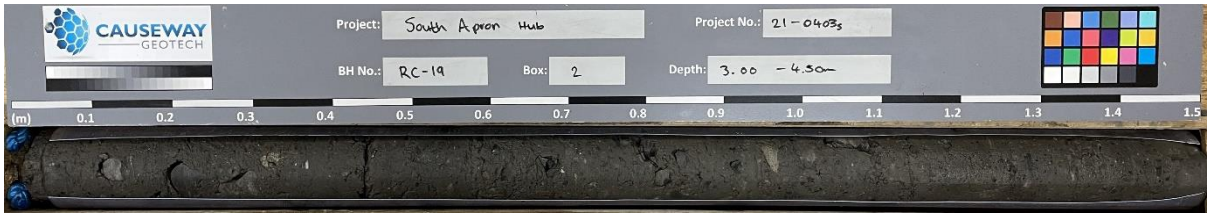
RC13 Box 5 (7.50-9.00m)



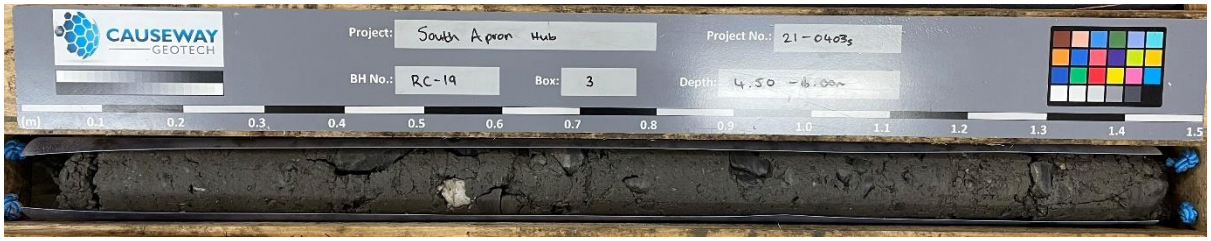
RC13 Box 6 (9.00-10.00m)



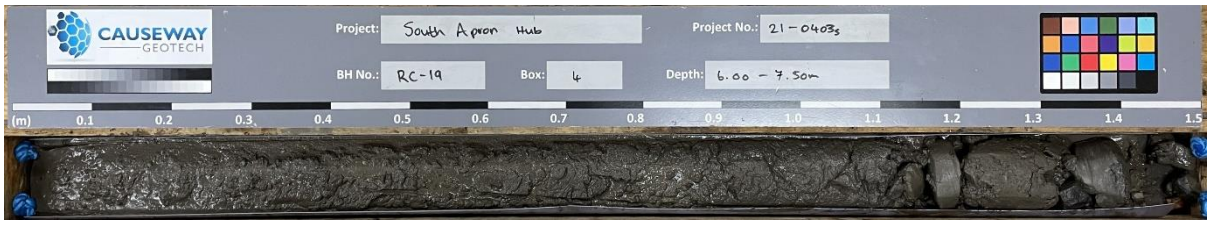
RC19 Box 1 (1.50-3.00m)



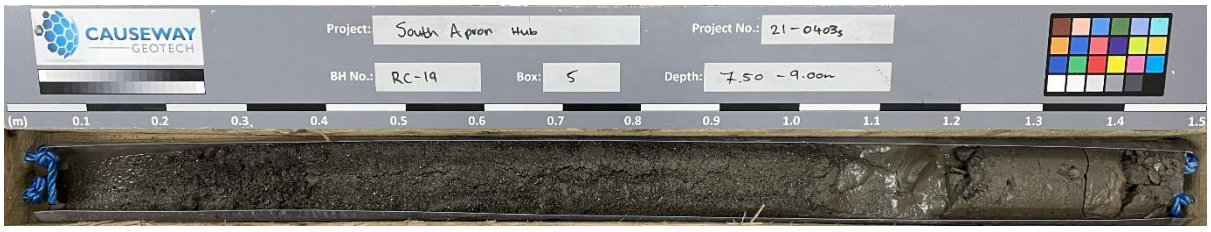
RC19 Box 2 (3.00-4.50m)



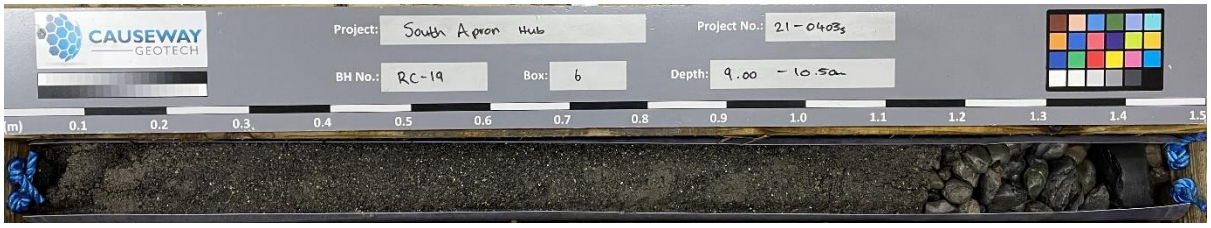
RC19 Box 3 (4.50-6.00m)



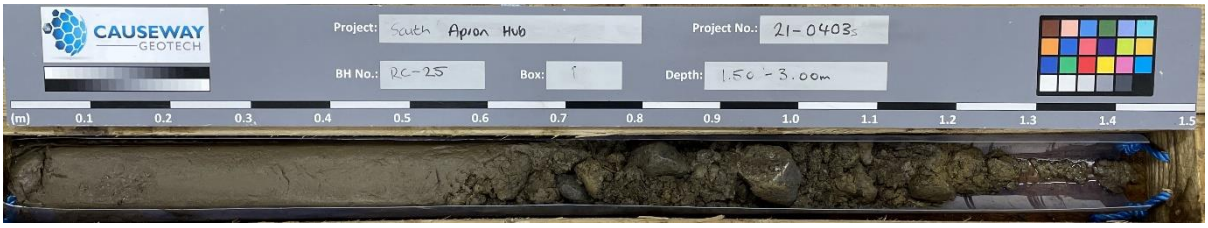
RC19 Box 4 (6.00-7.50m)



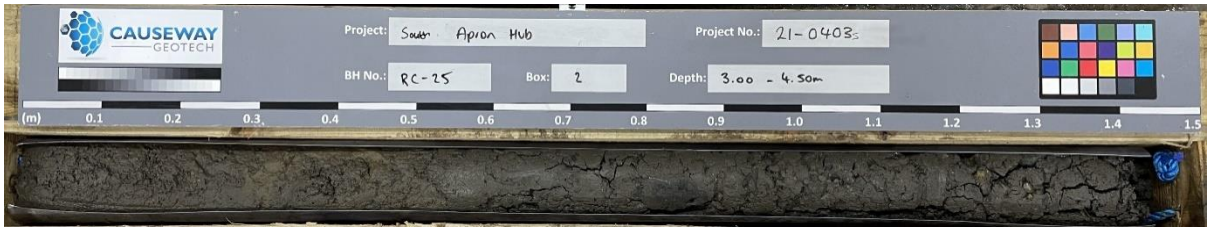
RC19 Box 5 (7.50-9.00m)



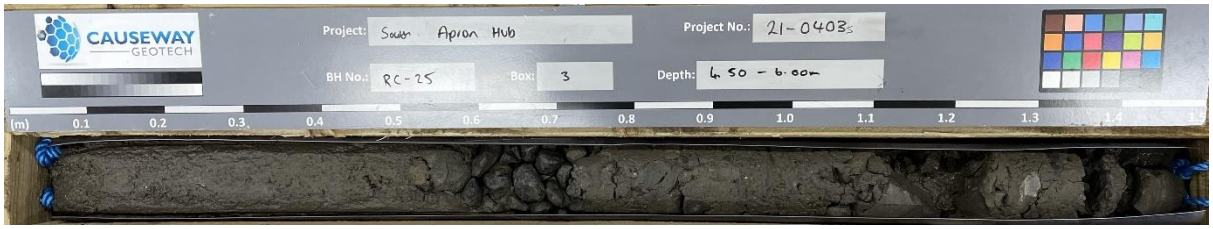
RC19 Box 6 (9.00-10.50m)



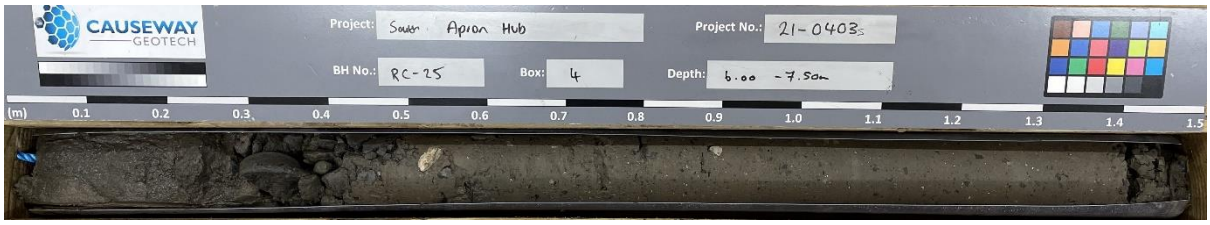
RC25 Box 1 (1.50-3.00m)



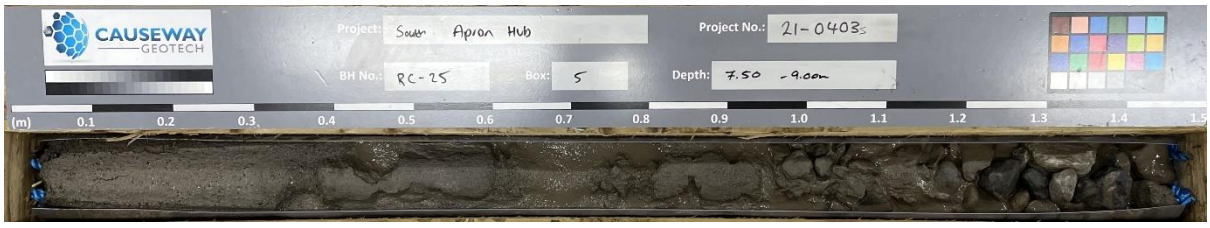
RC25 Box 2 (3.00-4.50m)



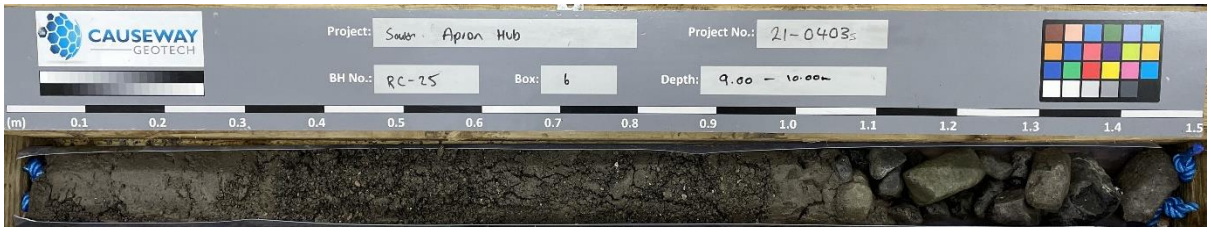
RC25 Box 3 (4.50-6.00m)



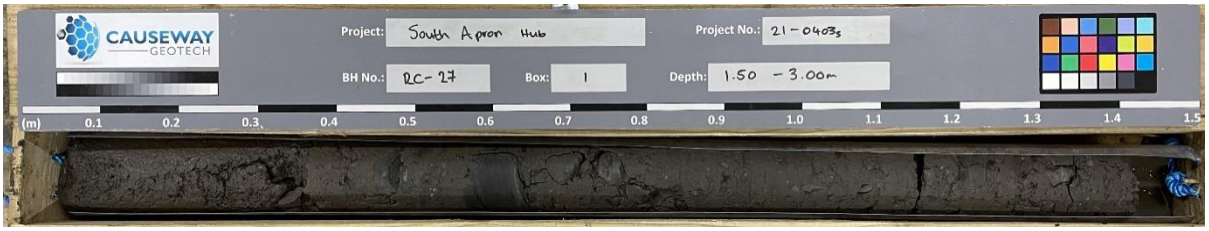
RC25 Box 4 (6.00-7.50m)



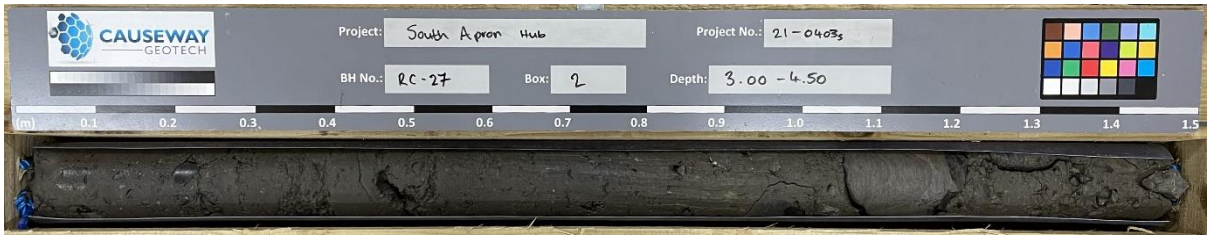
RC25 Box 5 (7.50-9.00m)



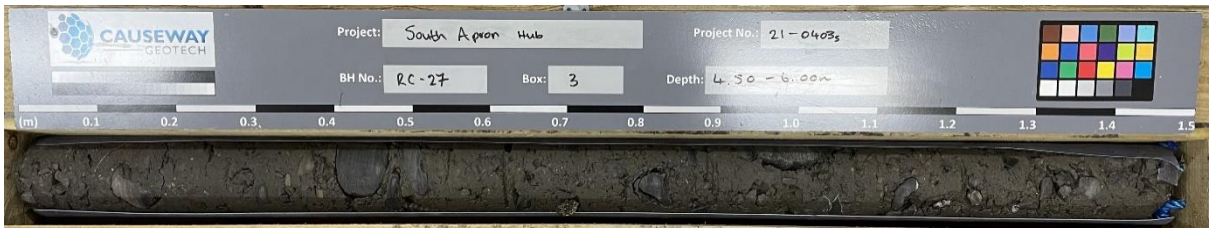
RC25 Box 6 (9.00-10.00m)



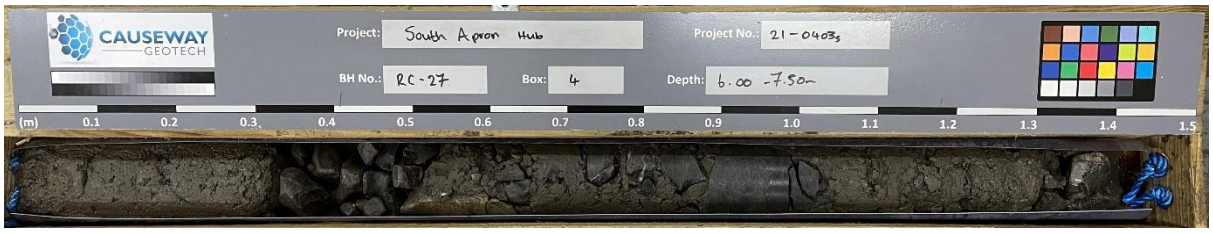
RC27 Box 1 (1.50-3.00m)



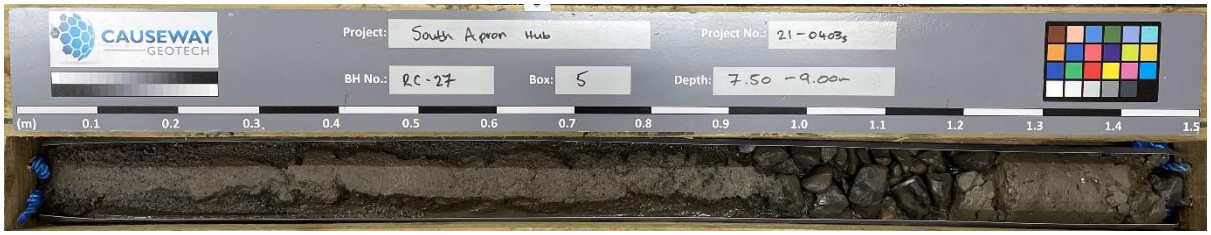
RC27 Box 2 (3.00-4.50m)



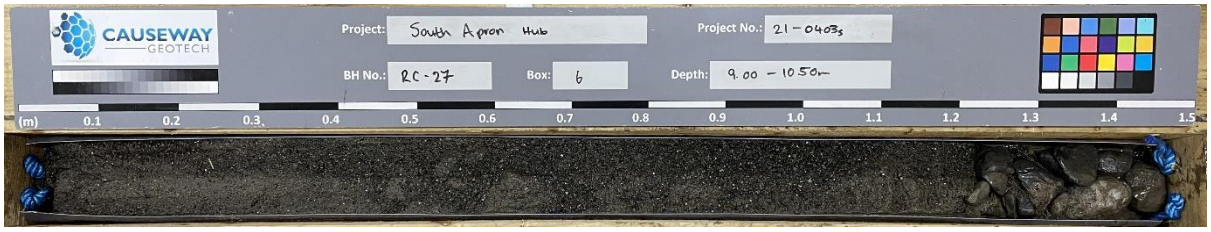
RC27 Box 3 (4.50-6.00m)



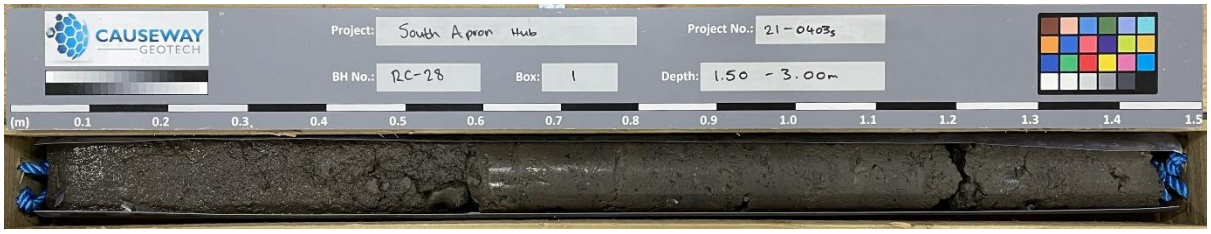
RC27 Box 4 (6.00-7.50m)



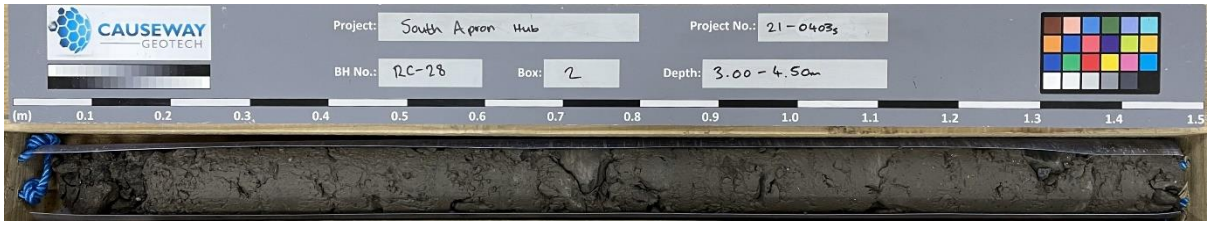
RC27 Box 5 (7.50-9.00m)



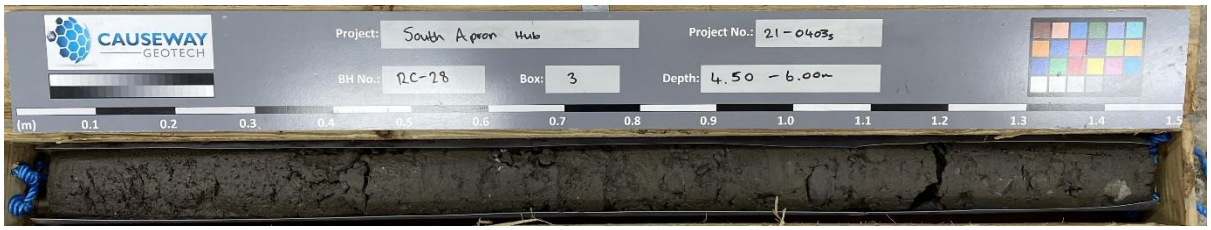
RC27 Box 6 (9.00-10.50m)



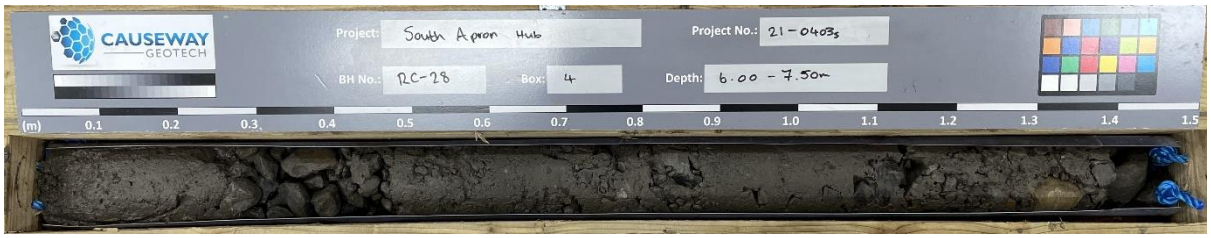
RC28 Box 1 (1.50-3.00m)



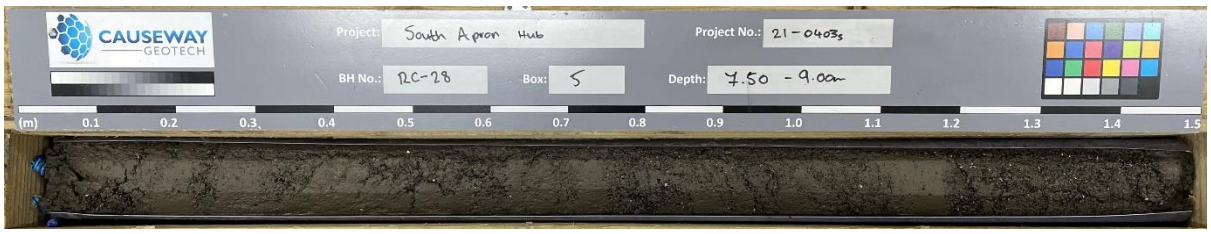
RC28 Box 2 (3.00-4.50m)



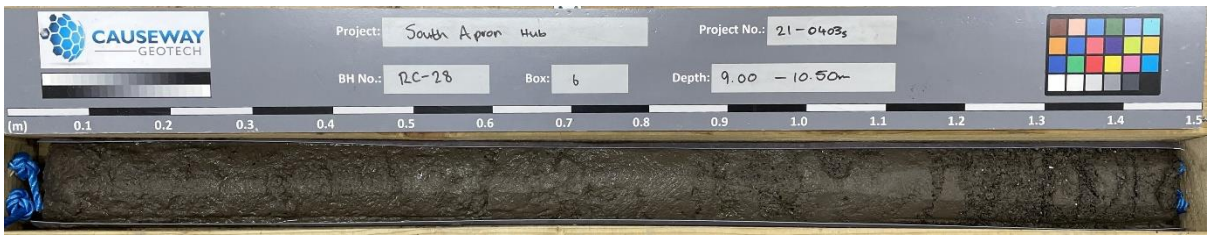
RC28 Box 3 (4.50-6.00m)



RC28 Box 4 (6.00-7.50m)



RC28 Box 5 (7.50-9.00m)



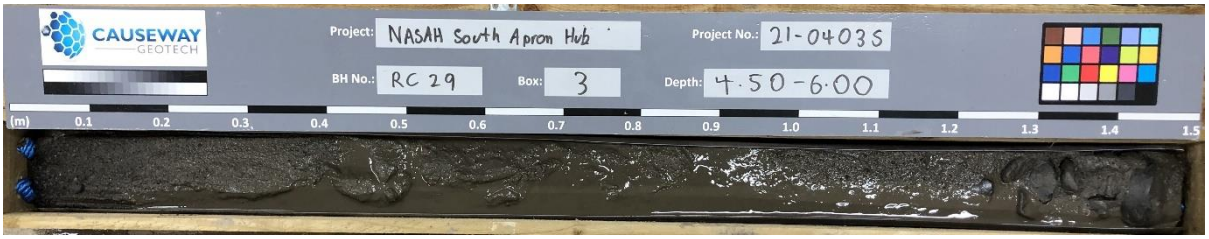
RC28 Box 6 (9.00-10.50m)



RC29 Box 1 (1.50-3.00m)



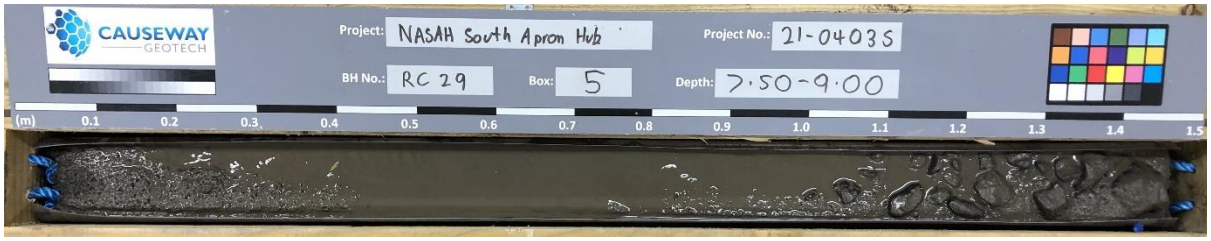
RC29 Box 2 (3.00-4.50m)



RC29 Box 3 (4.50-6.00m)



RC29 Box 4 (6.00-7.50m)



RC29 Box 5 (7.50-9.00m)



RC29 Box 6 (9.00-10.00m)



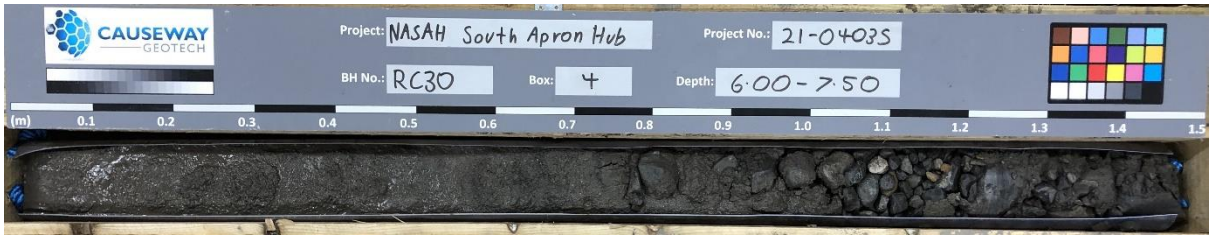
RC30 Box 1 (1.50-3.00m)



RC30 Box 2 (3.00-4.50m)



RC30 Box 3 (4.50-6.00m)



RC30 Box 4 (6.00-7.50m)



RC30 Box 5 (7.50-9.00m)



RC30 Box 6 (9.00-10.00m)



RC31 Box 1 (1.50-3.00m)



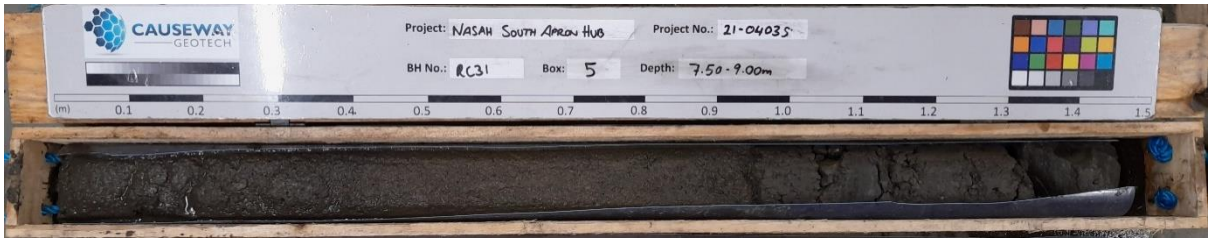
RC31 Box 2 (3.00-4.50m)



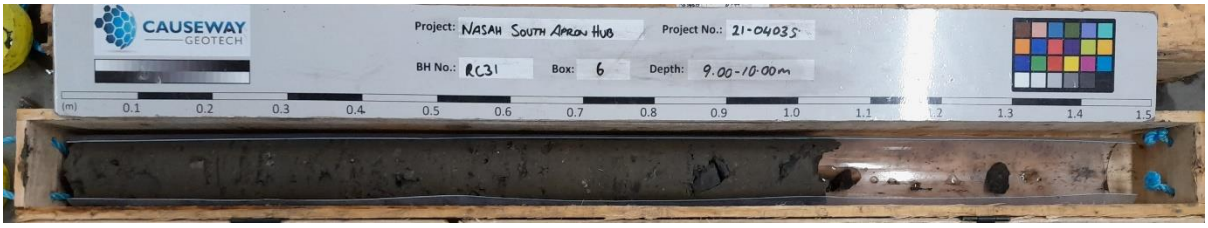
RC31 Box 3 (4.50-6.00m)



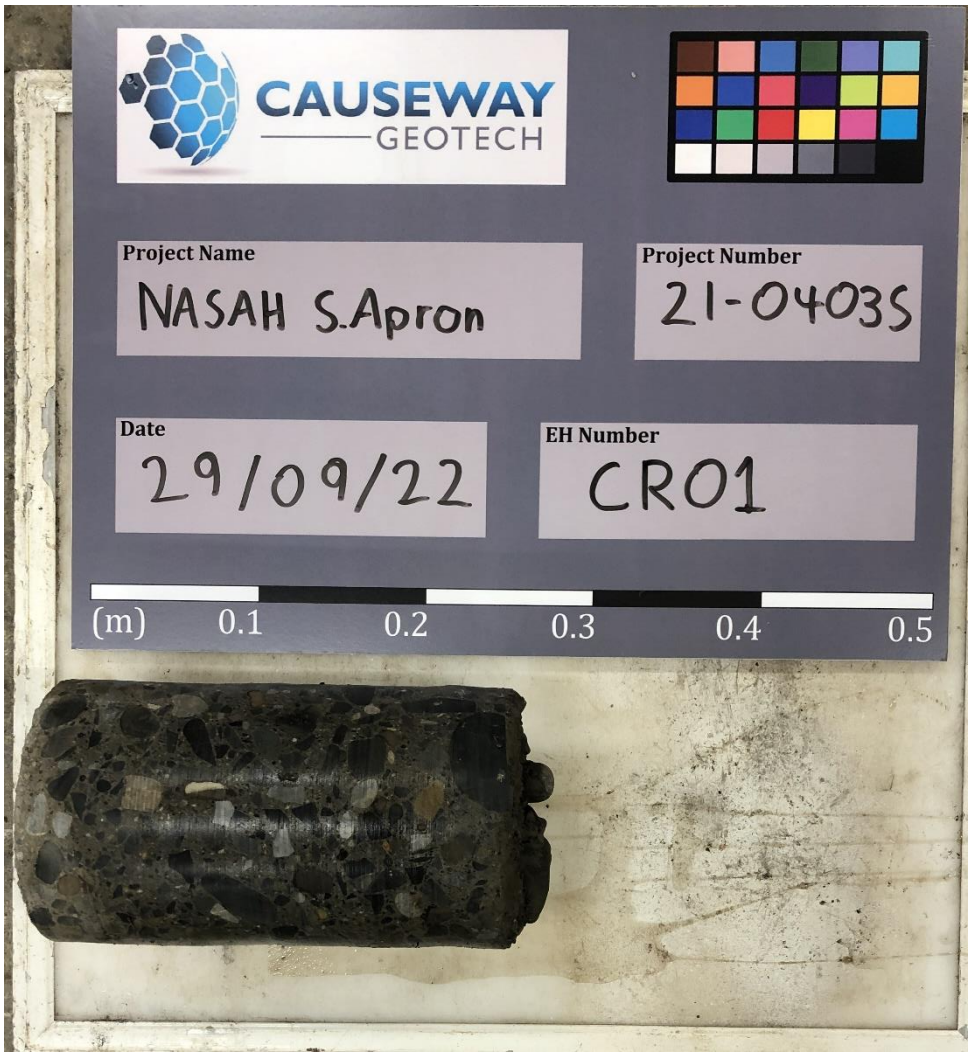
RC31 Box 4 (6.00-7.50m)



RC31 Box 5 (7.50-9.00m)



RC31 Box 6 (9.00-10.00m)



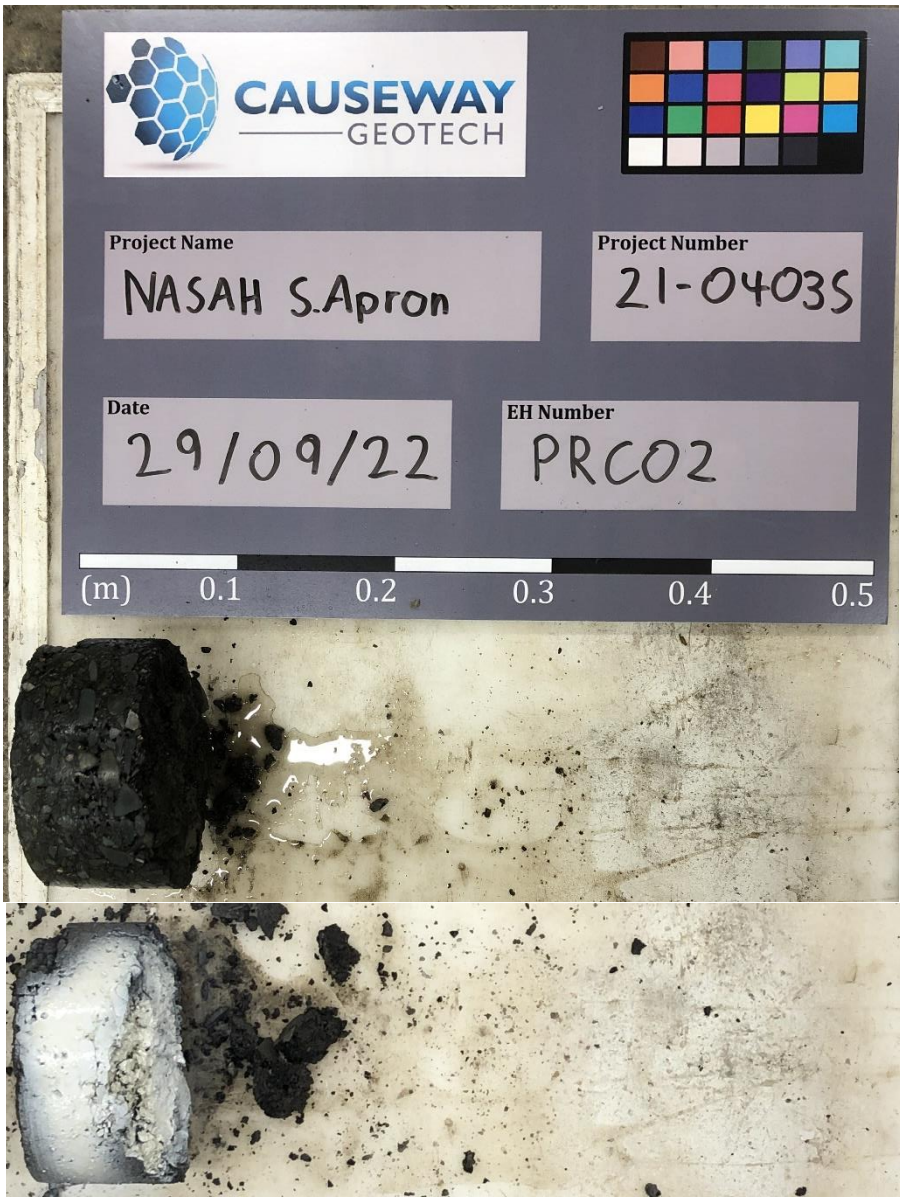
Layer	Depth	Thickness (mm)	Description	PAK Spray Discoloration
1	0-25	25	Strong grey and dark grey CONCRETE. 40-50% aggregate of angular to rounded fine to coarse predominantly sandstone and basalt gravel with occasional cobbles. 1-2% small to medium voids. No apparent reinforcement.	NA



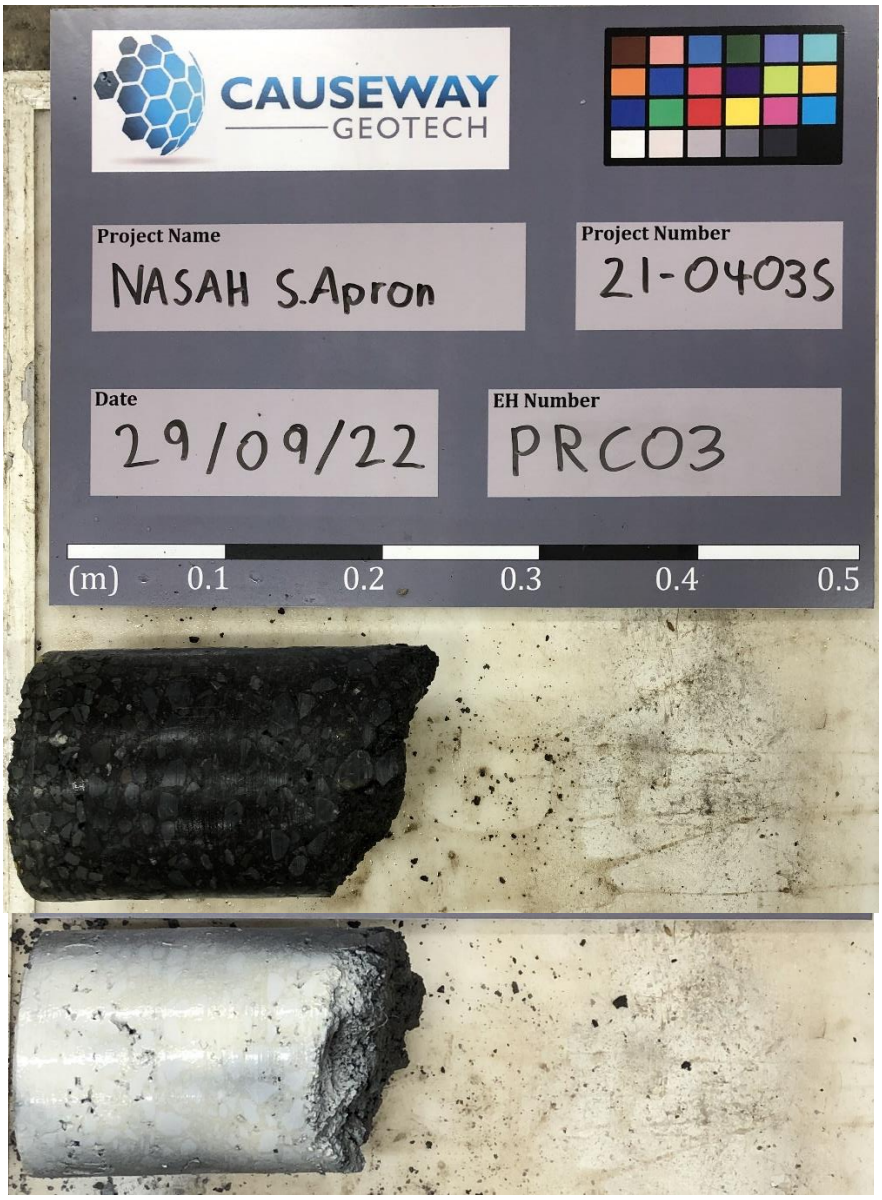
Layer	Depth	Thickness (mm)	Description	PAK Spray Discoloration
1	0-185	185	Strong grey and dark grey CONCRETE. 35-45% aggregate of angular to rounded fine to coarse gravel of various lithologies. 1-2% small to medium voids. 7-8mm diameter steel mesh reinforcement.	NA



Layer	Depth	Thickness (mm)	Description	PAK Spray Discoloration
1	0-20	20	Weak black BITMAC. 40-50% aggregate of angular to subangular fine to medium gravel. 5-10% small to medium voids.	Faint yellow
2	20-70	50	Moderately weak black BITMAC. 25-35% aggregate of angular to subrounded fine to coarse gravel. 0-5% small to medium voids.	Faint yellow



Layer	Depth	Thickness (mm)	Description	PAK Spray Discoloration
1	0-35	45	Moderately weak black BITMAC. 50-60% aggregate of angular to subangular fine to coarse gravel. 5-10% small to medium voids.	Faint yellow
2	35-75	40	Moderately weak black BITMAC. 70-80% aggregate of angular to subangular fine to coarse gravel. 10-20% small to medium voids.	Faint yellow



Layer	Depth	Thickness (mm)	Description	PAK Spray Discoloration
1	0-45	45	Moderately weak black BITMAC. 65-75% aggregate of angular to subangular fine to medium gravel. 15-25% small to medium voids.	Faint yellow
2	45	45-220	Medium strong black BITMAC. 35-45% aggregate of angular to subrounded fine to coarse gravel. 5-10% small to medium voids.	Faint yellow

CAUSEWAY GEOTECH

APPENDIX D

TRIAL PIT LOGS



CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP01
Coordinates	**Client:**	
716890.28 E 743043.16 N	Dublin Airport Authority	
Method:	**Client's Representative:**	Sheet 1 of 1
Trial Pitting	AECOM	Scale: 1:25
Plant:	**Elevation** / **Date:** / **Logger:**	FINAL
8T Tracked Excavator	63.93 mOD / 19/01/2023 / MMC	

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			63.63	0.30		CONCRETE	
						Lean mix CONCRETE	
0.50	B6						
0.50	ES1		63.33	0.60		MADE GROUND: Greyish brown clayey fine to coarse SAND and subangular to subrounded fine to coarse GRAVEL of limestone.	
1.00	B7						
1.00	ES2						
1.50	B8						
1.50	ES3		62.33	1.60		Stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to angular fine to coarse of limestone.	
1.70	B9						
1.70	ES4		62.13	1.80		Stiff dark grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
2.00	ES5						
			61.63	2.30		End of trial pit at 2.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.30
Width: 1.10
Length: 2.90

Remarks:
No groundwater encountered

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex		**Trial Pit ID** TP02
Coordinates 716907.86 E 743057.27 N	**Client:** Dublin Airport Authority		
Method: Trial Pitting	**Client's Representative:** AECOM		Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 63.95 mOD	**Date:** 18/01/2023	**Logger:** MMC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						CONCRETE	
			63.57	0.38		Lean mix CONCRETE	
0.50	PFAS1						
0.60	B6		63.37	0.58		MADE GROUND: Greyish brown slightly silty fine to coarse SAND and subangular fine to coarse GRAVEL of limestone.	
0.60	ES1						
			63.00	0.95		MADE GROUND: Light grey very sandy slightly silty subangular to angular fine to coarse GRAVEL of limestone. Sand is fine to coarse.	
1.00	B7						
1.00	ES2						
1.00	PFAS2						
1.50	B8						
1.50	ES3						
1.50	PFAS3						
		Water strike at 1.80m	62.15	1.80		Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to angular fine to coarse of limestone.	▼
2.00	B9						
2.00	ES4						
2.00	PFAS4		61.75	2.20		Stiff dark grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to angular fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.	
2.50	B10						
2.50	ES5						
2.50	PFAS5						
			61.15	2.80		End of trial pit at 2.80m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
1.80	Water strike at 1.80m

Depth: 2.80
Width: 1.10
Length: 3.10

Remarks:

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

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CAUSEWAY GEOTECH

Project No. 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex		**Trial Pit ID** TP03
Coordinates 716932.96 E 743067.30 N	**Client:** Dublin Airport Authority		
Method: Trial Pitting	**Client's Representative:** AECOM		Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 63.96 mOD	**Date:** 18/01/2023	**Logger:** MMC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			63.76	0.20		CONCRETE	
			63.59	0.37		Lean mix CONCRETE	
0.50	B4					MADE GROUND: Grey subangular fine to coarse GRAVEL.	
0.50	ES1						
			63.31	0.65		MADE GROUND: Brown slightly sandy very clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.	
			63.06	0.90		MADE GROUND: Light grey subangular fine to coarse GRAVEL with fragments of plastic.	
1.00	B5						
1.00	ES2						
1.50	B6		62.46	1.50		Stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	▼
1.50	ES3	Water strike at 1.50m					
			62.26	1.70		Very stiff dark grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to angular of limestone. Cobbles are subangular of limestone.	
2.00	B9						
2.50	B10						
2.50	ES4						
			60.96	3.00		End of trial pit at 3.00m	
4.20	ES5						

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
1.50	Water strike at 1.50m

Depth: 3.00
Width: 1.30
Length: 3.20

Remarks:

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

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CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP04
	Coordinates 716996.47 E 743005.61 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 62.89 mOD	**Date:** 20/01/2023	**Logger:** MMC — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						BITMAC	
			62.64	0.25		MADE GROUND: Light very sandy subrounded to subangular fine to coarse GRAVEL of limestone with medium cobble content. Sand is fine to coarse.	
0.40	B6						
0.40	ES1		62.41	0.48		Firm to stiff brown slightly mottled light grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
1.00	B7						
1.00	ES2						
1.50	B8						
1.50	ES3						
			61.19	1.70		Brown slightly mottled light grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
2.00	B9						
2.00	ES4						
2.50	B10						▼
2.50	ES5	Slow seepage at 2.50m					
			59.99	2.90		Stiff dark grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to fine to coarse of limestone.	
3.00	B12						
3.00	ES6						
			59.59	3.30		End of trial pit at 3.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes				
Struck at (m)	Remarks	**Depth:** 3.30	**Remarks:**	
2.50	Slow seepage at 2.50m	**Width:** 1.20		
		Length: 3.50		
		Stability: Stable	**Termination Reason** Terminated on refusal.	**Last Updated** 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP05
Coordinates	**Client:**	
717008.91 E 743074.03 N	Dublin Airport Authority	
Method: Trial Pitting	**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 62.63 mOD / **Date:** 22/08/2022 / **Logger:** MRG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						BITMAC	
0.30	ES1		62.33	0.30			
0.30		PID = 4.50ppm				MADE GROUND: Greyish brown and blackish grey slightly silty sandy subangular to angular fine to coarse GRAVEL of mixed lithologies. Sand is fine to coarse.	
0.50	ES2		62.18	0.45			
0.50		PID = 0.90ppm Heavy flow at 0.55m	62.08 62.06	0.55 0.57		MADE GROUND: Dark grey slightly sandy subangular to subrounded fine to coarse GRAVEL of limestone. Sand is fine to coarse.	▼
0.70	ES3					MADE GROUND: TERRAM	
0.70		PID = 15.40ppm	61.83	0.80		MADE GROUND: Soft to firm greenish brown slightly sandy slightly gravelly slightly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
1.00	ES4						
1.00		PID = 0.20ppm				Firm greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.00	ES5						
2.00		PID = 0.00ppm					
			60.03	2.60		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.90	ES6		59.73	2.90		End of trial pit at 2.90m	
2.90		PID = 0.00ppm					

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
0.55	Heavy flow at 0.55m

Depth: 2.90
Width: 1.20
Length: 3.80

Remarks:

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex		**Trial Pit ID** TP06
Coordinates 717025.42 E 743089.54 N	**Client:** Dublin Airport Authority		
Method: Trial Pitting	**Client's Representative:** AECOM		Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 62.69 mOD	**Date:** 09/08/2022	**Logger:** MRG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			62.59	0.10		TARMAC	
0.30	B1					MADE GROUND: Greyish brown silty sandy subangular fine to coarse GRAVEL. Sand is fine to coarse.	
0.30	ES2						
			62.24	0.45		MADE GROUND: TERRAM	
			62.19	0.50		MADE GROUND: Firm greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
1.00	B3						
1.00	ES4						
			61.24	1.45		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of limestone.	
1.50	ES6						
1.60	B5						
			60.84	1.85		End of trial pit at 1.85m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.85
Width: 1.20
Length: 2.80

Remarks:
4" PVC water main encountered and damaged at 0.60m. Repaired in 1 hour.
No groundwater encountered

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP07
Coordinates	**Client:**	
717050.28 E	Dublin Airport Authority	
743047.46 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
62.65 mOD	08/08/2022 / MRG	FINAL

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						CONCRETE	
			62.45	0.20			
0.30	ES1					MADE GROUND: Greyish brown slightly sandy clayey subangular to subrounded fine to coarse GRAVEL of mixed lithologies with fragments of concrete and red brick. Sand is fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
			62.25	0.40			
0.50	ES					MADE GROUND: Firm greyish brown slightly sandy gravelly CLAY with medium cobble content and fragments of plastic pipes, red brick and concrete.	
0.70	ES						
0.70	ES3						
0.80	B2						
						1.00m: 4 inch sewer pipe encountered at 1.0m.	
1.50	ES						
1.50	ES4						
		Hard flow at 1.80m Sewage smell	60.85	1.80		Firm greyish brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.00	B5						
2.00	ES6						
			60.45	2.20		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.50	ES						
2.50	ES7						
			60.05	2.60		End of trial pit at 2.60m	

Water Strikes

Struck at (m)	Remarks
1.80	Hard flow at 1.80m Sewage smell

Depth: 2.60
Width: 1.13
Length: 3.80

Remarks:
Trench cut at an angle to avoid service at 1.00m.
Services at the front and back of the trench could not extend pit.

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP08
Coordinates	**Client:**	
717108.40 E	Dublin Airport Authority	
743062.80 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
63.10 mOD	15/08/2022 / MRG	FINAL

Method: Stable

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			63.08	0.02		MADE GROUND: Slightly sandy very gravelly TOPSOIL with fragments of plastic. Sand is fine to coarse. Gravel is subangular to subrounded of mixed lithologies.	
0.30	ES					MADE GROUND: Dark grey slightly sandy slightly clayey subangular to angular fine to coarse GRAVEL of mixed lithologies with fragments of timber, plastic, concrete and red brick. Sand is fine to coarse.	
0.30	ES1						
0.50	B6						
0.50		PID = 2.80ppm					
			62.40	0.70		Firm greenish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
0.90	B7						
0.90	ES						
0.90	ES2						
1.00		PID = 1.40ppm					
			61.90	1.20		Firm light brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.50	B8						
1.50	ES						
1.50	ES3						
1.50		PID = 1.00ppm Moderate flow at 1.70m	61.40	1.70		Light brownish grey slightly sandy silty subangular to subrounded fine to medium GRAVEL of limestone. Sand is fine to coarse.	▼
1.90	B9						
1.90	ES4						
1.90		PID = 0.00ppm					
2.40	B10		60.70	2.40		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.50	ES5						
2.50		PID = 0.00ppm	60.50	2.60		End of trial pit at 2.60m	

Water Strikes	
Struck at (m)	Remarks
1.70	Moderate flow at 1.70m

Depth: 2.60
Width: 1.20
Length: 3.70

Remarks:

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP09
Coordinates	**Client:**	
717030.01 E 742910.22 N	Dublin Airport Authority	
Method: Trial Pitting	**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: Tracked Excavator	**Elevation** 61.80 mOD / **Date:** 09/09/2022 / **Logger:** BS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			61.70	0.10		CONCRETE	
						MADE GROUND: Grey angular to subangular fine to coarse GRAVEL.	
			61.35	0.45			
0.50	B3					MADE GROUND: Brown clayey very sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse.	
0.50	ES1						
0.50		PID = 0.00ppm					
		Fast flow at 1.30m					▼
1.50	B4		60.30	1.50		End of trial pit at 1.50m	
1.50	ES2						
1.50		PID = 0.00ppm					

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
1.30	Fast flow at 1.30m

Depth: 1.50
Width: 1.00
Length: 2.50

Remarks:

Stability: Stable

Termination Reason: Terminated due to water ingress.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP10
	Coordinates 717082.93 E 742970.33 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 61.12 mOD	**Date:** 13/09/2022	**Logger:** MRG FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						CONCRETE	
0.25	B5		60.92	0.20			
0.25	ES1					MADE GROUND: Grey slightly silty sandy subangular to angular fine to coarse GRAVEL of limestone. Sand is fine to coarse.	
0.25		PID = 8.20ppm	60.77	0.35		MADE GROUND: Soft to firm dark greenish greyish brown and greyish brown slightly sandy gravelly CLAY with medium cobble content and fragments of plastic and steel. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.	
0.70	B6						
0.70	ES2						
0.70		PID = 16.40ppm					
			59.72	1.40			
1.50	ES3					Firm greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
1.50		PID = 0.20ppm					
1.60	B7		59.42	1.70		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
2.00	ES4		59.12	2.00		End of trial pit at 2.00m	
2.00		PID = 0.00ppm					
2.30	B8						

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.00
Width: 1.10
Length: 2.70

Remarks: No groundwater encountered.

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP12
Coordinates	**Client:**	
717153.90 E	Dublin Airport Authority	
743042.10 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
62.44 mOD	16/08/2022 / MRG	FINAL

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			62.34	0.10		TOPSOIL	
						MADE GROUND: Firm greyish brown sandy very gravelly CLAY with high cobble content and fragments of red brick, plastic, wires and timber. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of various lithologies.	
0.50	B1						
0.50	ES2						
0.50		PID = 9.30ppm					
			61.54	0.90		MADE GROUND: Firm greyish brown slightly sandy slightly gravelly CLAY with medium cobble content and fragments of red brick and plastic. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of various lithologies.	
1.00	ES4						
1.00		PID = 12.50ppm					
1.10	B3						
			61.24	1.20		Firm greyish brown mottled orange slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of limestone.	
1.50	ES6						
1.50		PID = 0.20ppm					
2.00	B5						
			60.24	2.20		Stiff grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subangular of limestone.	
2.40	ES8						
2.40		PID = 0.00ppm	59.99	2.45		End of trial pit at 2.45m	
2.45	B7						

Water Strikes	
Struck at (m)	Remarks

Depth: 2.45
Width: 0.90
Length: 4.05

Remarks: No groundwater encountered.

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP13
Coordinates	**Client:**	
717150.89 E	Dublin Airport Authority	
742993.77 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
62.07 mOD	12/09/2022 / MRG	FINAL

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			61.99	0.08		BITMAC	
						MADE GROUND: Light greyish white slightly silty sandy subangular to angular fine to coarse GRAVEL. Sand is fine to coarse.	
0.30	B6		61.77	0.30		MADE GROUND: Dark grey slightly sandy clayey subangular to angular fine to coarse GRAVEL of limestone. Sand is fine to coarse.	
0.30	ES1						
0.30		PID = 7.40ppm					
0.50	B7						
0.50	ES2						
0.50		PID = 4.20ppm	61.42	0.65		MADE GROUND: Firm greyish brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse. Cobbles are subangular to subrounded.	
0.85	B8						
0.85	ES3						
1.00		PID = 0.10ppm	61.07	1.00		Firm greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
1.50		PID = 0.00ppm					
2.00	B9						
2.00	ES4						
2.00		PID = 0.00ppm					
2.50		PID = 0.00ppm					
			59.47	2.60		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
3.00	B10		59.07	3.00		End of trial pit at 3.00m	
3.00	ES5						

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks

Depth: 3.00
Width: 1.05
Length: 3.00

Remarks: No groundwater encountered.

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP15
Method: Trial Pitting	**Coordinates** 717106.34 E 742876.14 N	**Client:** Dublin Airport Authority	
		Client's Representative: AECOM	Sheet 1 of 1 Scale: 1:25
Plant: Tracked Excavator	**Elevation** 61.05 mOD	**Date:** 07/09/2022 **Logger:** BS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						BITMAC	
			60.70	0.35		MADE GROUND: Grey angular to subangular fine to coarse GRAVEL.	
0.50	B3		60.55	0.50		MADE GROUND: Brown clayey very sandy subangular to angular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Gravel is subangular to angular fine to coarse.	
0.50	ES1						
0.50		PID = 0.00ppm					
1.20	B4		59.85	1.20		End of trial pit at 1.20m	
1.20	ES2						
1.20		PID = 0.00ppm					

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 1.00
Length: 2.70

Remarks:
No groundwater encountered.

Stability:	Termination Reason	Last Updated
Stable	Terminated due to service encountered.	09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP16
	Coordinates 717137.06 E 742951.62 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 60.20 mOD	**Date:** 12/09/2022	**Logger:** MRG FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			60.00	0.20		CONCRETE	
0.30	B4					MADE GROUND: Grey slightly clayey sandy subangular to angular fine to coarse GRAVEL of limestone with medium cobble content. Sand is fine to coarse.	
0.30	ES1						▼
0.30		PID = 40.50ppm Moderate flow at 0.40m	59.75	0.45		MADE GROUND: Greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
0.70	B5						
			59.30	0.90		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
1.00	ES2						
1.00		PID = 15.40ppm					
1.50	B6						
1.50	ES3						
1.50		PID = 0.00ppm	58.50	1.70		End of trial pit at 1.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
0.40	Moderate flow at 0.40m

Depth: 1.70
Width: 1.00
Length: 3.10

Remarks:

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

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CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP17
	Coordinates 717199.68 E 742964.40 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 61.31 mOD	**Date:** 25/08/2022	**Logger:** MRG FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			61.26	0.05		TOPSOIL	
0.30	ES2					MADE GROUND: Firm greyish brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of various lithologies.	
0.30 - 2.90	ES1						
0.30		PID = 0.10ppm	60.91	0.40		Firm brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular of various lithologies. Cobbles are subangular of various lithologies.	
1.00	B3						
1.00	ES3						
1.00		PID = 0.00ppm					
2.00	B4						
		Slow seepage at 2.70m	58.61	2.70		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.	▼
2.90	B5		58.41	2.90		End of trial pit at 2.90m	
2.90		PID = 0.00ppm					

Water Strikes	
Struck at (m)	Remarks
2.70	Slow seepage at 2.70m

Depth: 2.90
Width: 1.00
Length: 2.90

Remarks:

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP18
Coordinates	**Client:**	
717224.28 E	Dublin Airport Authority	
742992.87 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
60.93 mOD	24/08/2022 / MRG	FINAL

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			60.83	0.10		TOPSOIL with rootlets.	
0.50	ES1					MADE GROUND: Greyish brown sandy gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. Cobbles are subrounded of mixed lithologies.	
0.50		PID = 1.20ppm	60.33	0.60			
0.80	ES2					MADE GROUND: Greyish brown slightly gravelly slightly clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse. Cobbles are subangular of various lithologies.	
0.80		PID = 1.10ppm	60.03	0.90			
						MADE GROUND: Firm greenish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of various lithologies.	
1.50	ES3						
1.50		PID = 12.20ppm					
			58.53	2.40			
2.50	ES4					Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of limestone.	
			58.23	2.70		End of trial pit at 2.70m	

Water Strikes	
Struck at (m)	Remarks

Depth: 2.70
Width: 1.00
Length: 3.00

Remarks:
Old store drain encountered at 2.00m.
No groundwater encountered

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

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CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP19
Coordinates	**Client:**	
717271.31 E	Dublin Airport Authority	
743025.82 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
60.54 mOD	24/08/2022 / MRG	FINAL

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			60.48	0.06		BITMAC	
						MADE GROUND: Grey slightly sandy slightly silty subangular to angular fine to coarse GRAVEL of limestone. Sand is fine to coarse.	
0.30	B5						
0.30	ES1						
0.30		PID = 17.80ppm Moderate flow at 0.40m	60.14	0.40		MADE GROUND: Greyish brown slightly silty gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium of mixed lithologies.	▼
0.60	B6						
0.60		PID = 12.20ppm	59.84	0.70		Firm greyish brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
1.00	ES2						
1.10	B7						
1.10		PID = 0.20ppm					
1.50	ES3						
1.50		PID = 0.20ppm					
			58.84	1.70		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobble are subangular to subrounded of limestone.	
1.80	B8						
1.90	ES4		58.64	1.90		End of trial pit at 1.90m	
1.90		PID = 0.00ppm					

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
0.40	Moderate flow at 0.40m

Depth: 1.90
Width: 1.10
Length: 2.70

Remarks:

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP21
	Coordinates 717267.97 E 742929.45 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 60.08 mOD	**Date:** 30/08/2022	**Logger:** MRG — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			59.98	0.10		TARMAC	
0.30	B1					MADE GROUND: Grey slightly sandy slightly clayey subangular fine to coarse GRAVEL of limestone with high cobble content. Sand is fine to coarse. Cobbles are subrounded of limestone.	
0.30	ES2						
0.30		PID = 2.90ppm Medium flow at 0.50m	59.58	0.50		MADE GROUND: Soft to firm dark greyish brown slightly sandy gravelly CLAY with medium cobble content and fragments of plastic, rubber, rebar and construction waste. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of various lithologies.	▼
0.80	ES4						
0.80		PID = 29.10ppm					
0.90	B3		59.08	1.00		MADE GROUND: Firm brownish grey slightly sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of various lithologies.	
1.30	ES6						
1.30		PID = 12.40ppm	58.68	1.40		Firm greenish brown mottled orange and black slightly sandy slightly gravelly SILT with rotted rootlets. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of various lithologies.	
1.40	B5						
1.50	B7		58.43	1.65		Firm greyish brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of various lithologies.	
2.00	ES8						
2.00		PID = 19.00ppm					
2.10	B9						
2.50	ES10						
2.50		PID = 0.00ppm	57.08	3.00		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded of various lithologies.	
3.10	ES11		56.98	3.10		End of trial pit at 3.10m	
3.10		PID = 0.00ppm					

Water Strikes	
Struck at (m)	Remarks
0.50	Medium flow at 0.50m

Depth: 3.10
Width: 1.10
Length: 3.30

Remarks:

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP22
	Coordinates 717212.28 E 742901.54 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 6t Tracked Excavator	**Elevation** 59.98 mOD	**Date:** 03/02/2023	**Logger:** BS — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			59.88	0.10		TARMAC	
			59.68	0.30		MADE GROUND: Grey slightly sandy slightly silty angular to subangular fine to coarse GRAVEL. Sand is fine to coarse.	
						MADE GROUD: Dark brown greyish slightly sandy clayey GRAVEL. with high cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobbles Subrounded to Rounded.	
			58.78	1.20		Soft brown slightly sandy slightly silty CLAY. Sand is fine to coarse. Gravel is angular fine to coarse.	
			58.48	1.50		Firm brown greyish slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse.	
			57.98	2.00		Soft brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse.	
		Slow seepage at 2.40m					▼
			56.78	3.20		End of trial pit at 3.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.40	Slow seepage at 2.40m

Depth: 3.20
Width: 0.70
Length: 3.00

Remarks:

Stability: Stable

Termination Reason: Terminated at maximum reach of excavator.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP23
Method: Stable	**Coordinates** 717184.82 E 742845.25 N	**Client:** Dublin Airport Authority	
		Client's Representative: AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 5T Tracked Excavator	**Elevation** 60.46 mOD	**Date:** 06/09/2022 **Logger:** BS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			60.31	0.15		BITMAC	
			60.16	0.30		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular.	
0.50	B4					Brown sandy clayey angular to subangular fine to coarse GRAVEL. Sand is fine to coarse.	
0.50	ES1						
1.50	B5						
1.50	ES2						
1.50		PID = 1.00ppm					
			58.46	2.00		Firm to stiff dark brownish sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobbles are subangular.	
2.50	B6						
2.50	ES3						
2.50		PID = 0.00ppm	57.86	2.60		End of trial pit at 2.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes				
Struck at (m)	Remarks			
		Depth: 2.60	**Remarks:** No groundwater encountered.	
		Width: 1.00		
		Length: 3.00		
		Stability: Stable	**Termination Reason** Terminated due to services encountered.	**Last Updated** 09/03/2023

CAUSEWAY GEOTECH

Project No. 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex		**Trial Pit ID** TP24
Coordinates 717207.96 E 742817.81 N	**Client:** Dublin Airport Authority		
Method: Stable	**Client's Representative:** AECOM		Sheet 1 of 1 Scale: 1:25
Plant: 5T Tracked Excavator	**Elevation** 59.80 mOD	**Date:** 06/09/2022	**Logger:** BS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						BITMAC	
			59.57	0.23		MADE GROUND: Grey angular to subangular fine to coarse GRAVEL.	
			59.35	0.45			
0.50	B3					Brown sandy clayey angular to subangular fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Grave is angular to subangular fine to coarse. Cobbles are subrounded to rounded.	
0.50	ES1						
1.50	B4		58.30	1.50		Brown sandy clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.	
2.00	B5						
			57.10	2.70		Stiff greyish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to angular fine to coarse.	
3.00	B6		56.80	3.00		End of trial pit at 3.00m	▼
3.00	ES2						
3.00		PID = 0.00ppm Groundwater encountered at 3.00m					

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
3.00	Groundwater encountered at 3.00m

Depth: 3.00
Width: 1.00
Length: 3.00

Remarks:

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex		**Trial Pit ID** TP25
Coordinates 717240.58 E 742795.91 N	**Client:** Dublin Airport Authority		
Method: Trial Pitting	**Client's Representative:** AECOM		Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 59.63 mOD	**Date:** 19/08/2022	**Logger:** MRG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			59.33	0.30		TARMAC	
						CONCRETE	
			58.88	0.75		MADE GROUND: Dark greyish brown gravelly clayey fine to coarse SAND. Gravel is subangular fine to coarse of various lithologies. Cobbles are subrounded of various lithologies.	
1.00	B3						
1.00	ES1						
1.00		PID = 1.00ppm					
2.00	B4						
			56.63	3.00		Firm greenish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded.	
3.20	B5						
3.20	ES2						
3.20		PID = 0.00ppm					
			56.23	3.40		End of trial pit at 3.40m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.40
Width: 1.20
Length: 4.00

Remarks:
No groundwater encountered.

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP39
	Coordinates 716980.94 E 742629.05 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 57.66 mOD	**Date:** 27/07/2022	**Logger:** MRG FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	B5						
0.10		PID = 0.20ppm	57.46	0.20		Light grey slightly clayey sandy subangular to subrounded fine to coarse GRAVEL of predominantly limestone with fragments of concrete. Sand is fine to coarse.	
0.30	ES					Light brown slightly silty gravelly fine to coarse SAND with low cobble content. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles are subrounded of mixed lithologies.	
0.30	ES1						
0.50	ES2						
0.50		PID = 0.10ppm	57.06	0.60		Light brown silty very sandy subangular fine to coarse GRAVEL. Sand is fine to coarse.	
0.60	B6						
			56.66	1.00		Firm to stiff brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles are subangular to subrounded of mixed lithologies.	
1.50	ES3						
2.00	B7						
2.00		PID = 0.80ppm					
2.50	ES4						
			54.86	2.80		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
3.20	B8		54.46	3.20		End of trial pit at 3.20m	
3.20		PID = 0.10ppm					

Water Strikes	
Struck at (m)	Remarks

Depth: 3.20
Width: 1.10
Length: 3.90

Remarks:
No groundwater encountered.

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP40
Coordinates	**Client:**	
717020.03 E	Dublin Airport Authority	
742649.07 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
57.46 mOD	28/07/2022 / MRG	FINAL

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			57.31	0.15		TOPSOIL with rootlets	
0.30	ES					MADE GROUND: Light greyish brown sandy very gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
0.30	ES1						
0.40	B6						
0.50	ES						
0.50	ES2						
			56.66	0.80		MADE GROUND: Stiff dark grey and brown sandy very gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.40	B7						
1.50	ES3						
			55.66	1.80		Firm greenish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.90	B8						
			55.46	2.00		Firm light brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subronded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
2.10	B9						
			55.26	2.20		Firm to stiff greyish brown with orange mottling slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.50	ES4						
3.00	ES5						
3.20	B10						
			54.06	3.40		End of trial pit at 3.40m	

Water Strikes

Struck at (m)	Remarks

Depth: 3.40
Width: 4.00
Length: 1.10

Remarks: No groundwater encountered.

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP41
Coordinates	**Client:**	
717057.99 E	Dublin Airport Authority	
742632.95 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
56.68 mOD	02/08/2022 / MRG	FINAL

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			56.58	0.10		TOPSOIL	
0.30	ES					MADE GROUND: Firm greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
0.30	ES2						
0.50	B1						
0.50	ES						
0.50	ES3						
0.50		PID = 1.70ppm	55.98	0.70		MADE GROUND: Firm brown slightly sandy gravelly CLAY with low cobble content and fragments of plastic, red brick and concrete. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.00	B4						
1.00		PID = 0.60ppm					
			55.28	1.40		MADE GROUND: Soft dark greenish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.50	ES						
1.50	ES6						
1.50		PID = 2.40ppm					
1.90	B5						
			54.58	2.10		Firm greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
2.50	ES						
2.50	ES8						
3.00	B7						
3.00		PID = 0.70ppm					
			53.48	3.20		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
3.50	B9		53.18	3.50		End of trial pit at 3.50m	
3.50		PID = 0.00ppm					

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 1.10
Length: 4.60

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP42
Coordinates	**Client:**	
717034.03 E	Dublin Airport Authority	
742600.99 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
56.90 mOD	29/07/2022 / MRG	FINAL

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			56.80	0.10		TOPSOIL with rootlets	
0.30	B5					MADE GROUND: Firm to stiff light greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
0.30	ES						
0.30	ES1						
0.30		PID = 1.70ppm	56.40	0.50		MADE GROUND: Firm dark brown slightly sandy gravelly silty CLAY with medium cobble content and fragments of glass, ceramic and concrete. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
0.50	ES						
0.50	ES2						
0.70	B6						
0.70		PID = 0.70ppm					
			55.90	1.00		MADE GROUND: Firm greenish grey slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.30	B7		55.60	1.30		Soft to firm light brown with black mottling sandy slightly gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.30		PID = 0.90ppm					
1.50	ES						
1.50	ES3						
1.70	B8						
1.70		PID = 0.00ppm	55.10	1.80		Dark grey slightly gravelly slightly silty fine to coarse SAND with medium cobble content and one bolder. Gravel is subangular to subrounded of limestone. Cobbles are subangular to subrounded of limestone.	
2.20	B9		54.70	2.20		Dark grey sandy gravelly SILT. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.	
2.20		PID = 0.10ppm					
2.50	ES4						
			54.30	2.60		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrouded of limestone.	
3.40	B10		53.50	3.40		End of trial pit at 3.40m	
3.40		PID = 0.00ppm					

Water Strikes

Struck at (m)	Remarks

Depth: 3.40
Width: 1.10
Length: 6.10

Remarks: No groundwater encountered.

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP43
Method: Trial Pitting	**Coordinates** 717309.52 E 742595.67 N	**Client:** Dublin Airport Authority	
		Client's Representative: AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 5T Tracked Excavator	**Elevation** 55.67 mOD	**Date:** 08/09/2022 **Logger:** BS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			55.55	0.12		TOPSOIL	
0.50	B5					MADE GROUND: Brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse.	
0.50	ES1						
0.50		PID = 0.20ppm	55.07	0.60		Firm brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobbles are subangular.	
1.20	B6		54.47	1.20		Stiff sandy gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are subangular.	
1.20	ES2						
1.20		PID = 0.20ppm					
2.00	B7						
2.00	ES3						
2.00		PID = 0.20ppm					
			53.37	2.30		Very stiff grey slightly silty slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to angular fine to coarse.	
2.50	B8		53.17	2.50		End of trial pit at 2.50m	
2.50	ES4						
2.50		PID = 0.00ppm					

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 1.00
Length: 3.00

Remarks:
No groundwater encountered.

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

CAUSEWAY GEOTECH

Project No. 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex		**Trial Pit ID** TP44
Coordinates 717078.77 E 742723.94 N	**Client:** Dublin Airport Authority		
Method: Trial Pitting	**Client's Representative:** AECOM		Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 58.62 mOD	**Date:** 31/08/2022	**Logger:** MRG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			58.47	0.15		TOPSOIL	
0.40	B5					MADE GROUND: Grey slightly sandy slightly silty subangular to angular fine to coarse GRAVEL of limestone. Sand is fine to coarse.	
0.50	ES1						
0.50		PID = 7.20ppm	58.02	0.60		MADE GROUND: TERRAM	
			58.00	0.62		MADE GROUND: Firm dark brown slightly silty slightly sandy gravelly CLAY with medium cobble content and fragments of red brick, concrete, tarmac, plastic and timber. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.	
1.00	B6						
1.00	ES2						
1.00		PID = 52.40ppm	57.42	1.20		MADE GROUND: Soft to firm greenish brown slightly sandy slightly gravelly CLAY with low cobble content and fragments of ceramics, lead, rope, plastic, fabric and timber. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.50	ES3						
1.50		PID = 75.30ppm					
1.70	B7						
			56.02	2.60		Soft to firm greenish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.	▼
		Moderate flow at 2.70m					
3.10	B8						
3.50	ES4						
3.50		PID = 12.40ppm	55.02	3.60		End of trial pit at 3.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.70	Moderate flow at 2.70m

Depth: 3.60
Width: 3.45
Length: 1.65

Remarks:

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP45
Coordinates	**Client:**	
717199.13 E 742638.50 N	Dublin Airport Authority	
Method:	**Client's Representative:**	Sheet 1 of 1
Trial Pitting	AECOM	Scale: 1:25
Plant:	**Elevation** / **Date:** / **Logger:**	FINAL
8T Tracked Excavator	57.27 mOD / 14/09/2022 / MRG	

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			57.12	0.15		TOPSOIL and rootlets	
0.30	B4					MADE GROUND: Firm greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
0.30	ES1						
0.30		PID = 1.40ppm	56.82	0.45		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with low cobble content and rootlets. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subanguar to subrounded of mixed lithologies.	
1.00	B5						
1.00	ES2		56.16	1.10			
1.00		PID = 3.20ppm				MADE GROUND: Firm light greyish brown slightly sandy gravelly CLAY with low cobble content an d fragments of brick, concrete, plastic and timber. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
1.60	B6						
1.60	ES3						
1.60		PID = 1.80ppm					
			55.16	2.10		End of trial pit at 2.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.10
Width: 1.05
Length: 3.40

Remarks:
No groundwater encountered.

Stability:	Termination Reason	Last Updated
Stable	Terminated due to services encountered.	09/03/2023

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CAUSEWAY GEOTECH

Project No. 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex		**Trial Pit ID** TP46
Coordinates 717099.88 E 742584.58 N	**Client:** Dublin Airport Authority		
Method: Stable	**Client's Representative:** AECOM		Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 56.32 mOD	**Date:** 29/07/2022	**Logger:** MRG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			56.22	0.10		TOPSOIL with rootlets.	
0.30	B5					MADE GROUND: Firm to stiff light greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
0.30	ES						
0.30	ES1						
0.30		PID = 1.50ppm	55.82	0.50		MADE GROUND: Firm to stiff dark brown sandy very gravelly CLAY with medium cobble content and fragments of concrete and rebar. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
0.50	ES						
0.50	ES2						
0.80	B6						
0.80		PID = 0.80ppm					
			55.32	1.00		Soft to firm greenish grey and light brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
1.50	ES						
1.50	ES3						
2.00	B7						
2.00		PID = 0.00ppm					
			54.02	2.30		Soft grey sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.40	B8						
2.40		PID = 0.00ppm	53.82	2.50		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine t coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.50	ES4						
3.20	B9						
3.20		PID = 0.00ppm	53.02	3.30		End of trial pit at 3.30m	

Water Strikes	
Struck at (m)	Remarks

Depth: 3.30
Width: 1.15
Length: 4.70

Remarks:
No groundwater encountered.

Stability: Stable

Termination Reason
Terminated on refusal.

Last Updated
09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP47
	Coordinates 717057.00 E 742563.69 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 56.48 mOD	**Date:** 05/08/2022	**Logger:** MRG — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			56.33	0.15		TOPSOIL	
0.50	B1					MADE GROUND: Firm grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies predominantly limestone.	
0.50	ES						
0.50	ES5						
0.50		PID = 1.80ppm					
			55.68	0.80		Firm to stiff light brown mottled orange and black slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
1.00	B2						
1.00	ES						
1.00	ES6		55.38	1.10		Firm dark greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
1.00		PID = 1.20ppm					
1.50	B3						
2.00	ES7						
2.00		PID = 0.00ppm					
			54.28	2.20		Stiff dark grey slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.50	ES8						
2.50		PID = 0.00ppm					
2.80	B4		53.68	2.80		End of trial pit at 2.80m	

Water Strikes	
Struck at (m)	Remarks

Depth: 2.80
Width: 1.10
Length: 4.70

Remarks: No groundwater encountered.

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

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CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP48
	Coordinates 717043.72 E 742419.24 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 56.65 mOD	**Date:** 04/08/2022	**Logger:** MRG FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			56.45	0.20		TOPSOIL	
0.50	B1					MADE GROUND: Firm light brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
0.50	ES						
0.50	ES2						
0.50		PID = 1.10ppm					
			55.85	0.80		Firm to stiff dark brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
1.20	ES						
1.20	ES4						
1.50	B3						
1.50		PID = 0.00ppm					
			54.95	1.70		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.00	ES6						
2.00		PID = 0.00ppm					
2.40	B5		54.25	2.40		End of trial pit at 2.40m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes				
Struck at (m)	Remarks	**Depth:** 2.40	**Remarks:** No groundwater encountered.	
		Width: 1.20		
		Length: 4.20		
		Stability: Stable	**Termination Reason** Terminated on refusal.	**Last Updated** 09/03/2023

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CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP49
Coordinates	**Client:**	
717107.44 E	Dublin Airport Authority	
742409.05 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
56.38 mOD	04/08/2022 / MRG	FINAL

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			56.23	0.15		TOPSOIL	
0.50	B3					MADE GROUND: Firm light brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
0.50	ES						
0.50	ES1						
0.50		PID = 0.80ppm					
1.00	ES						
1.00	ES2		55.28	1.10			
1.00		PID = 0.00ppm				Firm to stiff dark brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
1.60	B5						
2.00	ES						
2.00	ES4						
2.00		PID = 0.00ppm					
			54.18	2.20		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.70	B6		53.68	2.70		End of trial pit at 2.70m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.70
Width: 1.20
Length: 4.10

Remarks: No groundwater encountered.

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP50
Coordinates	**Client:**	
717141.47 E	Dublin Airport Authority	
742399.01 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	
56.01 mOD	05/08/2022 / MRG	FINAL

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			55.86	0.15		TOPSOIL	
0.50	B1					MADE GROUND: Firm light brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
0.50	ES		55.41	0.60			
0.50	ES2					Firm to stiff dark brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
0.50		PID = 1.20ppm					
1.00	B3						
1.00	ES						
1.00	ES4						
1.00		PID = 0.10ppm					
			54.41	1.60		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.00	ES6						
2.00		PID = 0.00ppm					
2.40	B5		53.61	2.40		End of trial pit at 2.40m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.40
Width: 1.10
Length: 4.50

Remarks: No groundwater encountered.

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP53
	Coordinates 717332.69 E 742561.43 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: Tracked Excavator	**Elevation** 55.58 mOD	**Date:** 09/09/2022	**Logger:** BS — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			55.33	0.25		TOPSOIL	
0.50	B4					MADE GROUND: Soft brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobbles are subrounded to rounded.	
0.50	ES1						
0.50		PID = 0.20ppm					
			54.88	0.70		Stiff brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse. Cobble are subangular to angular.	
1.50	B5						
1.50	ES2						
1.50		PID = 0.00ppm					
			53.68	1.90		Stiff to very stiff dark brownish grey sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse. Cobbles are subangular to subrounded.	
2.50	B6		53.08	2.50		End of trial pit at 2.50m	
2.50	ES3						
2.50		PID = 0.00ppm					

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes			
Struck at (m)	Remarks	**Depth:** 2.50	**Remarks:** No groundwater encountered.
		Width: 1.00	
		Length: 2.40	

Stability:	**Termination Reason**	**Last Updated**
Stable	Terminated on refusal.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No. 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex		**Trial Pit ID** TP54
Coordinates 716876.52 E 742688.61 N	**Client:** Dublin Airport Authority		
Method: Trial Pitting	**Client's Representative:** AECOM		Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 61.18 mOD	**Date:** 31/08/2022	**Logger:** MRG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			61.12	0.06		BITMAC	
0.15	B5					MADE GROUND: Greyish black slightly silty sandy subangular to angular fine to coarse GRAVEL of limestone. Sand is fine to coarse.	
0.15		PID = 22.50ppm	60.98	0.20		MADE GROUND: Greyish brown slightly silty sandy subangular to angular fine to coarse GRAVEL with medium cobble content of various lithologies. Sand is fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
0.30	B6						
0.40	ES1						
0.40		PID = 4.50ppm Slow seepage at 0.45m	60.73	0.45		MADE GROUND: Firm light brown and greyish brown slightly sandy gravelly CLAY with medium cobble content and fragments of red brick. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobble are subangular to subrounded of various lithologies.	▼
0.60	B7						
0.60	ES2		60.48	0.70			
0.60		PID = 36.20ppm					
1.00	ES3					MADE GROUND: Firm brown and dark greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.00		PID = 3.60ppm					
1.20	B8						
			59.83	1.35		MADE GROUND: Firm dark greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.90	B9		59.28	1.90		End of trial pit at 1.90m	
1.90	ES4						
1.90		PID = 0.20ppm					

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
0.45	Slow seepage at 0.45m

Depth: 1.90
Width: 1.05
Length: 3.20

Remarks:

Stability:	Termination Reason	Last Updated
Stable	Terminated due to services encountered.	09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP56
	Coordinates 717047.41 E 742616.39 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 56.88 mOD	**Date:** 02/08/2022	**Logger:** MRG FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			56.78	0.10		TOPSOIL	
0.30	B1					MADE GROUND: Firm greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
0.30	ES						
0.30	ES2						
0.50	B4						
0.50	ES						
0.50	ES3		56.23	0.65			
0.50		PID = 8.20ppm				MADE GROUND: Firm brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
			55.88	1.00		MADE GROUND: Firm greenish grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
1.10	B6						
1.10		PID = 0.20ppm	55.68	1.20		Firm light brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
1.50	B7						
1.50	ES						
1.50	ES5						
1.50		PID = 2.40ppm					
2.50	ES8						
2.50		PID = 0.00ppm					
			54.18	2.70		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
3.00	B9						
3.00		PID = 0.00ppm					
			53.38	3.50		End of trial pit at 3.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.50
Width: 1.20
Length: 4.10

Remarks:
No groundwater encountered.

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP57
Coordinates	**Client:**	
716928.89 E	Dublin Airport Authority	
742692.65 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	FINAL
57.71 mOD	02/08/2022 / MRG	

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			57.65	0.06		BITMAC	
0.15	B6					MADE GROUND: Black greyish brown sandy clayey subngular to angular fine to coarse GRAVEL of mixed lithologies with fragments of brick. Sand is fine to coarse.	
0.15	ES1						
0.15		PID = 5.40ppm	57.41	0.30		MADE GROUND: Firm dark brown slightly sandy gravelly CLAY with medium cobble content and fragments of plastic, red brick and tile. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded.	
0.50	ES2						
0.50		PID = 22.40ppm					
0.60	B7						
			56.96	0.75		Firm greenish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of various lithologies.	
0.90	B8						
0.90	ES3		56.71	1.00		Firm greyish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
0.90		PID = 12.40ppm					
		Slow seepage at 1.30					▼
1.50	B9						
1.50	ES4						
1.50		PID = 0.30ppm					
			55.61	2.10		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.50	B10		55.21	2.50		End of trial pit at 2.50m	
2.50	ES5						
2.50		PID = 0.00ppm					

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
1.30	Slow seepage at 1.30

Depth: 2.50
Width: 1.20
Length: 3.00

Remarks:

Stability: Stable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 21-0403S	**Project Name:** NASAH North Apron & South Apron GI Kilwex	**Trial Pit ID** TP58
	Coordinates 716988.69 E 742731.98 N	**Client:** Dublin Airport Authority	
Method: Trial Pitting		**Client's Representative:** AECOM	Sheet 1 of 1 Scale: 1:25
Plant: 8T Tracked Excavator	**Elevation** 57.25 mOD	**Date:** 01/09/2022	**Logger:** MRG — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			57.18	0.07		BITMAC	
						MADE GROUND: Blackish grey slightly silty slightly sandy subangular to angular fine to coarse GRAVEL of limestone. Sand is fine to coarse.	
0.50	B5						
0.50	ES1						
0.50		PID = 10.20ppm					
			56.45	0.80		MADE GROUND: Soft dark greenish brown slightly silty gravelly CLAY with medium cobble content, fragments of timber and plastic. Gravel is subangular to subrounded fine to coarse.	
1.00	B6						
1.00	ES2						
1.00		PID = 41.30ppm					
			55.90	1.35		Firm greyish brown and brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.50	ES3						
1.50		PID = 12.40ppm					
			55.25	2.00		Soft to firm dark blackish grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	▼
		Slow seepage at 2.10m					
2.50	ES4						
2.90	B7		54.35	2.90		End of trial pit at 2.90m	
2.90		PID = 0.00ppm					

Water Strikes	
Struck at (m)	Remarks
2.10	Slow seepage at 2.10m

Depth: 2.90
Width: 1.05
Length: 3.00

Remarks:

Stability: Unstable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
21-0403S	NASAH North Apron & South Apron GI Kilwex	TP59
Coordinates	**Client:**	
716924.75 E	Dublin Airport Authority	
742744.22 N	**Client's Representative:**	Sheet 1 of 1
	AECOM	Scale: 1:25
Elevation	**Date:** / **Logger:**	FINAL
57.81 mOD	02/09/2022 / MRG	

Method: Trial Pitting

Plant: 8T Tracked Excavator

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			57.69	0.12		BITMAC	
						MADE GROUND: Blackish grey slightly sandy subangular to angular fine to coarse GRAVEL. Sand is fine to coarse.	
0.50	B5						
0.50	ES1						
			56.86	0.95		MADE GROUND: TERRAM	
			56.84	0.97		Soft greenish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of mixed lithologies.	
1.20	B6						
1.20	ES2						
			56.46	1.35		Firm greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
		Slow seepage at 1.55m					▼
2.00	B7						
2.00	ES3						
			55.11	2.70		Stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	
2.80	B8		55.01	2.80		End of trial pit at 2.80m	
2.80	ES4						

Water Strikes	
Struck at (m)	Remarks
1.55	Slow seepage at 1.55m

Depth: 2.80
Width: 1.25
Length: 3.15

Remarks:

Stability: Unstable

Termination Reason: Terminated on refusal.

Last Updated: 09/03/2023

AGS

CAUSEWAY GEOTECH

APPENDIX E

TRIAL PIT PHOTOGRAPHS





TP01



TP01



TP01



TP01



TP01



TP02



TP02



TP02



TP02



TP02



TP02



TP03



TP03



TP03



TP03



TP04



TP04



TP04



TP04



TP04



TP04



TP04



TP05/RC05a



TP05/RC05a



TP05/RC05a



TP05/RC05a



TP05/RC05a



TP05/RC05a



TP05/RC05a



TP05/RC05a


CAUSEWAY
GEOTECH
South Apron A18
21-0403S
22/03/22
RC05a/TP05

TP05/RC05a



TP05/RC05a


CAUSEWAY
GEOTECH
Project Name
South Apron HUB
Project Number
21-0403S
Date
11/08/22
Pit Number
TP06

TP06



TP06



TP06



TP06


CAUSEWAY
Project Name
South Apron - HVB
Project Number
21-0403S
Date
11/03/22
TP06

TP06



TP06



TP08/RC07



TP08/RC07



TP08/RC07



TP08/RC07



TP08/RC07



TP08/RC07



TP09



TP09


CAUSEWAY
GEOTECH
Project Name
NASAH
Project Number
21-0403
Date
09-09-2022
EH Number
TP09
(m)
0.1
0.2
0.3
0.4
0.5

TP09


CAUSEWAY
South Apron HUB
21-0403S
13/09/22
TP 10

TP10


CAUSEWAY
GEOTECH
South Apron HUB
21-0403S
13/09/22
TP 10

TP10



TP10



TP10



TP12


CAUSEWAY
South Apron Hub
21-0403 S
16/08/22
TP 12

TP12


CAUSEWAY
South Apron Hub
21-0403 S
16/08/22
TP 12

TP12



TP12



TP12



TP13



TP13



TP13



TP13



TP13



TP15



TP15



TP15



TP15



TP16



TP16



TP16



TP16



TP16



TP16



TP17


CAUSEWAY
GEOTECH
Project Name
South Apron Hub
Project Number
21-0403 S
Date
25/08/22
GI Number
TP 19

TP17



TP17



TP17



TP17



TP17



TP19


CAUSEWAY
GEOTECH
South Apron Hub
21-0403 S
TP19
21/08/22

TP19


CAUSEWAY
GEOTECH
South Apron Hub
21-0403 S
TP19
21/08/22

TP19



TP19



TP19



TP19



TP21



TP21



TP21


Project Name
South Apron HuB
Project Number
21-0403S
Date
30/08/22
GI Number
TP21

TP21


CAUSEWAY
GEOTECH
South Apron HUB
21-0403S
30/08/22
TP21

TP21


CAUSEWAY
GEOTECH
CAUSEWAY
South Apron HUB
21-0403S
30/08/22
TP21

TP21



TP22



TP22



TP22


CAUSEWAY
GEOTECH
Project Name
NASAH
Project Number
21-0403S
Date
8-2-23
EH Number
TP22
(m) 0.1 0.2 0.3 0.4

TP22


CAUSEWAY
GEOTECH
Project Name
NASAH
Project Number
21-0403S
Date
8-2-23
EH Number
TP22
(m) 0.1 0.2 0.3 0.4 0.5

TP22



TP23



TP23


CAUSEWAY
GEOTECH
Project Name
NASAH
Project Number
21-0403
Date
06-09-2022
GI Number
TP23

TP23



TP23



TP24



TP24



TP24


CAUSEWAY
GEOTECH
Project Name
NASAH
Project Number
21-0403
Date
06-09-2022
EH Number
TP24
(m)
0.1
0.2
0.3
0.4
0.5

TP24



TP25



TP25



TP25



TP25



TP25



TP39



TP39



TP39



TP39



TP39



TP39



TP40



TP40



TP40



TP40



TP40



TP40



TP41



TP41



TP41



TP41



TP41



TP43



TP43


CAUSEWAY
GEOTECH
Project Name
NASAH
Project Number
21-0403
Date
08-09-2022
EH Number
TP43
(m)
0.1
0.2
0.3
0.4
0.5

TP43



TP44



TP44



TP44



TP44



TP44



TP44



TP53



TP53


CAUSEWAY
Project Name
NASAH
Project Number
21-0403
Date
09-09-2022
FH Number
TP53
0.1
0.2
0.3
0.4
0.5

TP53



TP53


CAUSEWAY
GEOTECH
Project Name
NASAH
Project Number
21-0403
Date
09-09-2022
EH Number
TP53
(m)
0.1
0.2
0.3
0.4

TP53



TP54



TP54



TP54



TP54



TP54



TP54



TP57


CAUSEWAY
South Apron HUB
21-0403 S
02/09/22
TP 57

TP57


CAUSEWAY
GEOTECH
South Apron HUB
21-0403 S
02/09/22
TP 57

TP57



TP57



TP57



TP57



TP58



TP58



TP58


CAUSEWAY
GEOTECH
South Apron HuB
21-0403S
01/09/22
TP 58

TP58


CAUSEWAY
GEOTECH
South Apron HuB
21-0403S
01/09/22
TP 58

TP58



TP58



TP59



TP59



TP59


CAUSEWAY
GEOTECH
South Apron Hub
21-0403 S
02/09/22
TP 59

TP59


IBERIA

TP59

CAUSEWAY GEOTECH

APPENDIX F

PLATE LOAD TEST RESULTS



CAUSEWAY GEOTECH

PLATE LOADING TEST REPORT

in accordance with BS 1377 : Part 9 Cl. 4.1 : 1990
Incremental loading test

Project	Stand 409	**Test No:**	TP04
Client		**Lab Ref No:**	21-0403s
		Date Reported	09.03.23
		Weather Conditions	Dry
Technician	MMc	**Air Temperature °C**	6
Date Tested	20.01.23	**Plate Dia (mm)**	762
Location			
GPS Coord's		**Depth (m)**	1.0
Material Type	Clay	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

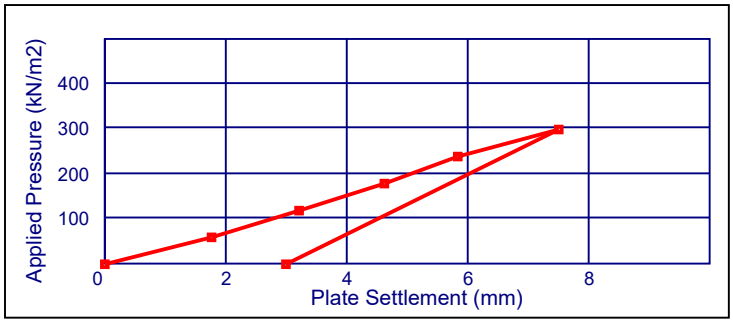
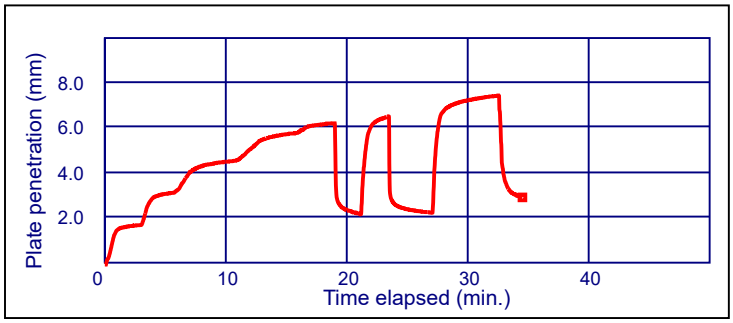


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
1.76	60.0
3.21	119.5
4.62	179.6
5.83	239.7
7.50	299.8
2.99	0.2



	Cycle 1
Maximum Applied Pressure (kPa):	**303**
Maximum deformation (mm):	**7.50**
Modulus of subgrade reaction K (MN/m3):	**34.0**
K762 (MN/m3):	**34.0**
Estimated CBR (%):	**4.4**

Comments:

Test Remarks:

Approved Signature
Company Name
Darren O'Mahony
Director

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP10
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Dry
Technician	MRG	**Air Temperature °C**	
Date Tested	13.09.22	**Plate Dia (mm)**	762
Location	Airside: Adjacent to Ground Handlers		
GPS Coord's		**Depth (m)**	1.0
Material Type	MG: CLAY	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

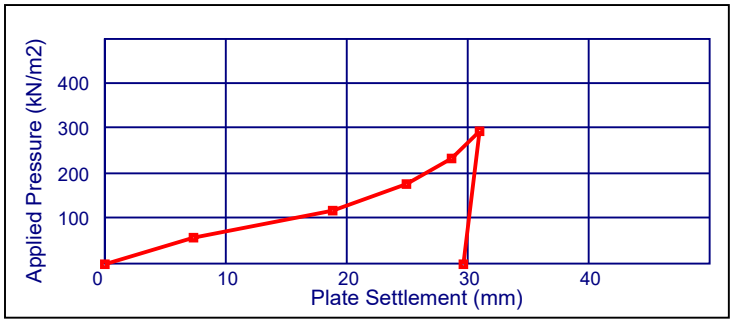
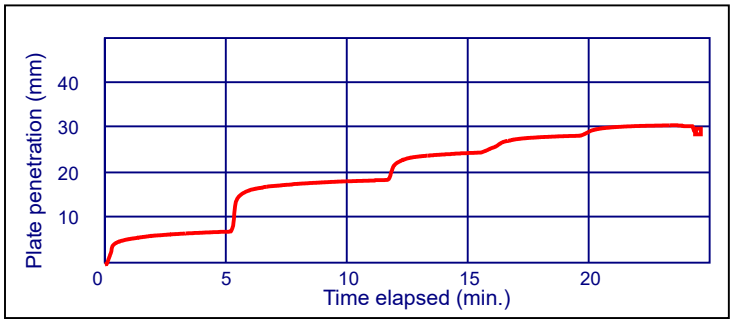


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
7.32	59.1
18.83	119.5
24.93	178.6
28.66	235.4
30.97	296.0
29.64	0.0



	Cycle 1
Maximum Applied Pressure (kPa):	**299**
Maximum deformation (mm):	**30.97**
Modulus of subgrade reaction K (MN/m3):	**8.1**
K762 (MN/m3):	**8.3**
Estimated CBR (%):	**0.4**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP13
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Raining
Technician	MRG	**Air Temperature °C**	18
Date Tested	12.09.22	**Plate Dia (mm)**	762
Location	Landside: Adjacent to Gate Gourmet		
GPS Coord's		**Depth (m)**	1.00
Material Type	MG: CLAY	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

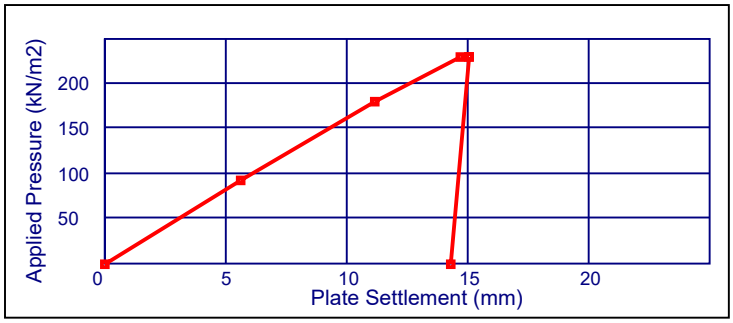
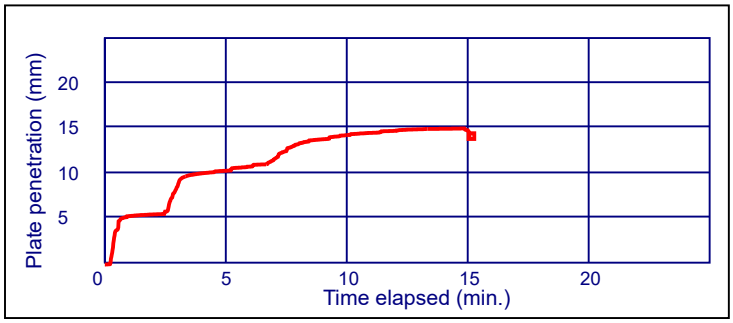


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
5.61	93.4
11.16	181.0
14.69	230.6
15.05	230.8
15.05	230.8
14.30	0.0



	Cycle 1
Maximum Applied Pressure (kPa):	**234**
Maximum deformation (mm):	**15.05**
Modulus of subgrade reaction K (MN/m3):	**16.6**
K762 (MN/m3):	**17.1**
Estimated CBR (%):	**1.3**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP15
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Wet
Technician	BS	**Air Temperature °C**	
Date Tested	01.09.22	**Plate Dia (mm)**	762
Location	Landside: Adjacent to CT1/Bond Road		
GPS Coord's		**Depth (m)**	1.00
Material Type	Sandy GRAVEL	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

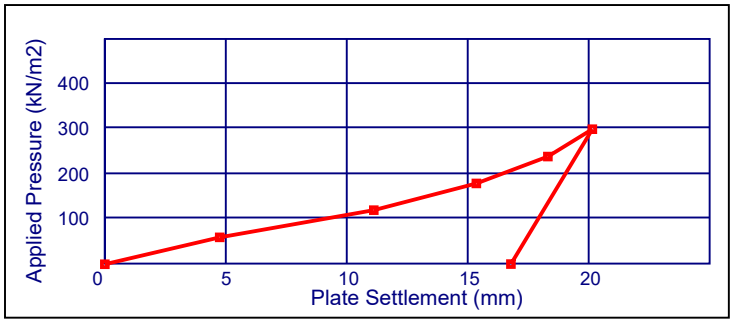
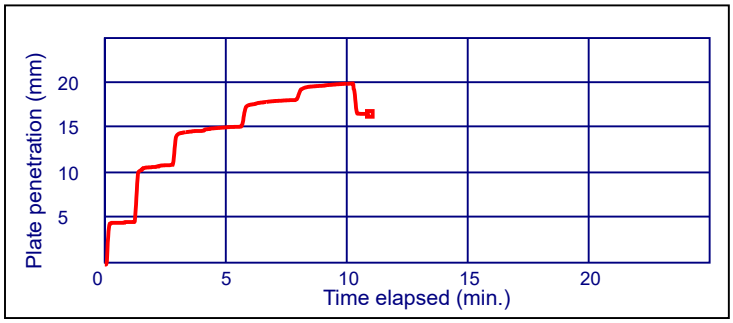


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
4.74	60.0
11.11	120.4
15.36	180.1
18.31	239.9
20.15	300.6
16.78	0.3



	Cycle 1
Maximum Applied Pressure (kPa):	**304**
Maximum deformation (mm):	**20.15**
Modulus of subgrade reaction K (MN/m3):	**12.7**
K762 (MN/m3):	**13.0**
Estimated CBR (%):	**0.8**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP16
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Raining
Technician	MRG	**Air Temperature °C**	18
Date Tested	12.09.22	**Plate Dia (mm)**	762
Location	Landside: Adjacent to CT1		
GPS Coord's		**Depth (m)**	1.00
Material Type	MG: CLAY	**Reaction Type**	27 t
No Cycles	1	**App Weight (kg)**	135

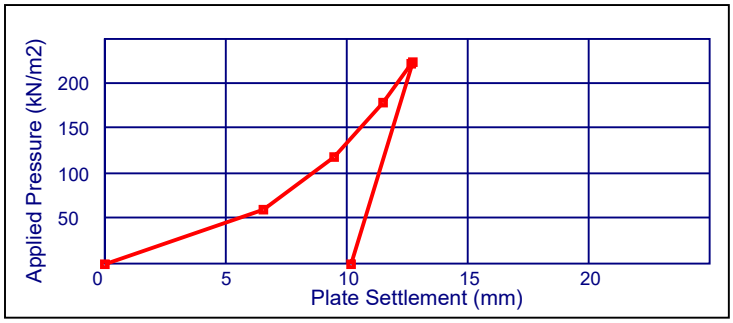
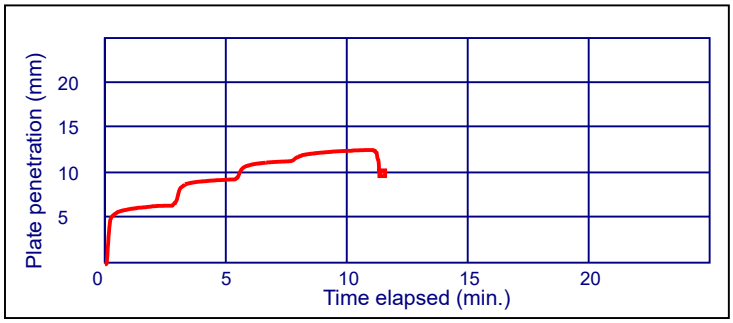


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
6.55	60.8
9.47	119.3
11.50	179.9
12.66	223.2
12.73	224.9
10.17	0.0



	Cycle 1
Maximum Applied Pressure (kPa):	**228**
Maximum deformation (mm):	**12.73**
Modulus of subgrade reaction K (MN/m3):	**9.3**
K762 (MN/m3):	**9.6**
Estimated CBR (%):	**0.5**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

CAUSEWAY GEOTECH

PLATE LOADING TEST REPORT

in accordance with BS 1377 : Part 9 Cl. 4.1 : 1990
Incremental loading test

Project	Dubin Airport	**Test No:**	TP22
Client	Kilwex	**Lab Ref No:**	21-0403s
		Date Reported	09.03.23
		Weather Conditions	Dry
Technician	Brent Smith	**Air Temperature °C**	
Date Tested	03.02.23	**Plate Dia (mm)**	762
Location			
GPS Coord's		**Depth (m)**	1.0
Material Type	MG Clayey GRAVEL	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

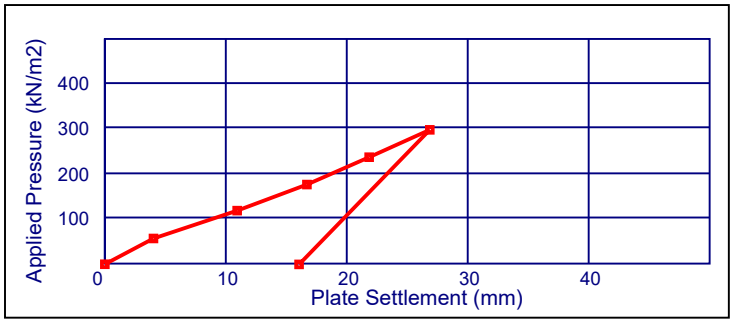
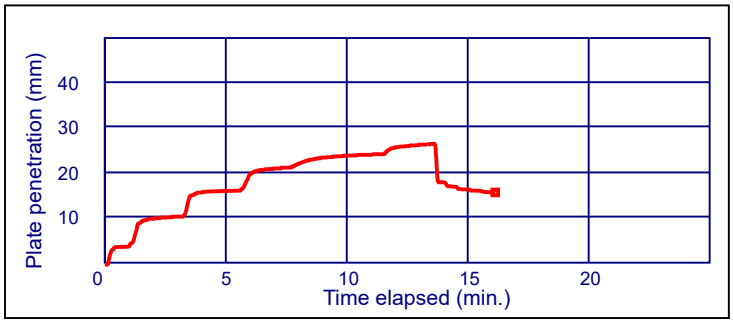


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
4.01	57.3
10.94	119.5
16.70	177.3
21.84	238.5
26.86	299.4
16.05	-0.2



	Cycle 1
Maximum Applied Pressure (kPa):	**299**
Maximum deformation (mm):	**26.86**
Modulus of subgrade reaction K (MN/m3):	**14.3**
K762 (MN/m3):	**14.3**
Estimated CBR (%):	**1.0**

Comments:

Test Remarks:

Approved Signature
Company Name
Darren O'Mahony
Director

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP23
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Wet
Technician	BS	**Air Temperature °C**	
Date Tested	01.09.22	**Plate Dia (mm)**	762
Location	Landside: Adjacent to CT2		
GPS Coord's		**Depth (m)**	1.00
Material Type	Clayey GRAVEL	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

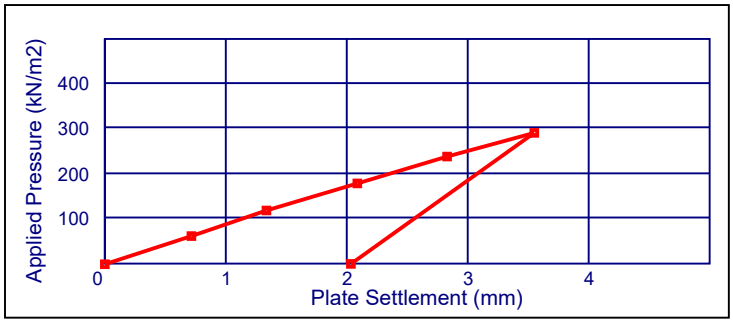
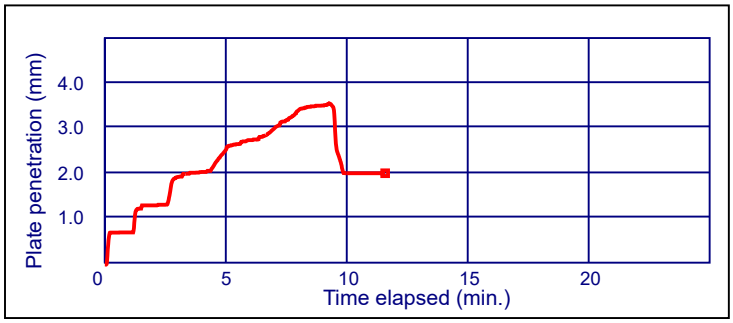


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
0.72	62.7
1.33	119.7
2.09	180.0
2.83	239.8
3.55	292.5
2.03	0.7



	Cycle 1
Maximum Applied Pressure (kPa):	**295**
Maximum deformation (mm):	**3.55**
Modulus of subgrade reaction K (MN/m3):	**89.5**
K762 (MN/m3):	**92.1**
Estimated CBR (%):	**24**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP24
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Wet
Technician	BS	**Air Temperature °C**	
Date Tested	01.09.22	**Plate Dia (mm)**	762
Location	Landside: Adjacent to CT2		
GPS Coord's		**Depth (m)**	1.00
Material Type	MG: CLAY	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

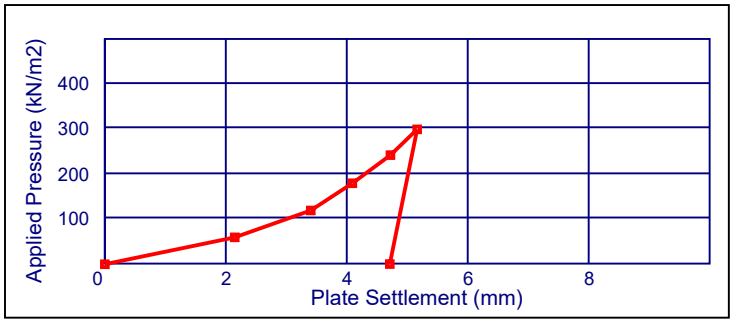
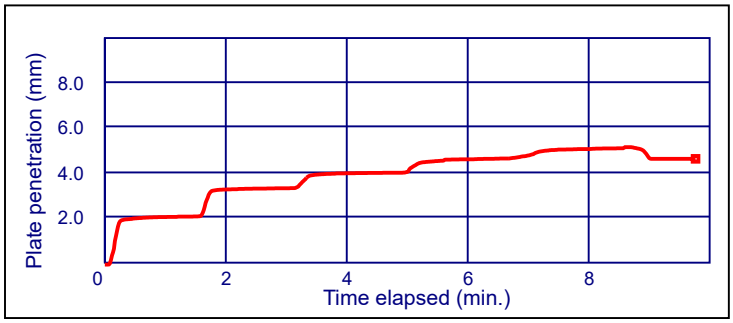


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
2.15	59.9
3.40	119.6
4.09	180.3
4.72	242.9
5.16	300.5
4.71	0.6



	Cycle 1
Maximum Applied Pressure (kPa):	**303**
Maximum deformation (mm):	**5.16**
Modulus of subgrade reaction K (MN/m3):	**27.9**
K762 (MN/m3):	**28.8**
Estimated CBR (%):	**3.3**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP43
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Wet
Technician	BS	**Air Temperature °C**	
Date Tested	08.09.22	**Plate Dia (mm)**	762
Location	Airside: Between SAH & GP26		
GPS Coord's		**Depth (m)**	1.00
Material Type	MG: CLAY	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

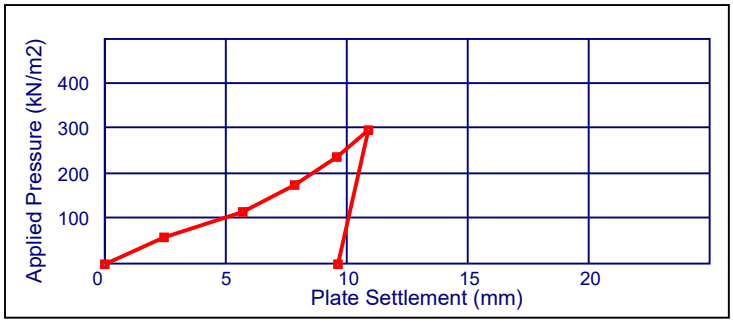
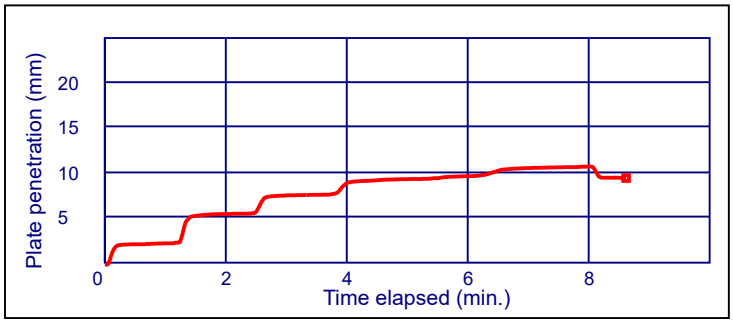


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
2.44	60.0
5.70	116.5
7.84	176.5
9.59	238.7
10.89	298.6
9.64	0.1



	Cycle 1
Maximum Applied Pressure (kPa):	**302**
Maximum deformation (mm):	**10.89**
Modulus of subgrade reaction K (MN/m3):	**24.5**
K762 (MN/m3):	**25.3**
Estimated CBR (%):	**2.6**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP44
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Dry
Technician	MRG	**Air Temperature °C**	22
Date Tested	31.08.22	**Plate Dia (mm)**	762
Location	Airside: Between SAH & GP22		
GPS Coord's		**Depth (m)**	1.00
Material Type	MG: CLAY	**Reaction Type**	21T
No Cycles	1	**App Weight (kg)**	135

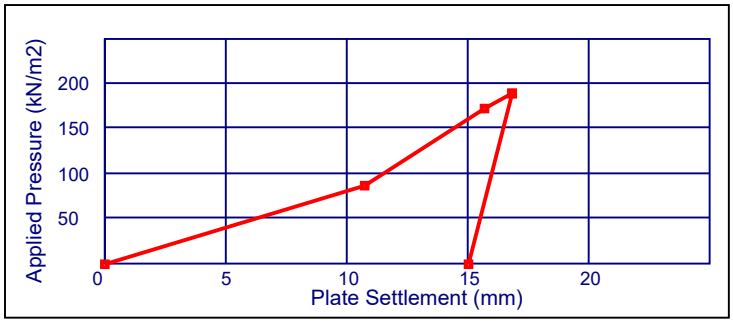
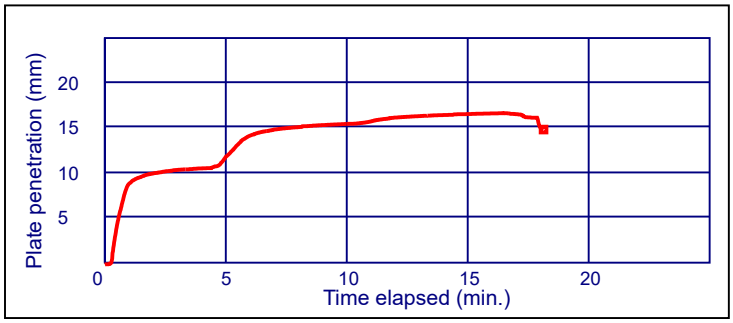


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
10.74	87.5
15.69	173.4
16.83	190.2
16.84	190.1
16.84	190.0
15.03	0.0



	Cycle 1
Maximum Applied Pressure (kPa):	**193**
Maximum deformation (mm):	**16.84**
Modulus of subgrade reaction K (MN/m3):	**8.1**
K762 (MN/m3):	**8.4**
Estimated CBR (%):	**0.4**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP45
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Dry
Technician	MRG	**Air Temperature °C**	17
Date Tested	14.09.22	**Plate Dia (mm)**	762
Location	Airside: Between SAH & GP22		
GPS Coord's		**Depth (m)**	1.00
Material Type	CLAY	**Reaction Type**	27 t
No Cycles	1	**App Weight (kg)**	135

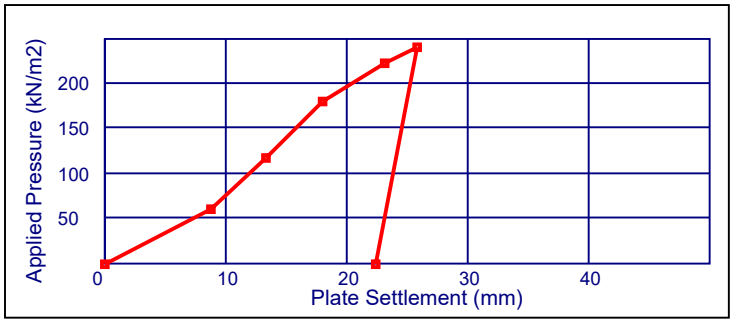
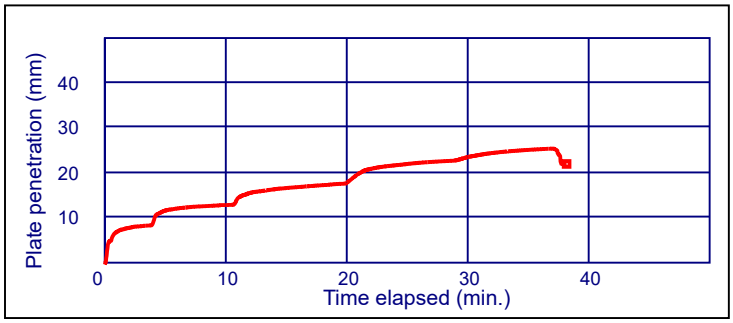


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
8.76	61.3
13.32	118.3
18.00	181.1
23.13	223.6
25.81	241.5
22.39	0.0



	Cycle 1
Maximum Applied Pressure (kPa):	**244**
Maximum deformation (mm):	**25.81**
Modulus of subgrade reaction K (MN/m3):	**7.0**
K762 (MN/m3):	**7.2**
Estimated CBR (%):	**0.3**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP53
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Wet
Technician	BS	**Air Temperature °C**	
Date Tested	09.09.22	**Plate Dia (mm)**	762
Location	Airside		
GPS Coord's		**Depth (m)**	1.00
Material Type	CLAY	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

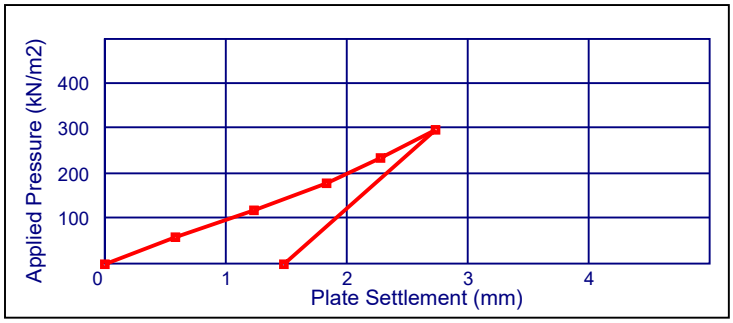
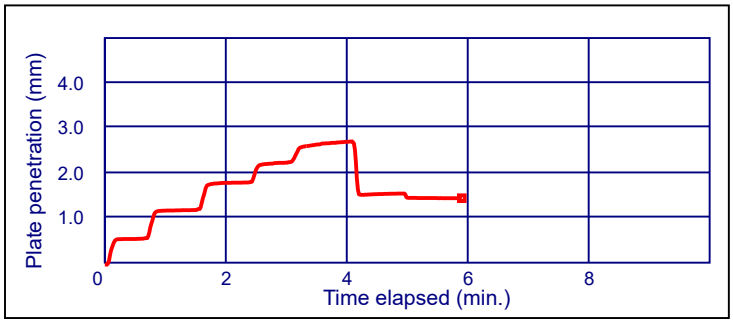


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
0.58	60.4
1.23	120.2
1.83	180.1
2.28	236.4
2.73	299.2
1.48	0.0



	Cycle 1
Maximum Applied Pressure (kPa):	**302**
Maximum deformation (mm):	**2.73**
Modulus of subgrade reaction K (MN/m3):	**97.6**
K762 (MN/m3):	**100.5**
Estimated CBR (%):	**28**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP57
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Dry
Technician	MRG	**Air Temperature °C**	18
Date Tested	01.09.22	**Plate Dia (mm)**	762
Location	Airside: Between SAH & GP22		
GPS Coord's		**Depth (m)**	1.20
Material Type	MG: CLAY	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

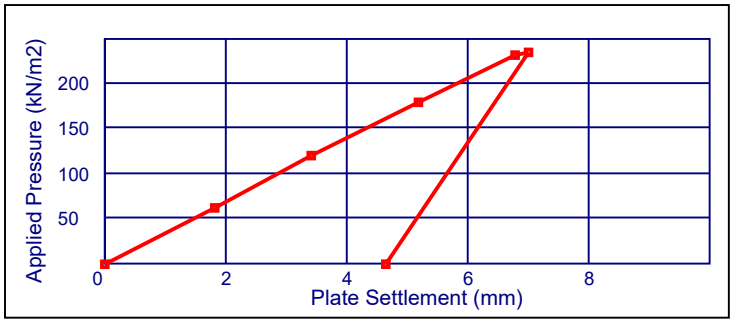
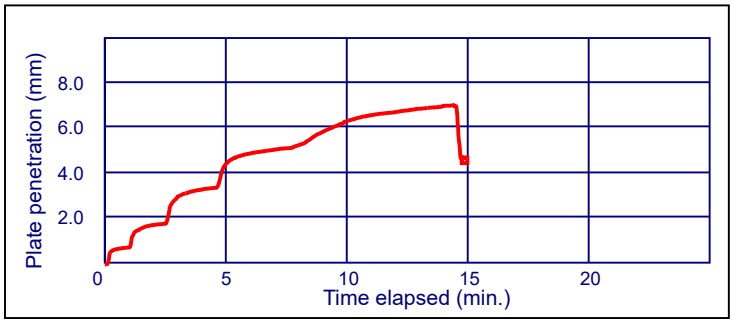


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
1.82	62.7
3.41	120.9
5.18	180.3
6.78	232.8
7.00	235.9
4.64	0.0



	Cycle 1
Maximum Applied Pressure (kPa):	**239**
Maximum deformation (mm):	**7.00**
Modulus of subgrade reaction K (MN/m3):	**34.6**
K762 (MN/m3):	**35.6**
Estimated CBR (%):	**4.7**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP58
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Dry
Technician	MRG	**Air Temperature °C**	18
Date Tested	01.09.22	**Plate Dia (mm)**	762
Location	Airside: Between SAH & GP22		
GPS Coord's		**Depth (m)**	1.00
Material Type	MG: CLAY	**Reaction Type**	21 ton
No Cycles	1	**App Weight (kg)**	135

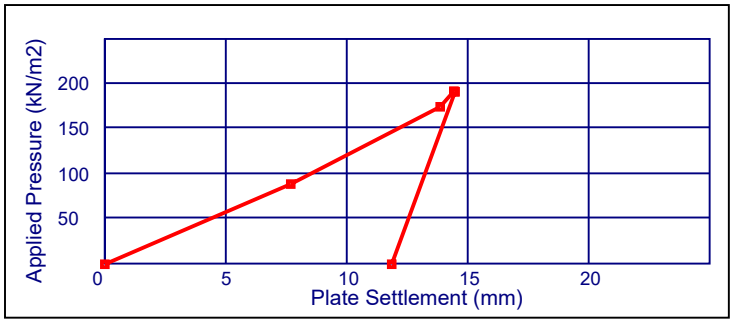
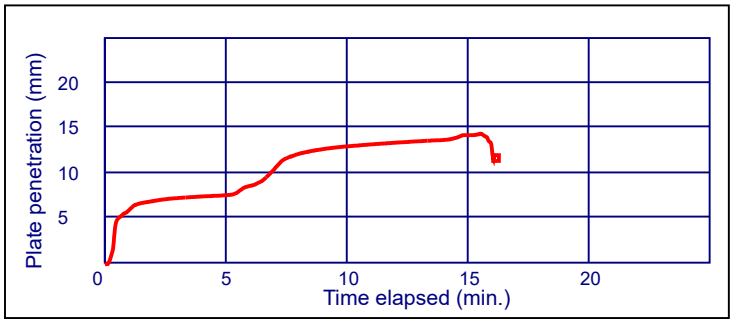


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
7.68	89.2
13.86	175.3
14.42	192.5
14.45	192.2
14.47	192.1
11.85	0.0



	Cycle 1
Maximum Applied Pressure (kPa):	**195**
Maximum deformation (mm):	**14.47**
Modulus of subgrade reaction K (MN/m3):	**11.6**
K762 (MN/m3):	**12.0**
Estimated CBR (%):	**0.7**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP58A
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Dry
Technician	MRG	**Air Temperature °C**	22
Date Tested	01.09.22	**Plate Dia (mm)**	762
Location	Airside: Between SAH & GP22		
GPS Coord's		**Depth (m)**	1.20
Material Type	MG: CLAY	**Reaction Type**	27 T
No Cycles	1	**App Weight (kg)**	135

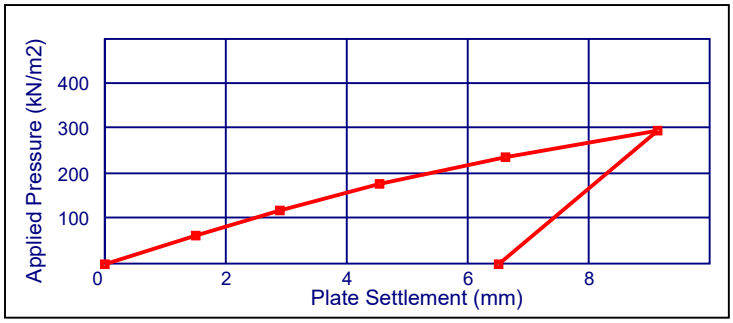
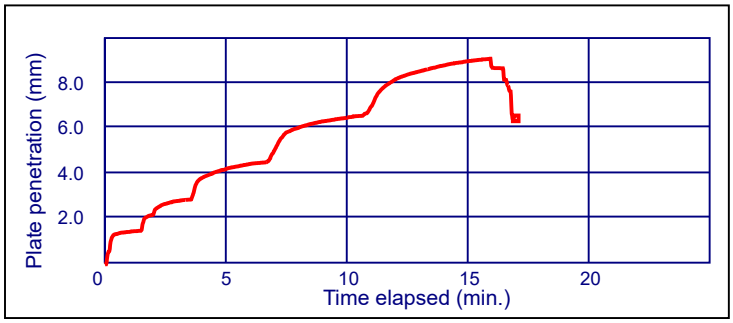


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
1.50	63.9
2.89	119.7
4.54	178.7
6.62	238.4
9.14	297.6
6.51	0.0



	Cycle 1
Maximum Applied Pressure (kPa):	**300**
Maximum deformation (mm):	**9.14**
Modulus of subgrade reaction K (MN/m3):	**42.6**
K762 (MN/m3):	**43.8**
Estimated CBR (%):	**6.8**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

TEST REPORT
PLATE LOADING TEST

Project	21-0403S South Apron	**Test No:**	TP59
Client	Kilwex	**Lab Ref No:**	21-0403S
		Date Reported	12.01.23
		Weather Conditions	Dry
Technician	MRG	**Air Temperature °C**	18
Date Tested	02.09.22	**Plate Dia (mm)**	762
Location	Airside: Between SAH & GP22		
GPS Coord's		**Depth (m)**	1.00
Material Type	MG: CLAY	**Reaction Type**	27T
No Cycles	1	**App Weight (kg)**	135

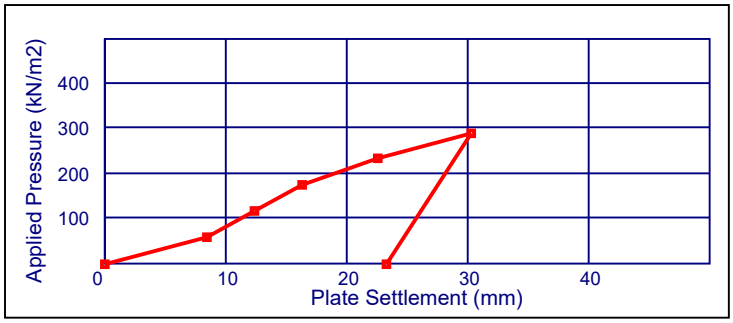
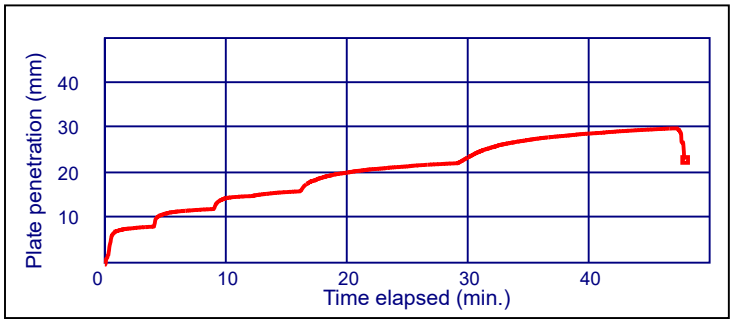


Plate Settlement (mm)	Applied Pressure (kN/m2)
0.00	0.0
8.43	60.4
12.36	118.8
16.30	176.8
22.55	235.8
30.28	291.4
23.28	0.0



	Cycle 1
Maximum Applied Pressure (kPa):	**294**
Maximum deformation (mm):	**30.28**
Modulus of subgrade reaction K (MN/m3):	**7.2**
K762 (MN/m3):	**7.4**
Estimated CBR (%):	**0.3**

Comments:

Approved Signature
Causeway Geotech
Darren O'Mahony
Director

Plate Load - Tested in accordance with BS 1377: Part 9 Cl 4.1: 1990

UKAS TESTING 10122

CAUSEWAY GEOTECH

APPENDIX G

INDIRECT IN-SITU CBR TEST RESULTS



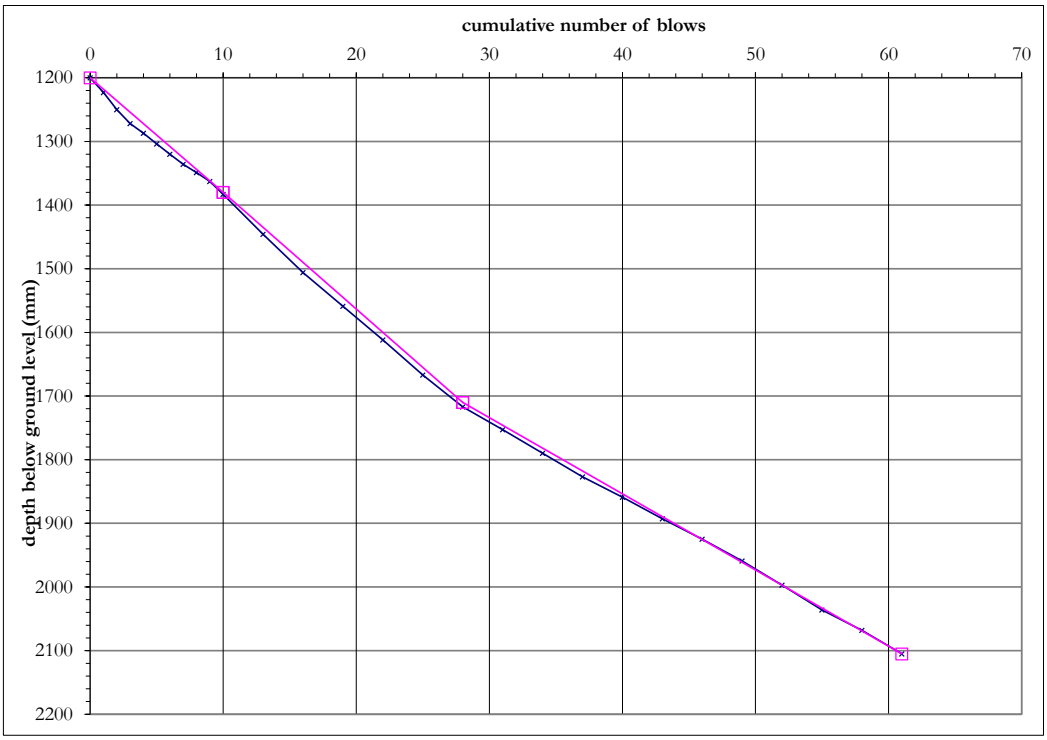
Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	21-0403S
Project Name	NASAH South Apron
Site Location	

Test Number	TP08/RC07	**Date Tested**	15/08/2022
Depth bgl (m)	1.20	**Weather**	Wet

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4.
CBR calculated using the TRL equation: log10(CBR) = 2.48 - 1.057 x log10(mm/blow) iaw IAN 73/06 Rev 1 2009.

Surface preparation	**Description of surface material at test depth**
Services Cleared	Grey brown CLAY



top / base of layer (mm)	mm/ blow	CBR (%)
1200	18	14
1380		
1380	18	14
1710		
1710	12	22
2105		

CBR Range	Min: 14 Max: 22	The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value.

Deviation(s) from standard procedure	None

Observations and comments	

Approved Name and Appointment		
Darren O'Mahony Director		November 2022

UKAS TESTING 10122

CAUSEWAY GEOTECH

APPENDIX H

GEOTECHNICAL LABORATORY TEST RESULTS



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SOIL AND ROCK SAMPLE ANALYSIS
LABORATORY TEST REPORT

24 October 2022

Project Name:	Dublin Airport Authority
Project No.:	21-0403S
Client:	Kilwex Ltd
Engineer:	AECOM

We are pleased to attach the results of laboratory testing carried out for the above project. This memo and its attachments constitute a report of the results of tests as detailed in the Contents page(s). This testing was performed between 30/09/2022 and 24/10/2022.

The attached results complete the testing requested and we would therefore wish to confirm that samples will be retained without charge for a period of 28 days from the above date after which they will be appropriately disposed of unless we receive written instructions to the contrary prior to that date.

We trust our report meets with your approval but if you have any queries or require additional information, please do not hesitate to contact the undersigned.

Stephen Watson

Laboratory Manager

Signed for and on behalf of Causeway Geotech Ltd

Project Name: NASAH South Apron GI Kilwex

Report Reference: Schedule 2

The table below details the tests carried out, the specifications used, and the number of tests included in this report. The results contained in this report relate to the sample(s) as received

Tests marked with* in this report are not United Kingdom Accreditation Service (UKAS) accredited and are not included in Causeway Geotech Limited's scope of UKAS Accreditation Schedule of Tests. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
SOIL	Moisture Content of Soil	BS 1377-2: 1990: Cl 3.2	12
SOIL	Liquid and Plastic Limits of soil-1 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	12
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	2
SOIL	California Bearing Ratio (CBR) / Moisture Content Relationship	BS 1377-4: 1990: Cl 7	2

Summary of Classification Test Results

Project No.	Project Name
21-0403S	NASAH South Apron GI Kilwex

Hole No.	Sample				Specimen Description	Density bulk / dry Mg/m3		*w* %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
	Ref	Top	Base	Type										
RC06	2	2.35	2.80	B	Grey sandy slightly gravelly silty CLAY.			30.0	48	26 -1pt	15	11		CL
RC08	5	2.00	2.50	B	Grey sandy slightly gravelly silty CLAY.			16.0	66	31 -1pt	18	13		CL
RC13	4	2.00	2.50	C	Dark brown slightly gravelly clayey fine to coarse SAND.			15.0	33	46 -1pt	21	25		CI
RC19	1	2.50	3.00	B	Grey sandy slightly gravelly silty CLAY.			7.2	63	27 -1pt	15	12		CL
RC22	1	1.50	2.00	B	Greyish brown sandy slightly gravelly silty CLAY.			13.0	62	29 -1pt	16	13		CL
RC27	3	2.50	3.00	B	Greyish brown sandy slightly gravelly silty CLAY.			11.0	61	27 -1pt	15	12		CL
RC30	1	2.00	2.50	B	Greyish brown sandy slightly gravelly silty CLAY.			15.0	63	30 -1pt	17	13		CL
TP07	5	2.00		B	Dark brown sandy gravelly silty CLAY.			11.0	68	30 -1pt	17	13		CL
TP21	7	1.50		B	Greyish brown sandy slightly gravelly clayey SILT.			36.0	89	48 -1pt	30	18		MI
TP41	5	1.90		B	Greyish brown sandy slightly gravelly silty CLAY.			17.0	67	37 -1pt	21	16		CI
TP47	2	1.00		B	Greyish brown sandy slightly gravelly silty CLAY.			17.0	84	44 -1pt	24	20		CI
TP50	3	1.00		B	Greyish brown sandy slightly gravelly silty CLAY.			18.0	81	42 -1pt	22	20		CI

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

Date Printed

24/10/2022

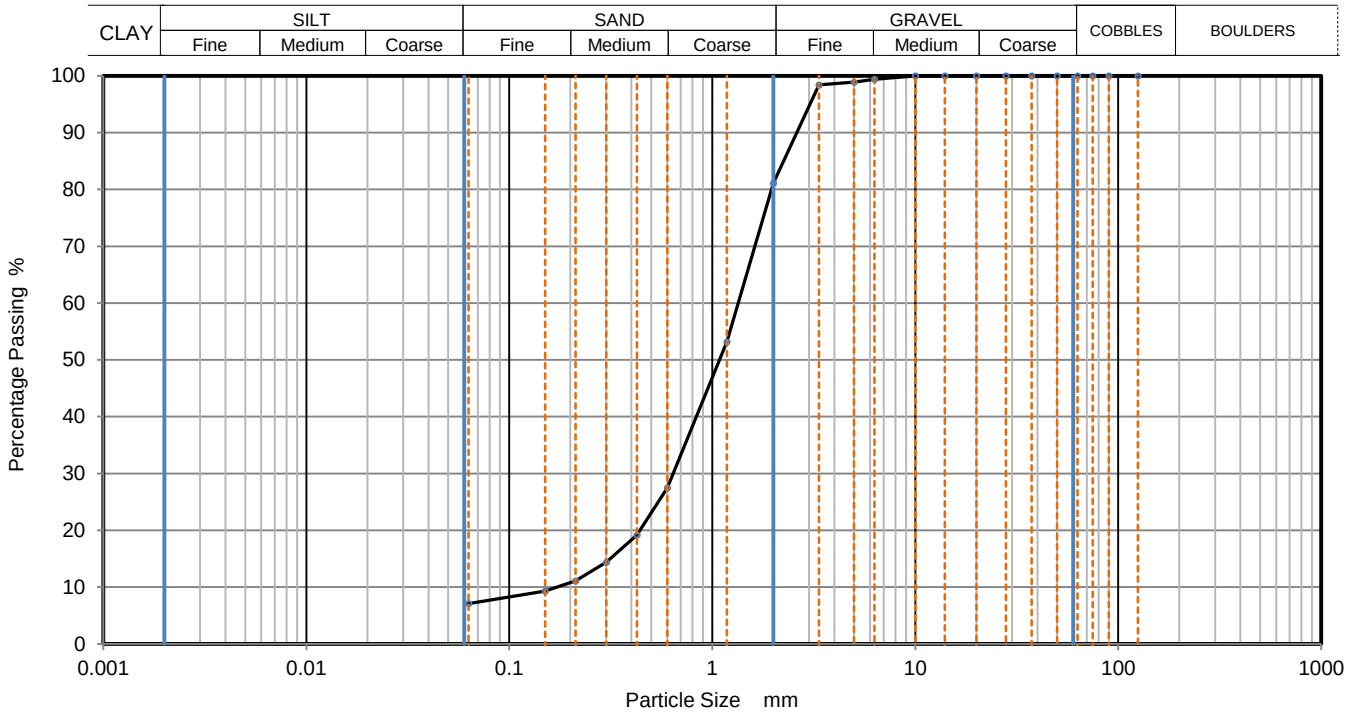
Approved By

Stephen Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-0403S**
				Borehole/Pit No.	RC19
Site Name	NASAH South Apron GI Kilwex			Sample No.	3
Specimen Description	Greyish brown slightly gravelly slightly silty fine to coarse SAND.			Sample Depth (m) Top	7.50
				Base	8.10
Specimen Reference	2	Specimen Depth	7.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022093044



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	98		
2	81		
1.18	53		
0.6	28		
0.425	19		
0.3	14		
0.212	11		
0.15	9		
0.063	7		

Dry Mass of sample, g: 533

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	18.9
Sand	74.0
Fines <0.063mm	7.0

Grading Analysis		
D100	mm	
D60	mm	1.34
D30	mm	0.641
D10	mm	0.171
Uniformity Coefficient		7.8
Curvature Coefficient		1.8

Remarks

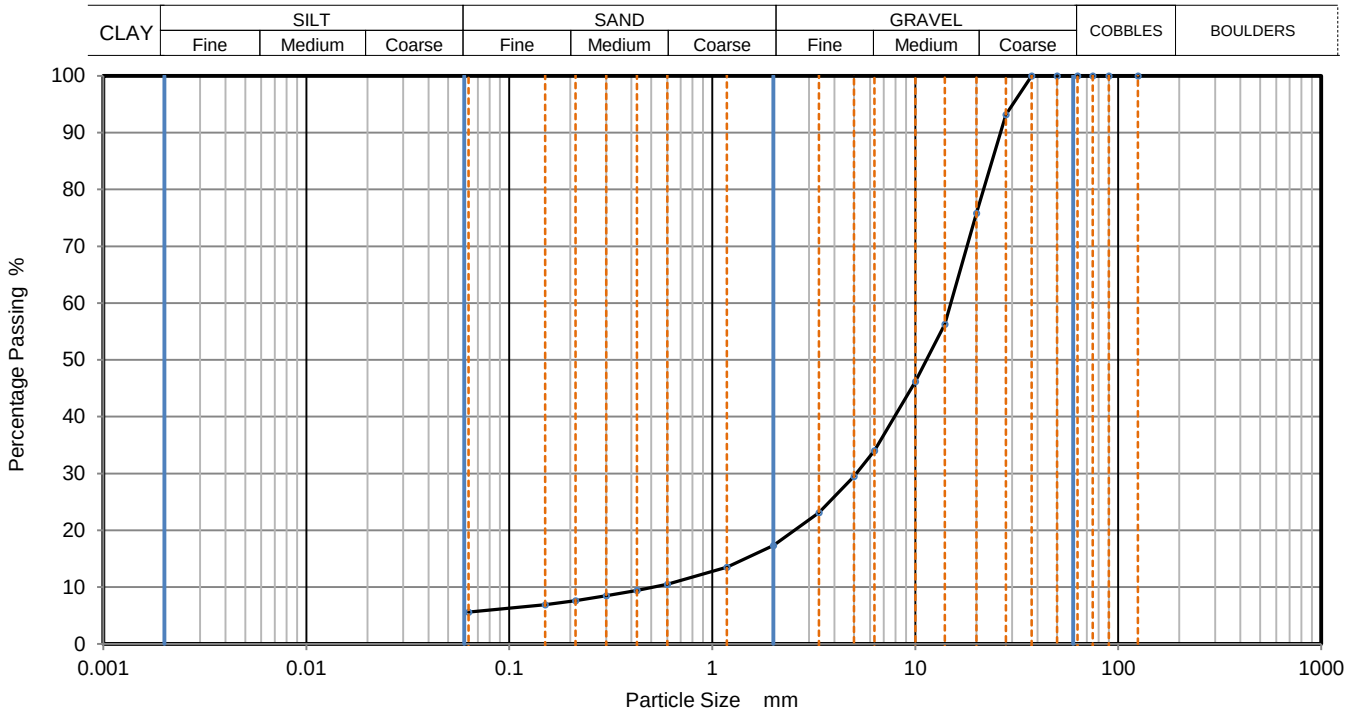
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

LAB 05R - Version 6

UKAS TESTING 10122

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-0403S**
				Borehole/Pit No.	TP06
Site Name	NASAH South Apron GI Kilwex			Sample No.	1
Specimen Description	Greyish brown sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	0.30
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	0.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022093048



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	93		
20	76		
14	56		
10	46		
6.3	34		
5	30		
3.35	23		
2	17		
1.18	14		
0.6	11		
0.425	9		
0.3	9		
0.212	8		
0.15	7		
0.063	6		

Dry Mass of sample, g: 4382

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	82.7
Sand	11.6
Fines <0.063mm	6.0

Grading Analysis		
D100	mm	
D60	mm	15
D30	mm	5.12
D10	mm	0.517
Uniformity Coefficient		29
Curvature Coefficient		3.4

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

LAB 05R - Version 6

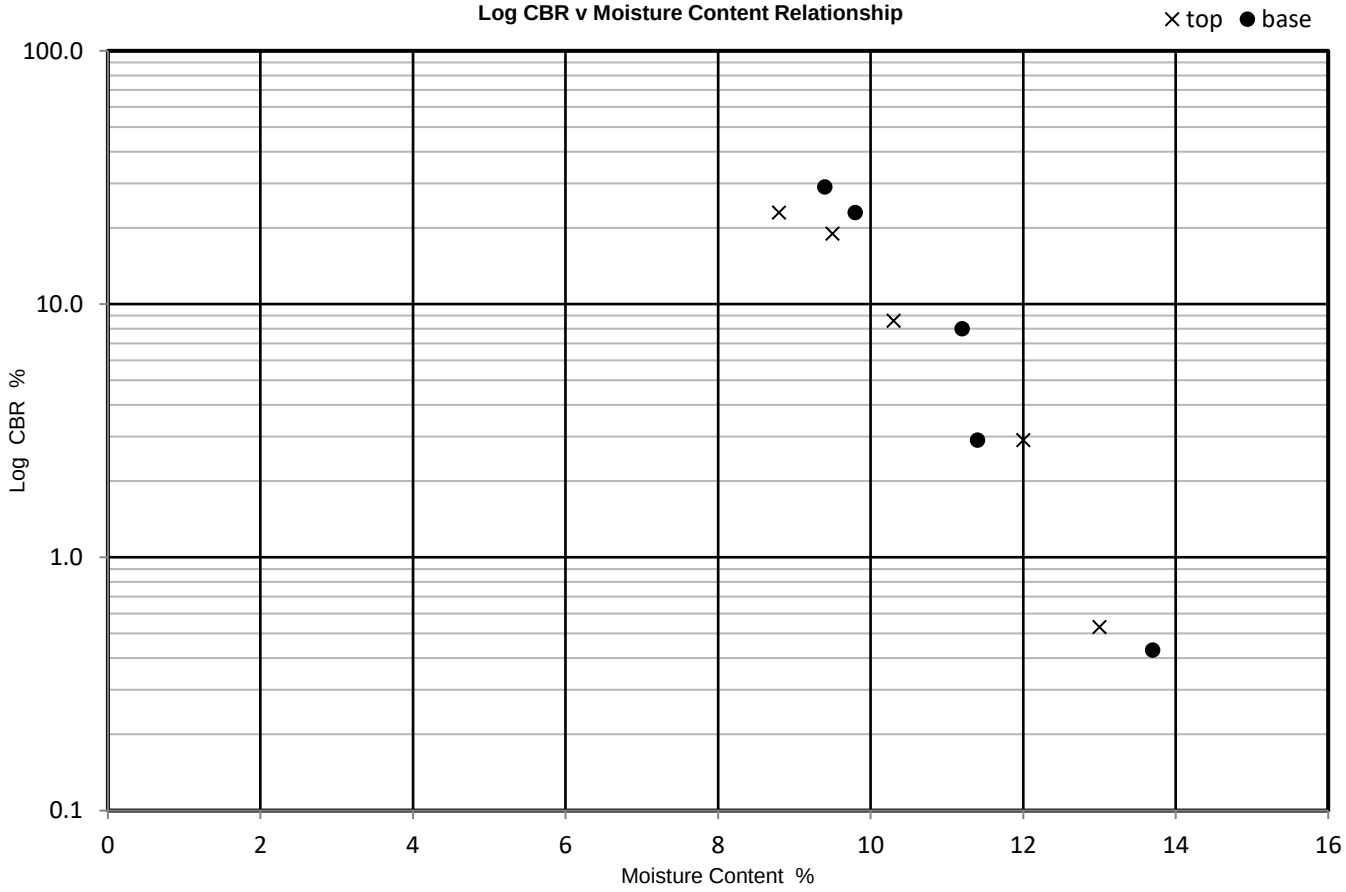
UKAS TESTING 10122

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)** **CBR v Moisture Content Relationship**	Job Ref	21-0403S
		Borehole/Pit No.	TP07
Site Name	NASAH South Apron GI Kilwex	Sample No.	5
Soil Description	Dark brown sandy gravelly silty CLAY.	Depth m	2
Test Method	BS1377 : Part 4 : 1990, clause 7	Sample Type	B
Preparation details	Recompacted with specified standard effort using 2.5kg rammer	KeyLAB ID	Caus202208274

Specimens listed in ascending order of initial moisture content

Spec Ref	Bulk density	Dry density	Moisture Content			CBR Value		Swell if soaked	Surcharge	Remarks
			Initial	Top	Base	Top	Base			
	Mg/m3	Mg/m3	%	%	%	%	%	mm	kPa	
1	2.02	1.85	9.0	8.8	9.4	23.0	29.0		3	
2	2.13	1.94	9.6	9.5	9.8	19.0	23.0		3	
3	2.21	2.00	10.7	10.3	11.2	8.6	8.0		3	
4	2.22	1.99	11.8	12.0	11.4	2.9	2.9		3	
5	2.18	1.93	13.2	13.0	13.7	0.5	0.4		3	

Log CBR v Moisture Content Relationship



General Remarks

Approved
Stephen Watson

1

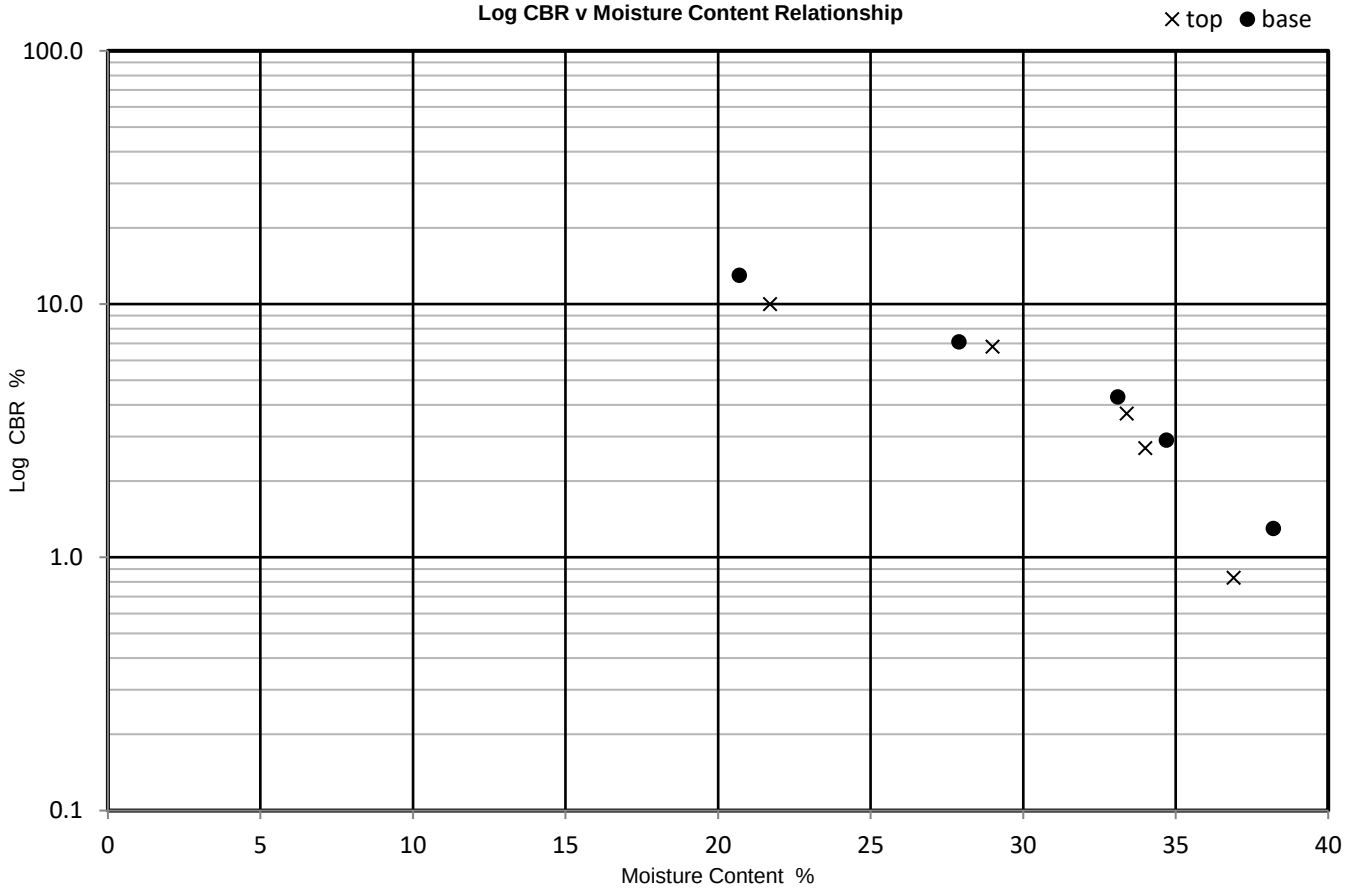
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CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)** **CBR v Moisture Content Relationship**	Job Ref	21-0403S
		Borehole/Pit No.	TP21
Site Name	NASAH South Apron GI Kilwex	Sample No.	7
Soil Description	Greyish brown sandy slightly gravelly clayey SILT.	Depth m	1.5
Test Method	BS1377 : Part 4 : 1990, clause 7	Sample Type	B
Preparation details	Recompacted with specified standard effort using 2.5kg rammer	KeyLAB ID	Caus2022093049

Specimens listed in ascending order of initial moisture content

Spec Ref	Bulk density	Dry density	Moisture Content			CBR Value		Swell if soaked	Surcharge	Remarks
			Initial	Top	Base	Top	Base			
	Mg/m3	Mg/m3	%	%	%	%	%	mm	kPa	
1	1.67	1.38	21.3	21.7	20.7	10.0	13.0		3	
2	1.75	1.36	28.6	29.0	27.9	6.8	7.1		3	
3	1.77	1.33	33.2	33.4	33.1	3.7	4.3		3	
4	1.75	1.30	34.4	34.0	34.7	2.7	2.9		3	
5	1.71	1.24	37.5	36.9	38.2	0.8	1.3		3	

Log CBR v Moisture Content Relationship



General Remarks

Approved
Stephen Watson

1

1

CAUSEWAY GEOTECH

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SOIL AND ROCK SAMPLE ANALYSIS
LABORATORY TEST REPORT

8 November 2022

Project Name:	NASAH South Apron GI Kilwex
Project No.:	21-0403S
Client:	Kilwex Ltd
Engineer:	AECOM

We are pleased to attach the results of laboratory testing carried out for the above project. This memo and its attachments constitute a report of the results of tests as detailed in the Contents page(s). This testing was performed between 13/10/2022 and 08/11/2022.

The attached results complete the testing requested and we would therefore wish to confirm that samples will be retained without charge for a period of 28 days from the above date after which they will be appropriately disposed of unless we receive written instructions to the contrary prior to that date.

We trust our report meets with your approval but if you have any queries or require additional information, please do not hesitate to contact the undersigned.

Stephen Watson

Laboratory Manager

Signed for and on behalf of Causeway Geotech Ltd

Project Name: NASAH South Apron GI Kilwex

Report Reference: Schedule 3

The table below details the tests carried out, the specifications used, and the number of tests included in this report. The results contained in this report relate to the sample(s) as received

Tests marked with* in this report are not United Kingdom Accreditation Service (UKAS) accredited and are not included in Causeway Geotech Limited's scope of UKAS Accreditation Schedule of Tests. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
SOIL	Moisture Content of Soil	BS 1377-2: 1990: Cl 3.2	10
SOIL	Liquid and Plastic Limits of soil-1 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	6
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	7
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	2
SOIL	California Bearing Ratio (CBR)	BS 1377-4: 1990: Cl 7	2
SOIL	California Bearing Ratio (CBR) / Moisture Content Relationship	BS 1377-4: 1990: Cl 7	2
SOIL	Undrained shear strength – triaxial compression without measurement of pore pressure (loads from 0.12 to 24 kN)	BS 1377-7: 1990: Cl 8	2

Summary of Classification Test Results

Project No.	Project Name
21-0403S	NASAH South Apron GI Kilwex

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
TP08	7	0.90		B	Greyish brown sandy slightly gravelly silty CLAY.			24	77	46 -1pt	15	31		CI
TP09	3	0.50		B	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.			7	32	27 -1pt	17	10		CL
TP15	4	1.20		B	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL..			7						
TP19	7	1.10		B	Greyish brown sandy slightly gravelly silty CLAY.			16	55	32 -1pt	21	11		CL
TP23	4	0.50		B	Greyish brown gravelly clayey fine to coarse SAND.			6						
TP24	4	1.50		B	Greyish brown sandy slightly clayey subangular fine to coarse GRAVEL.			5						
TP54	8	1.20		B	Greyish brown sandy slightly gravelly silty CLAY.			12	65	36 -1pt	21	15		CI
TP57	9	1.50		B	Greyish brown sandy slightly gravelly silty CLAY.			11	68	27 -1pt	15	12		CL
TP58	7	2.90		B	Greyish brown sandy slightly gravelly silty CLAY.			12						
TP59	7	2.00		B	Greyish brown sandy slightly gravelly silty CLAY.			13	69	30 -1pt	16	14		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

Date Printed

11/08/2022 00:00

Approved By

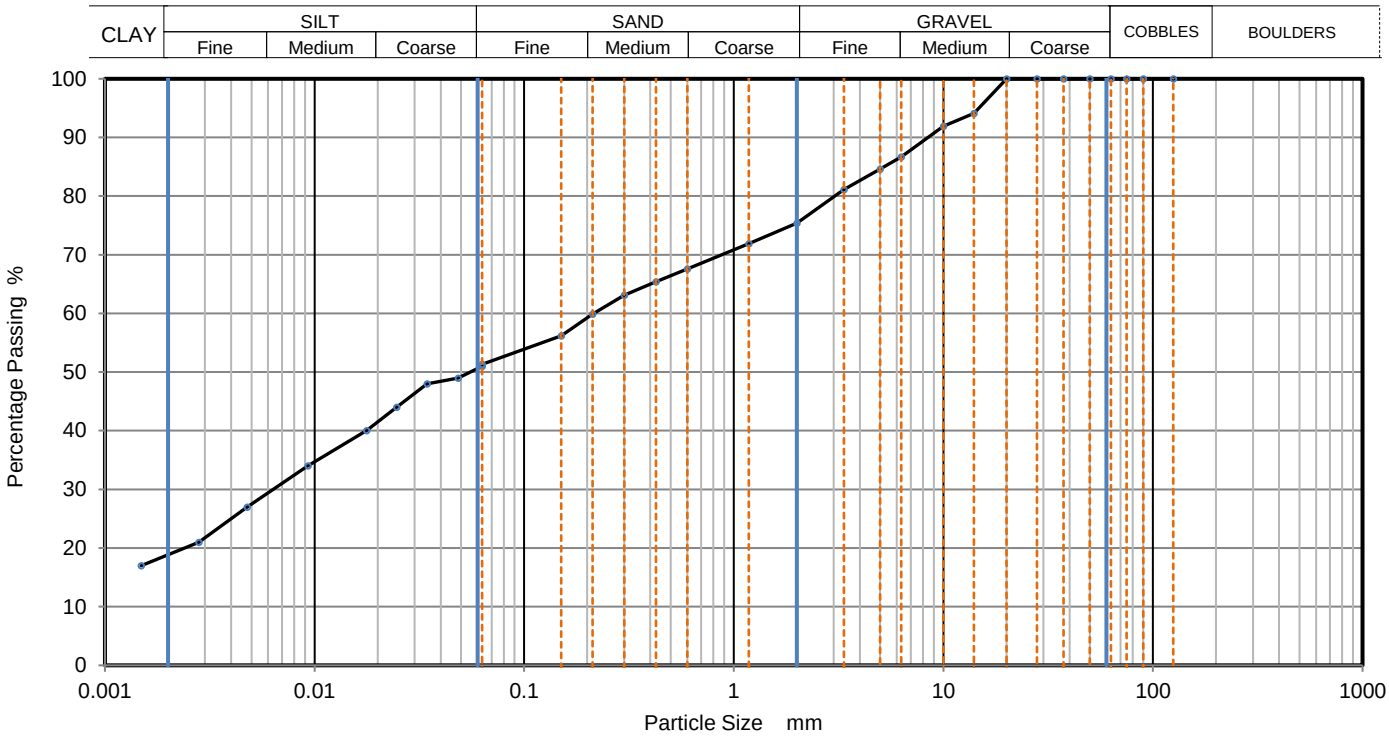
Stephen Watson

UKAS TESTING

10122

PARTICLE SIZE DISTRIBUTION

Job Ref					21-0403S
Borehole/Pit No.					RC10
Site Name	NASAH South Apron GI Kilwex			Sample No.	1
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Base	2.00
Specimen Reference	2	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022101311



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	51
90	100	0.04836	49
75	100	0.03443	48
63	100	0.02468	44
50	100	0.01768	40
37.5	100	0.00930	34
28	100	0.00477	27
20	100	0.00280	21
14	94	0.00149	17
10	92		
6.3	87		
5	85		
3.35	81		
2	75		
1.18	72		
0.6	68	Particle density	(assumed)
0.425	65	2.65	Mg/m3
0.3	63		
0.212	60		
0.15	56		
0.063	51		

Dry Mass of sample, g: 534

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.6
Sand	24.0
Silt	32.5
Clay	18.9

Grading Analysis		
D100	mm	
D60	mm	0.213
D30	mm	0.00643
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

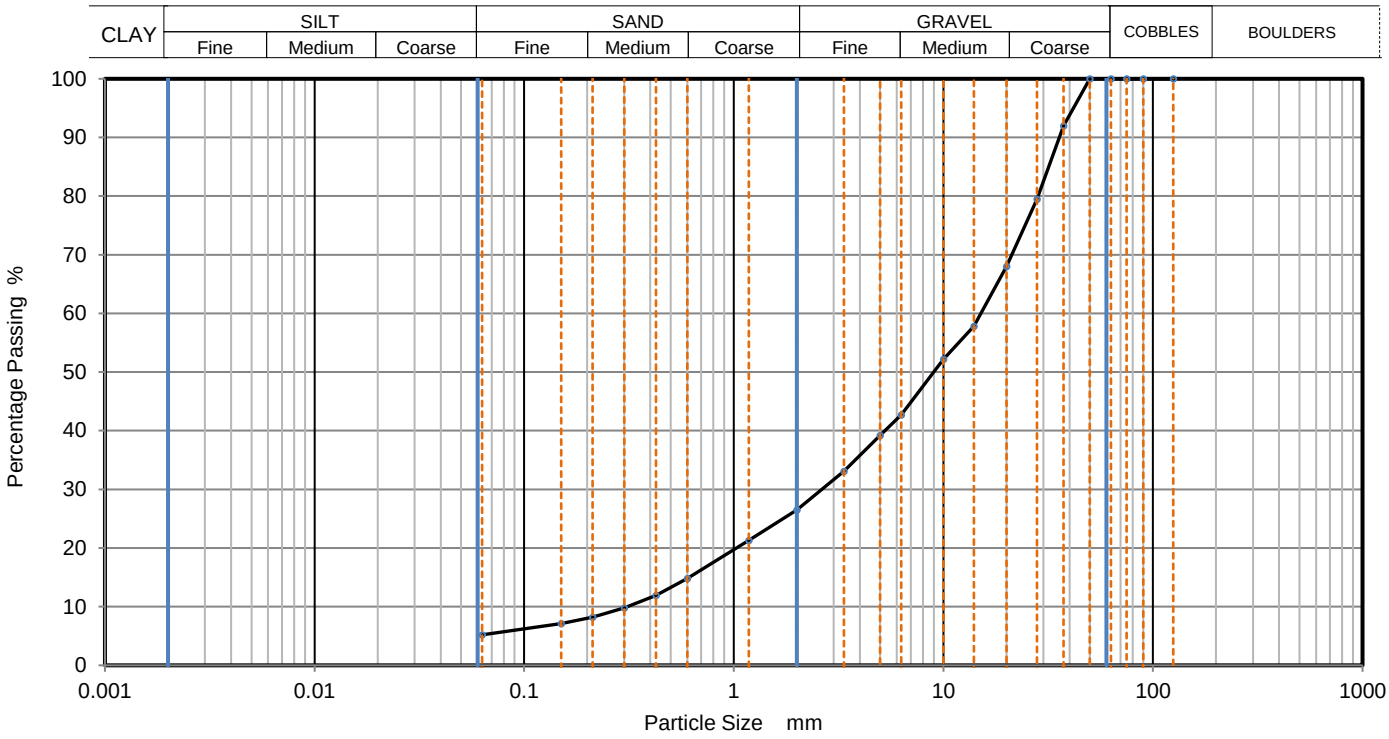
Approved
Stephen Watson

LAB 05R - Version 6

10122

PARTICLE SIZE DISTRIBUTION

Job Ref					21-0403S
Borehole/Pit No.					RC11
Site Name	NASAH South Apron GI Kilwex			Sample No.	4
Specimen Description	Greyish brown sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	2.40
				Base	2.90
Specimen Reference	2	Specimen Depth	2.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022101313



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	92		
28	80		
20	68		
14	58		
10	52		
6.3	43		
5	39		
3.35	33		
2	27		
1.18	21		
0.6	15		
0.425	12		
0.3	10		
0.212	8		
0.15	7		
0.063	5		

Dry Mass of sample, g: 6088

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	73.5
Sand	21.3
Fines <0.063mm	5.0

Grading Analysis		
D100	mm	
D60	mm	15.1
D30	mm	2.63
D10	mm	0.311
Uniformity Coefficient		49
Curvature Coefficient		1.5

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

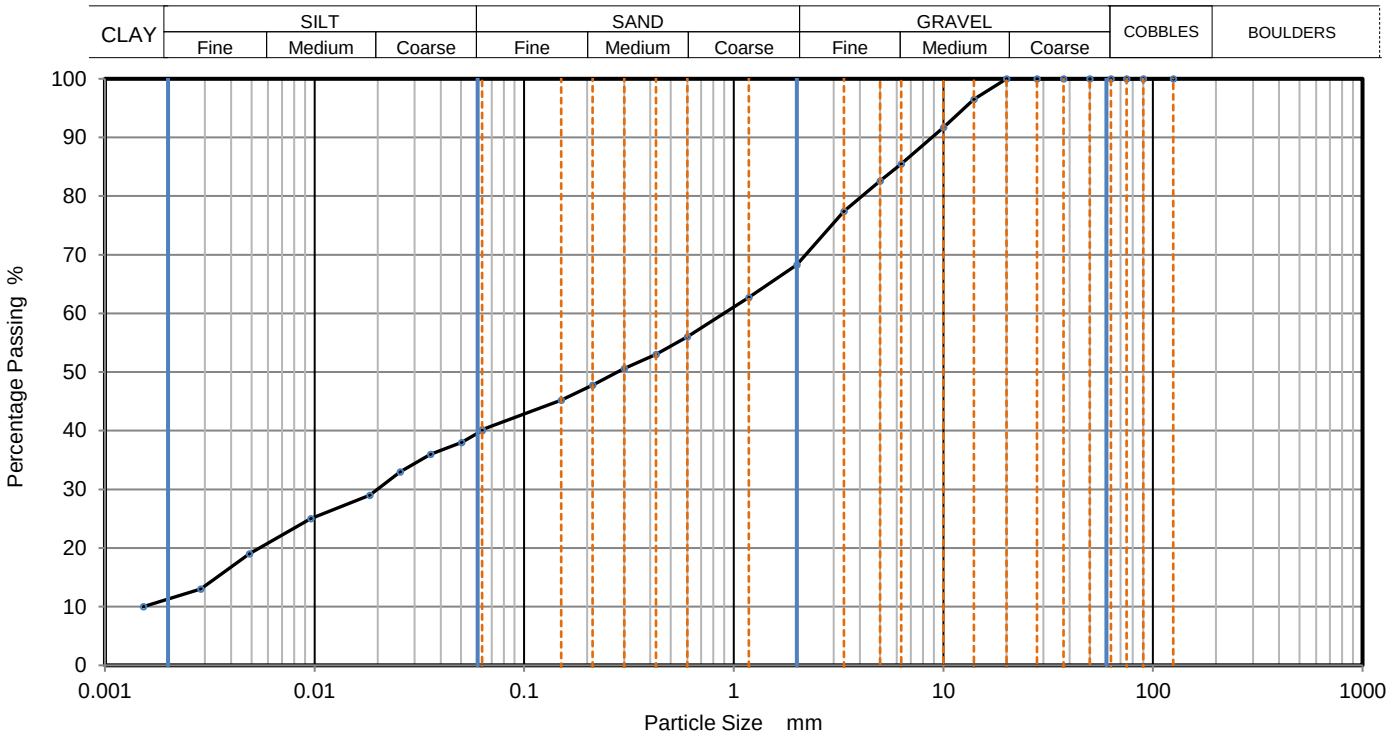
Approved
Stephen Watson

LAB 05R - Version 6

10122

PARTICLE SIZE DISTRIBUTION

Job Ref					21-0403S
Borehole/Pit No.					TP08
Site Name	NASAH South Apron GI Kilwex			Sample No.	9
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.90
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	1.9 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022101316



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.05032	38
75	100	0.03581	36
63	100	0.02564	33
50	100	0.01835	29
37.5	100	0.00959	25
28	100	0.00488	19
20	100	0.00286	13
14	97	0.00152	10
10	92		
6.3	86		
5	83		
3.35	77		
2	68		
1.18	63		
0.6	56	Particle density	(assumed)
0.425	53	2.65	Mg/m3
0.3	51		
0.212	48		
0.15	45		
0.063	40		

Dry Mass of sample, g: 552

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	31.7
Sand	28.1
Silt	29.0
Clay	11.2

Grading Analysis		
D100	mm	
D60	mm	0.902
D30	mm	0.0205
D10	mm	0.00163
Uniformity Coefficient		550
Curvature Coefficient		0.29

Remarks

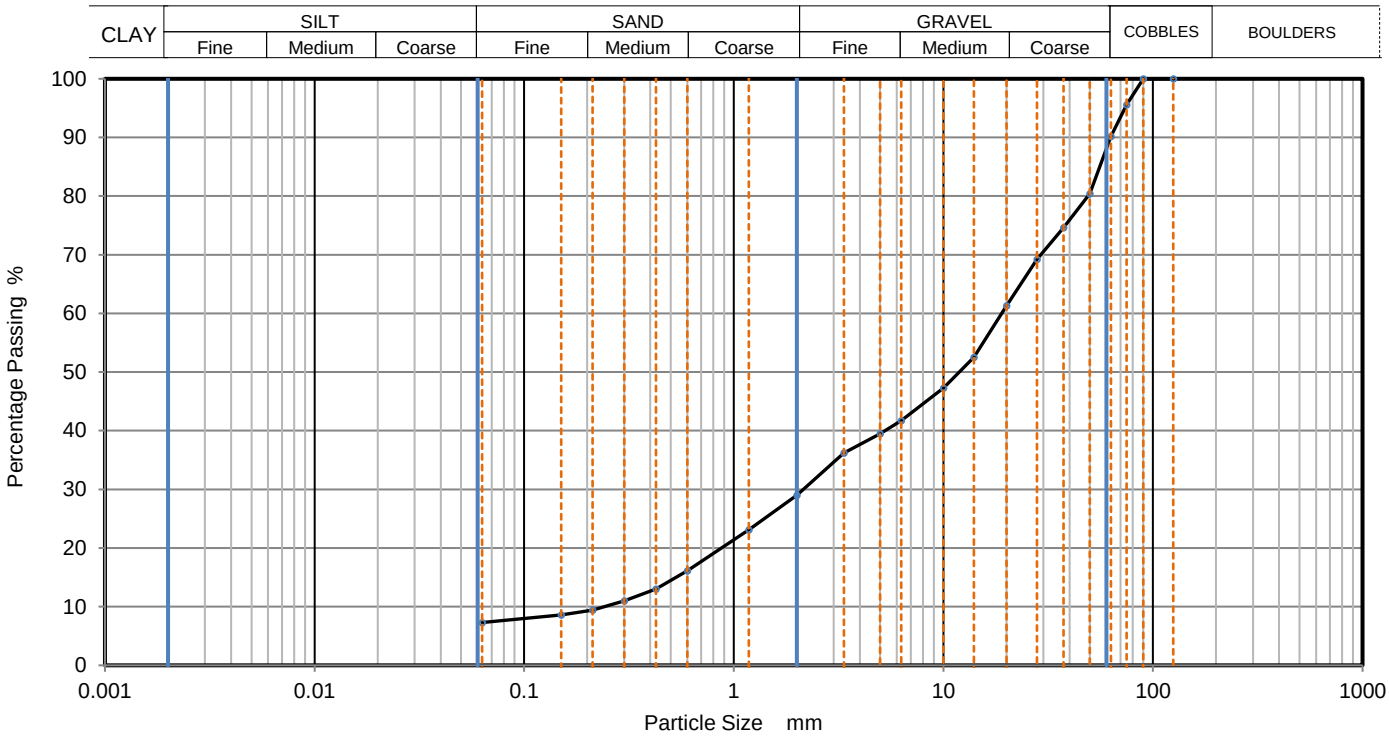
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

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UKAS TESTING 10122

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-0403S**
				Borehole/Pit No.	TP09
Site Name	NASAH South Apron GI Kilwex			Sample No.	3
Specimen Description	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	0.50
				Sample Depth (m) Base	
Specimen Reference	4	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022101317



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	96		
63	90		
50	80		
37.5	75		
28	69		
20	61		
14	53		
10	47		
6.3	42		
5	40		
3.35	36		
2	29		
1.18	23		
0.6	16		
0.425	13		
0.3	11		
0.212	9		
0.15	9		
0.063	7		

Dry Mass of sample, g: 14785

Sample Proportions	% dry mass
Cobbles	9.8
Gravel	61.2
Sand	21.8
Fines <0.063mm	7.0

Grading Analysis		
D100	mm	
D60	mm	19
D30	mm	2.14
D10	mm	0.241
Uniformity Coefficient		79
Curvature Coefficient		1

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

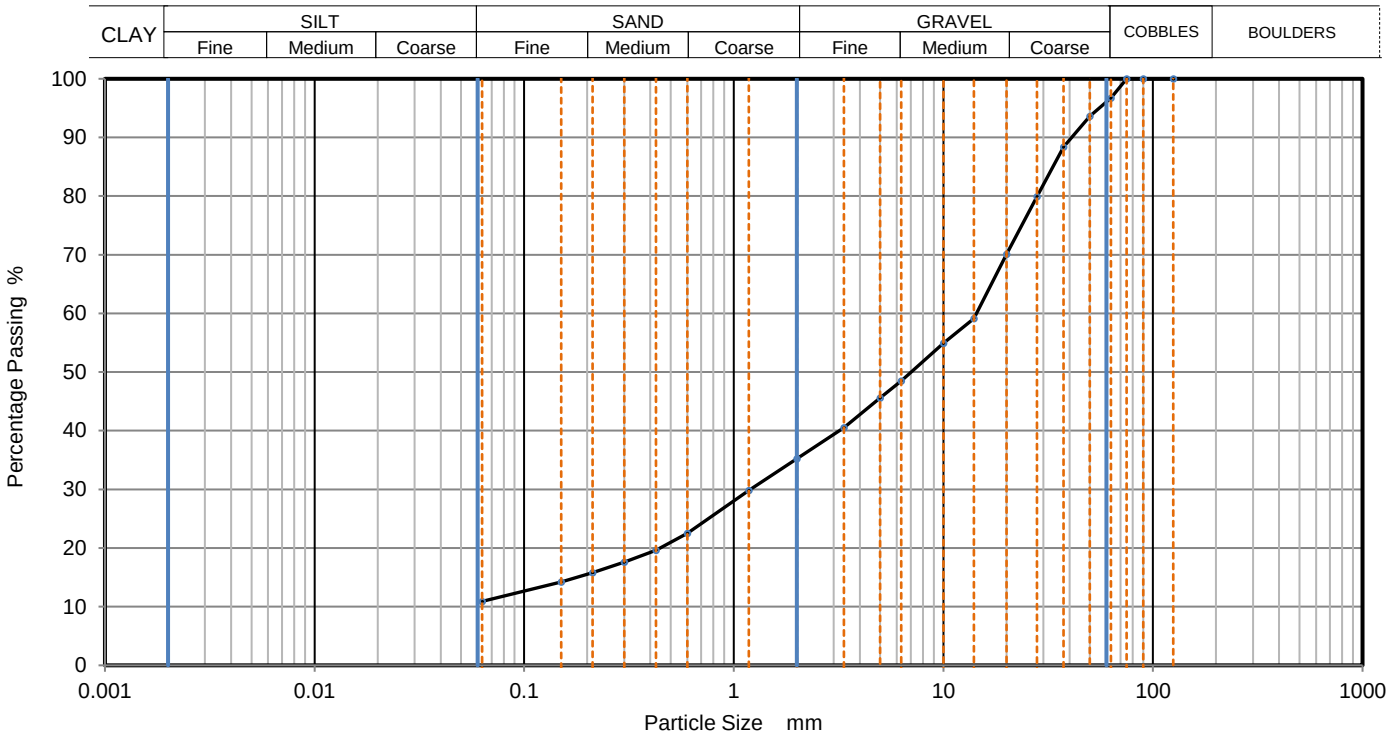
Approved
Stephen Watson

UKAS TESTING 10122

LAB 05R - Version 6

PARTICLE SIZE DISTRIBUTION

Job Ref					21-0403S
Borehole/Pit No.					TP15
Site Name	NASAH South Apron GI Kilwex			Sample No.	4
Specimen Description	Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL..			Sample Depth (m) Top	1.20
				Base	
Specimen Reference	5	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022101318



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	97		
50	94		
37.5	88		
28	80		
20	70		
14	59		
10	55		
6.3	49		
5	46		
3.35	41		
2	35		
1.18	30		
0.6	23		
0.425	20		
0.3	18		
0.212	16		
0.15	14		
0.063	11		

Dry Mass of sample, g	15646

Sample Proportions	% dry mass
Cobbles	3.3
Gravel	61.6
Sand	24.2
Fines <0.063mm	11.0

Grading Analysis		
D100	mm	
D60	mm	14.4
D30	mm	1.2
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

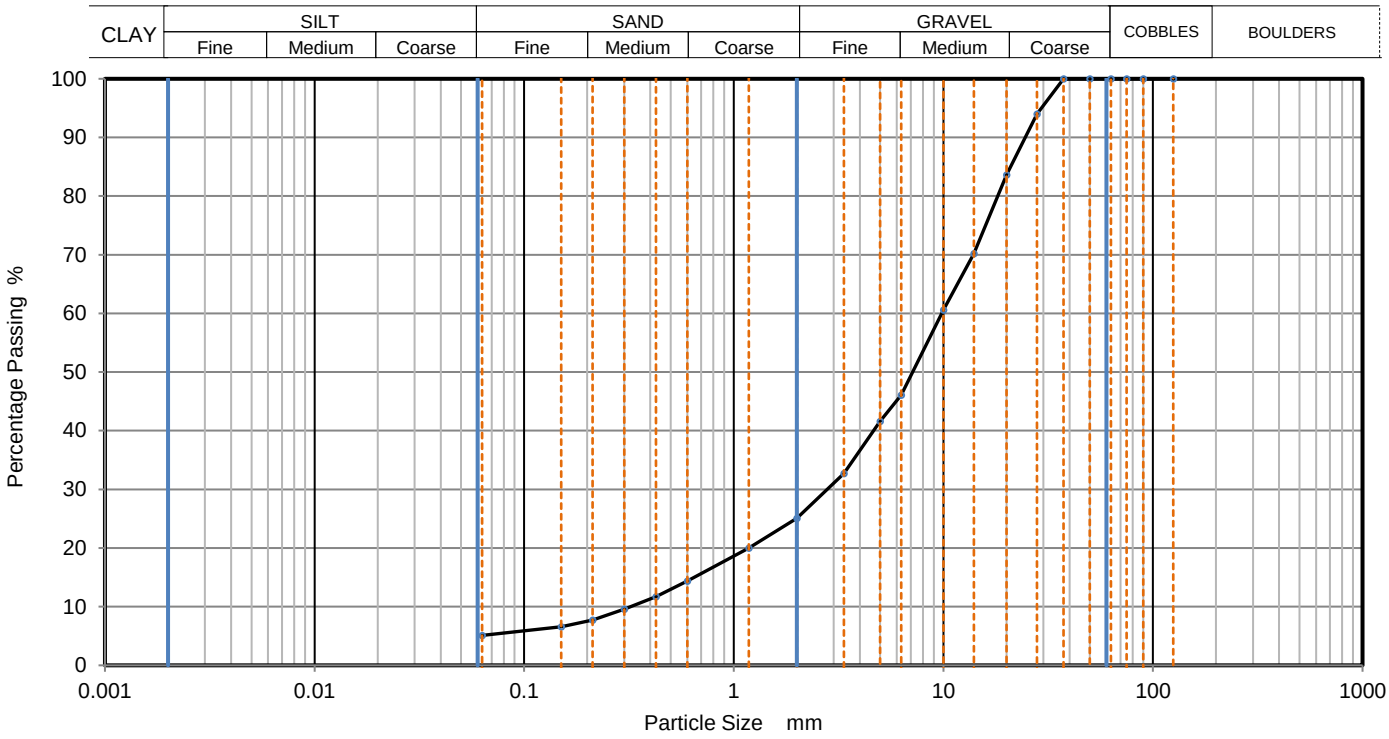
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

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10122

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		21-0403S
					Borehole/Pit No.		TP23
Site Name	NASAH South Apron GI Kilwex				Sample No.		4
Specimen Description	Greyish brown gravelly clayey fine to coarse SAND.				Sample Depth (m)	Top	0.50
						Base	
Specimen Reference	5	Specimen Depth	0.5	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2022101320



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	94		
20	84		
14	70		
10	61		
6.3	46		
5	42		
3.35	33		
2	25		
1.18	20		
0.6	14		
0.425	12		
0.3	10		
0.212	8		
0.15	7		
0.063	5		

Dry Mass of sample, g	3556

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	74.9
Sand	20.0
Fines <0.063mm	5.0

Grading Analysis		
D100	mm	
D60	mm	9.8
D30	mm	2.79
D10	mm	0.319
Uniformity Coefficient		31
Curvature Coefficient		2.5

Remarks

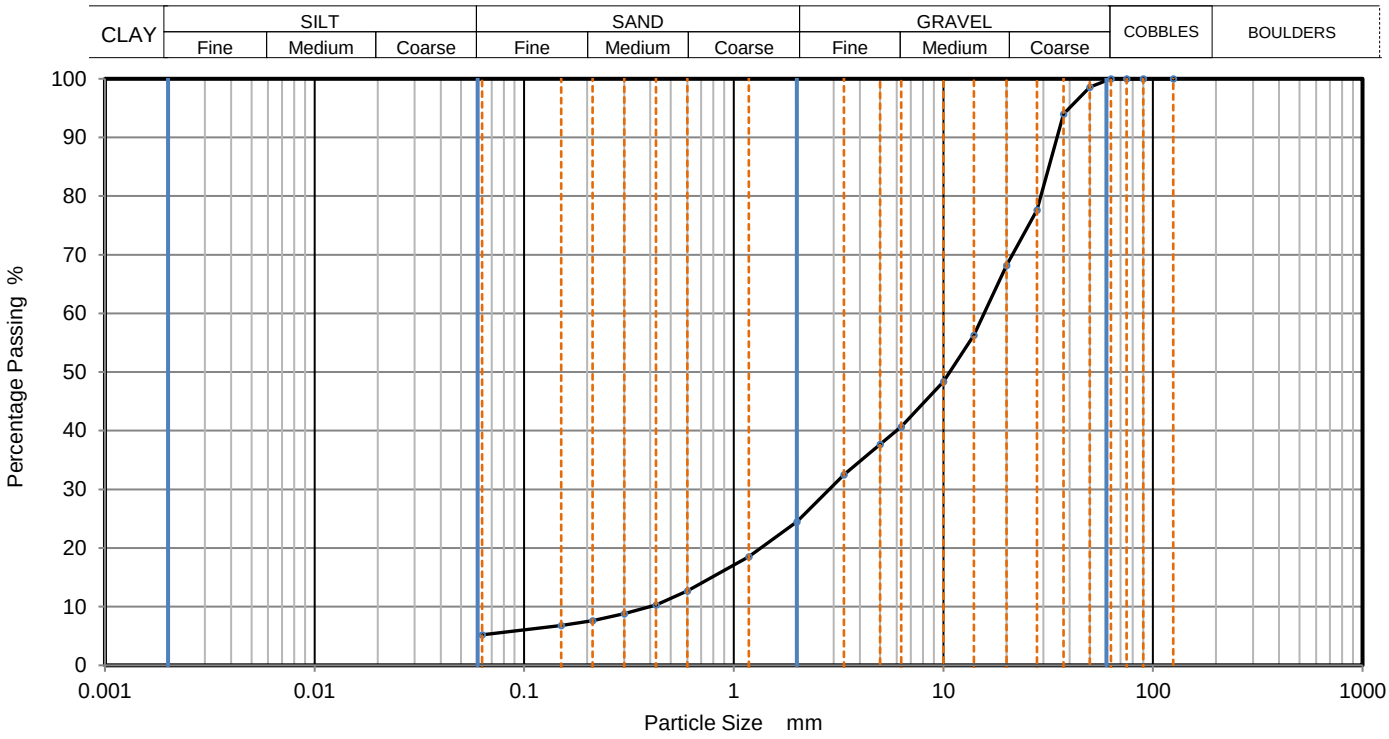
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-0403S**
				Borehole/Pit No.	TP24
Site Name	NASAH South Apron GI Kilwex			Sample No.	4
Specimen Description	Greyish brown sandy slightly clayey subangular fine to coarse GRAVEL.			Sample Depth (m) Top	1.50
				Sample Depth (m) Base	
Specimen Reference	5	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022101321



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	99		
37.5	94		
28	78		
20	68		
14	56		
10	48		
6.3	41		
5	38		
3.35	33		
2	25		
1.18	19		
0.6	13		
0.425	10		
0.3	9		
0.212	8		
0.15	7		
0.063	5		

Dry Mass of sample, g	16410

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	75.5
Sand	19.3
Fines <0.063mm	5.0

Grading Analysis		
D100	mm	
D60	mm	15.7
D30	mm	2.85
D10	mm	0.397
Uniformity Coefficient		39
Curvature Coefficient		1.3

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

LAB 05R - Version 6

UKAS TESTING

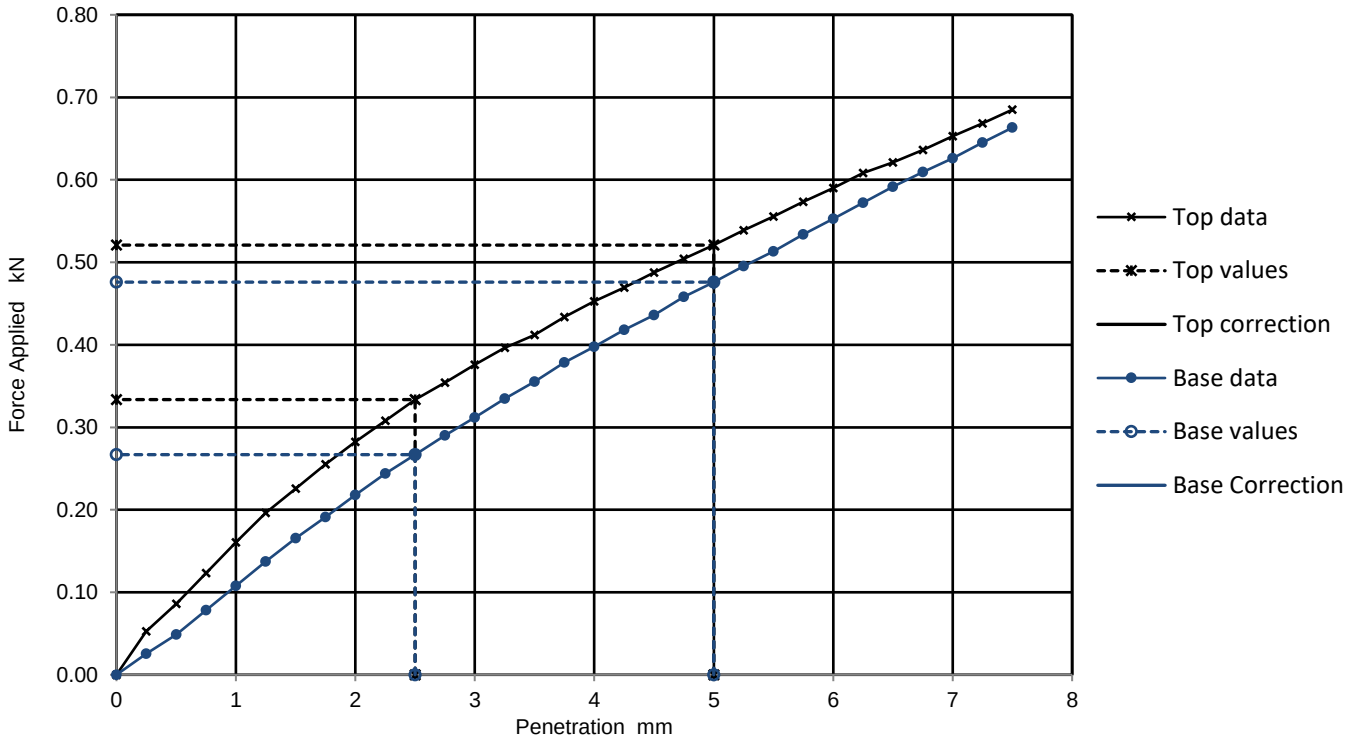
10122

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-0403S
				Borehole/Pit No.	TP54
Site Name	NASAH South Apron GI Kilwex			Sample No.	8
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Depth m	1.20
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022101325
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		5	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.05	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.74	Mg/m3		3	kPa
	Moisture content	18	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	2.5	2.6	2.6	2.5	18
BASE	No	2.0	2.4	2.4		19

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

UKAS TESTING

10122

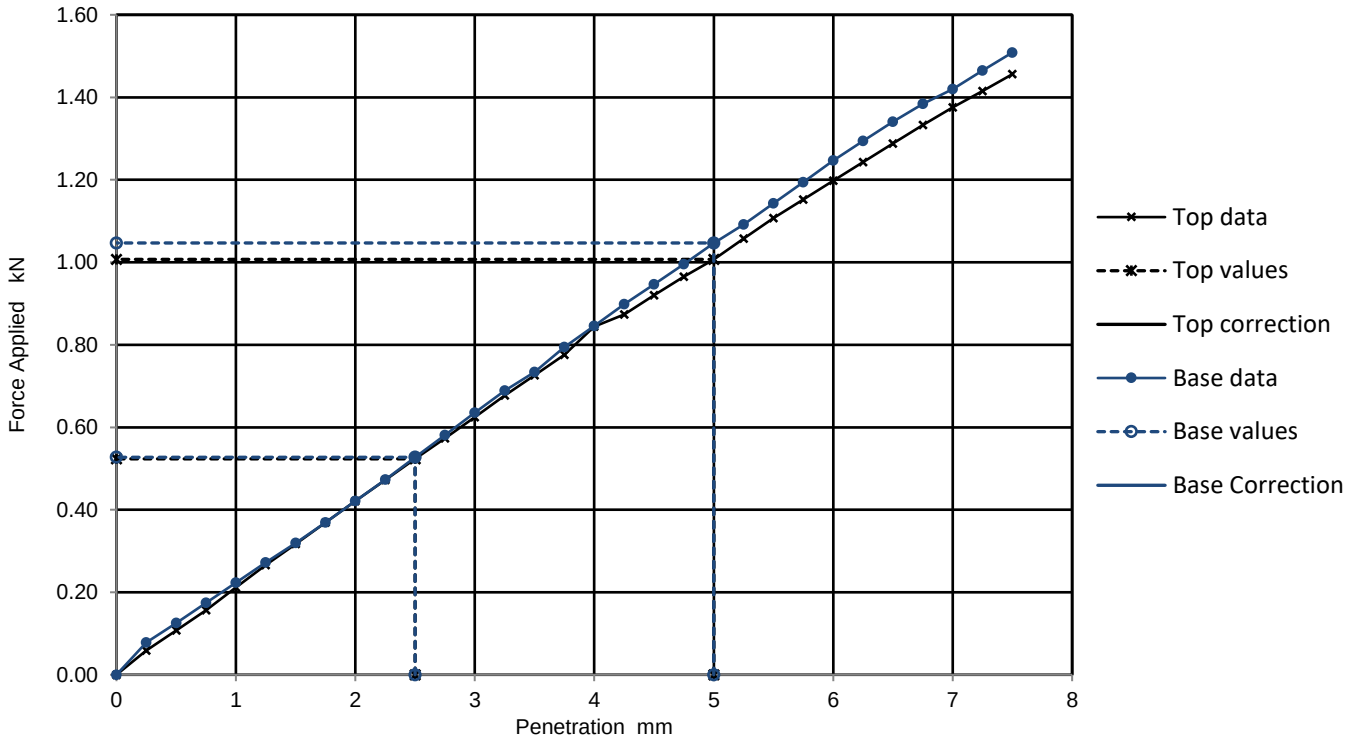
LAB 11R - Version 6

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	21-0403S
				Borehole/Pit No.	TP58
Site Name	NASAH South Apron GI Kilwex			Sample No.	7
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Depth m	2.90
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022101328
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		3	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.23	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.01	Mg/m3		3	kPa
	Moisture content	11	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	4.0	5.0	5.0	5.1	11
BASE	No	4.0	5.2	5.2		11

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

UKAS TESTING

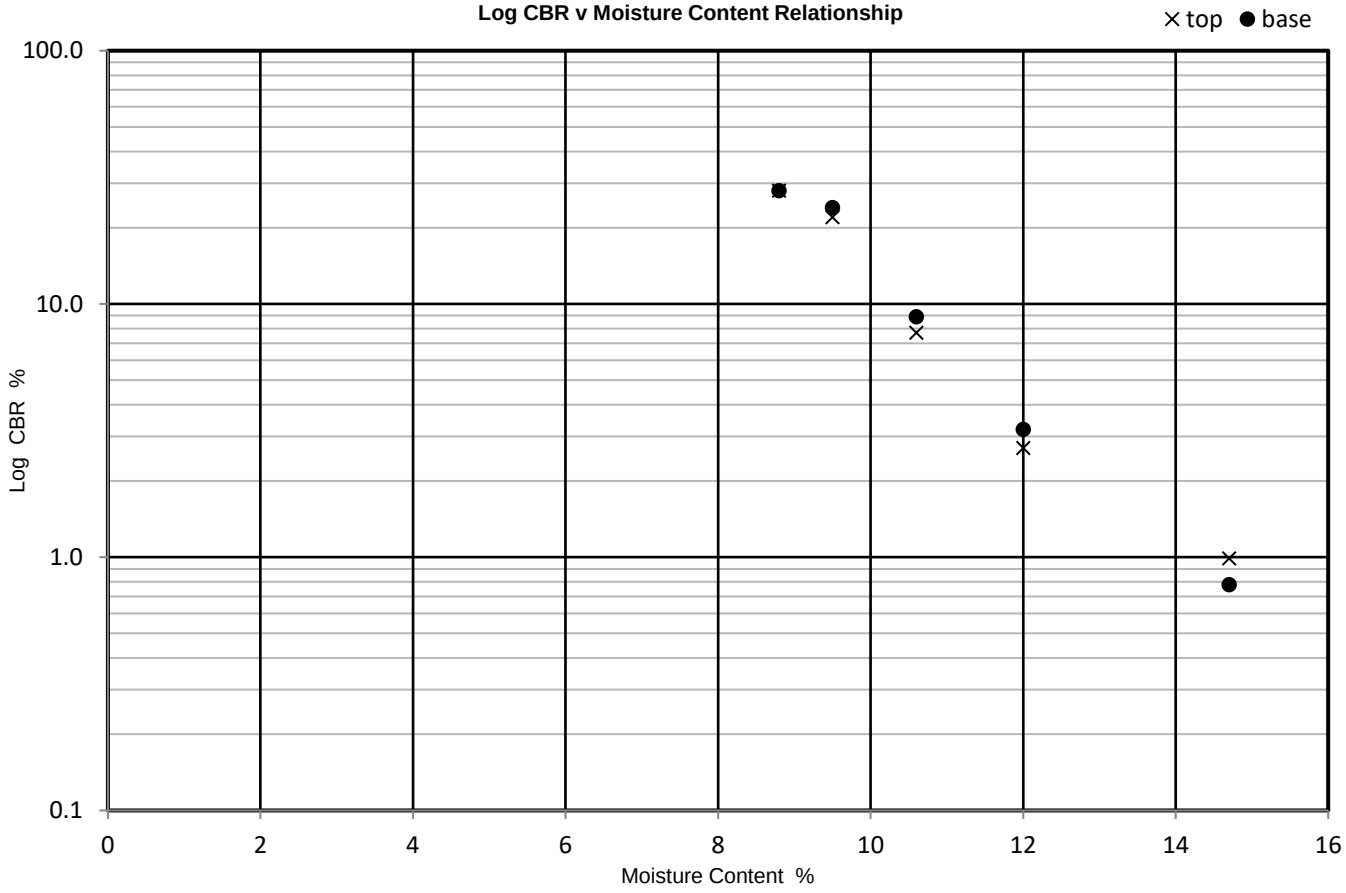
10122

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)** **CBR v Moisture Content Relationship**	Job Ref	21-0403S
		Borehole/Pit No.	TP57
Site Name	NASAH South Apron GI Kilwex	Sample No.	9
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.	Depth m	1.5
Test Method	BS1377 : Part 4 : 1990, clause 7	Sample Type	B
Preparation details	Recompacted with specified standard effort using 2.5kg rammer	KeyLAB ID	Caus2022101326

Specimens listed in ascending order of initial moisture content

Spec Ref	Bulk density	Dry density	Moisture Content			CBR Value		Swell if soaked	Surcharge	Remarks
			Initial	Top	Base	Top	Base			
	Mg/m^3	Mg/m^3	%	%	%	%	%	mm	kPa	
1	2.04	1.88	8.8	8.8	8.8	28.0	28.0		3	
2	2.16	1.97	9.5	9.5	9.5	22.0	24.0		3	
3	2.24	2.03	10.6	10.6	10.6	7.7	8.9		3	
4	2.28	2.04	12.0	12.0	12.0	2.7	3.2		3	
5	2.09	1.82	14.7	14.7	14.7	1.0	0.8		3	

Log CBR v Moisture Content Relationship



General Remarks

Approved
Stephen Watson

1

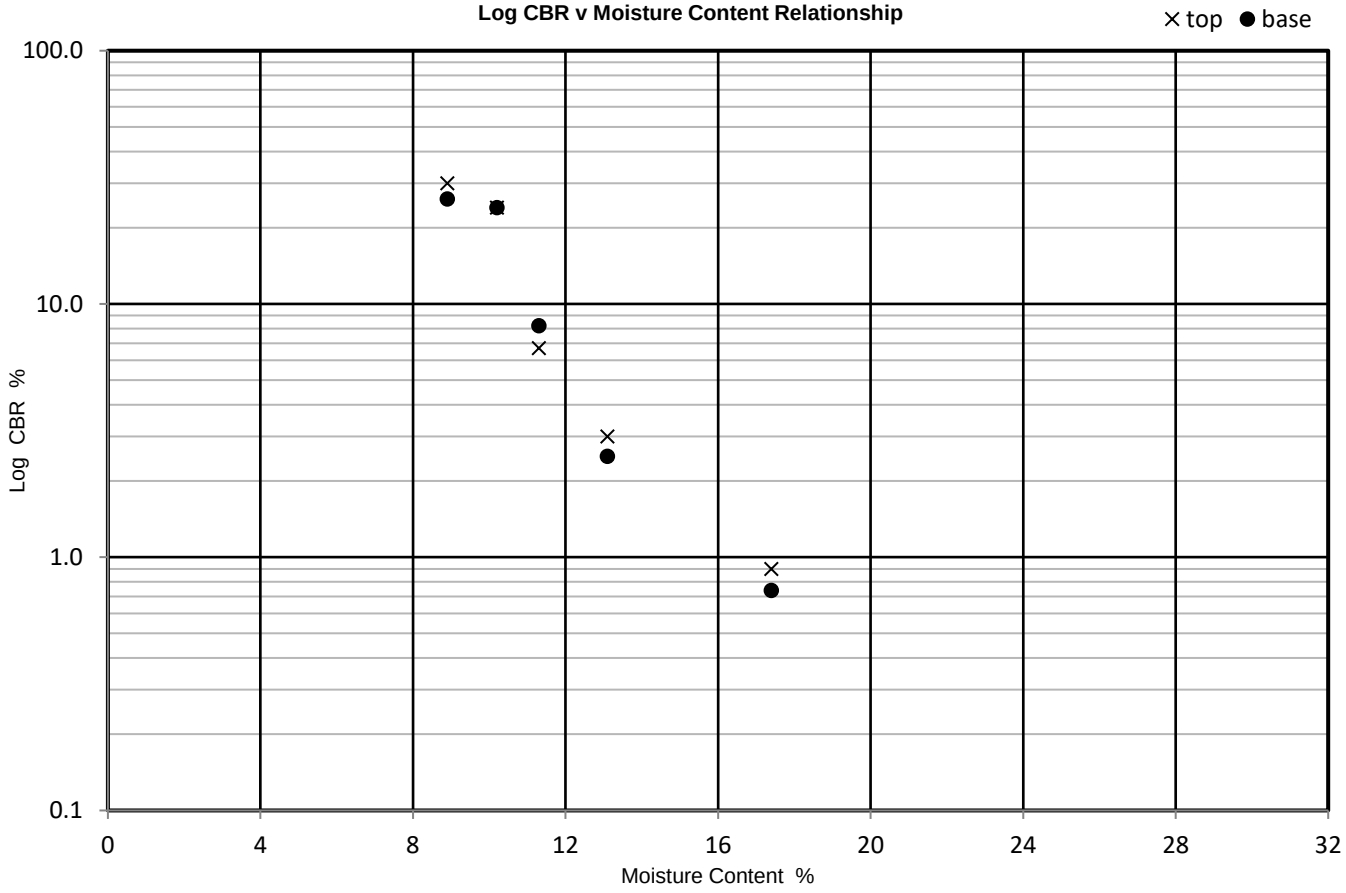
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CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)** **CBR v Moisture Content Relationship**	Job Ref	21-0403S
		Borehole/Pit No.	TP59
Site Name	NASAH South Apron GI Kilwex	Sample No.	7
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.	Depth m	2
Test Method	BS1377 : Part 4 : 1990, clause 7	Sample Type	B
Preparation details	Recompacted with specified standard effort using 2.5kg rammer	KeyLAB ID	Caus2022101329

Specimens listed in ascending order of initial moisture content

Spec Ref	Bulk density Mg/m^3	Dry density Mg/m^3	Moisture Content			CBR Value		Swell if soaked mm	Surcharge kPa	Remarks
			Initial %	Top %	Base %	Top %	Base %			
1	1.99	1.83	8.9	8.9	8.9	30.0	26.0		3	
2	2.15	1.95	10.2	10.2	10.2	24.0	24.0		3	
3	2.22	1.99	11.3	11.3	11.3	6.7	8.2		3	
4	2.14	1.89	13.1	13.1	13.1	3.0	2.5		3	
5	2.06	1.78	15.5	17.4	17.4	0.9	0.7		3	

Log CBR v Moisture Content Relationship



General Remarks

Approved
Stephen Watson

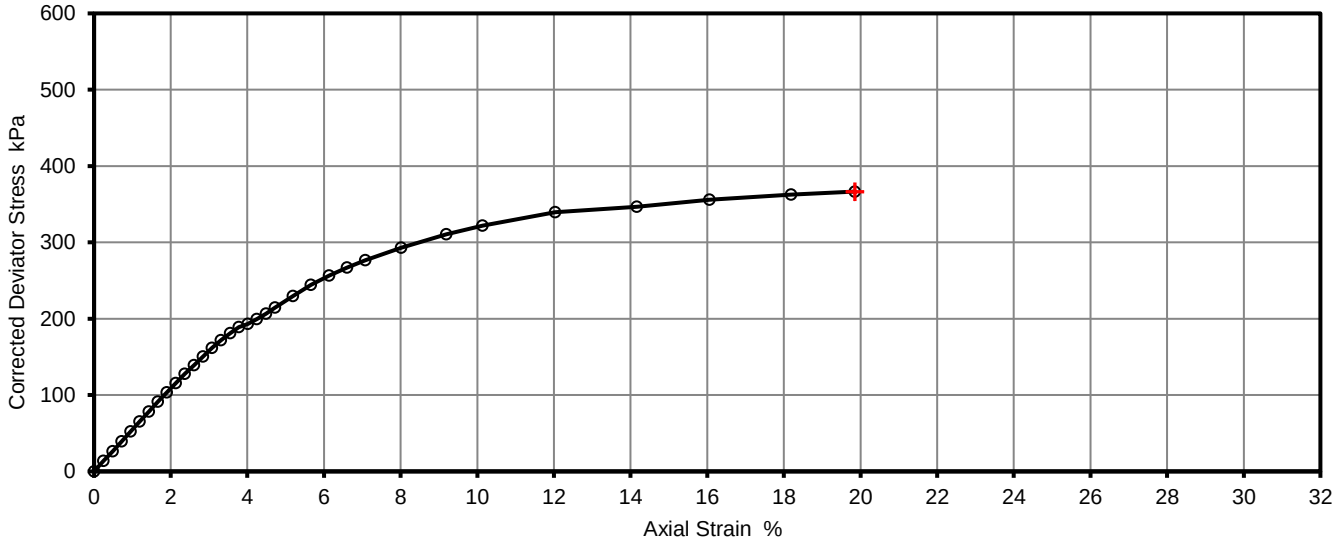
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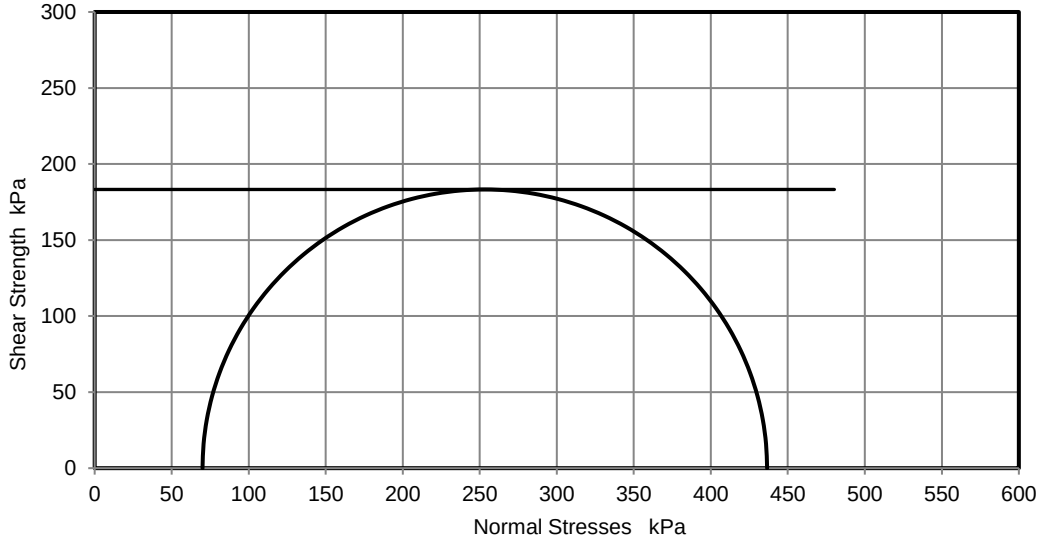
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-0403S
				Borehole/Pit No.	RC10
Site Name	NASAH South Apron GI Kilwex			Sample No.	5
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	3.70
				Base	4.00
Specimen Reference	3	Specimen Depth	3.70 m	Sample Type	C
Specimen Description	Stiff greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022101312
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	26/10/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.1	mm
Diameter		105.7	mm
Bulk Density		2.28	Mg/m3
Moisture Content		8	%
Dry Density		2.11	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		70	kPa
At failure	Axial Strain	19.8	%
	Deviator Stress, (σ1 - σ3)f	367	kPa
	Undrained Shear Strength, cu	183	kPa ½(σ1 - σ3)f
	Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved: Stephen Watson

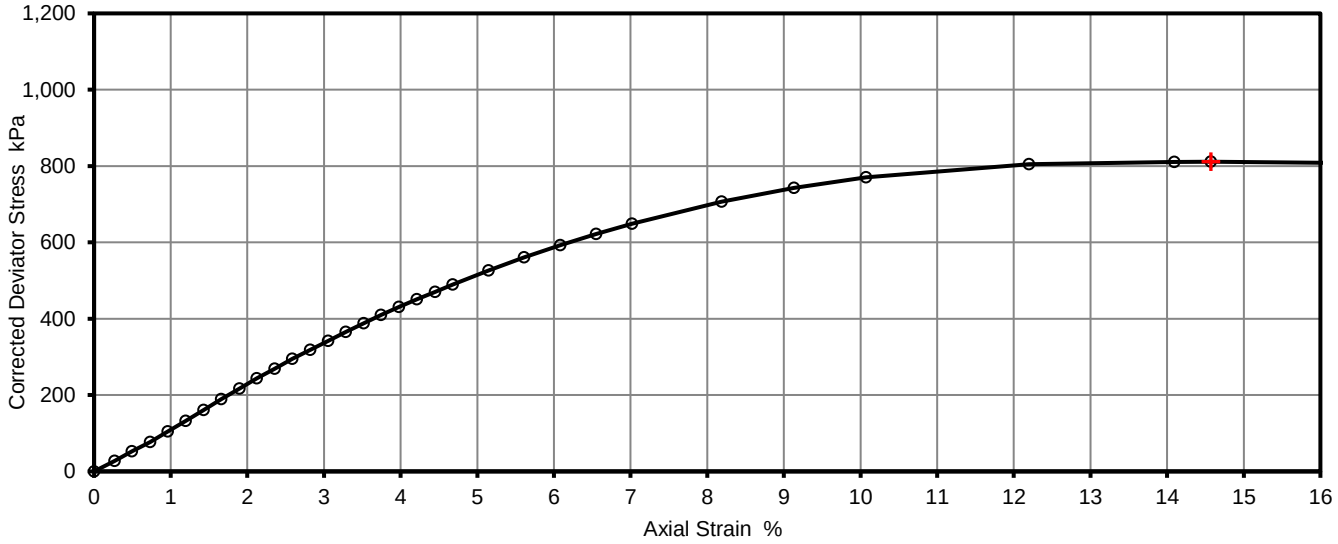
Printed: 08/11/2022 17:08

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10122

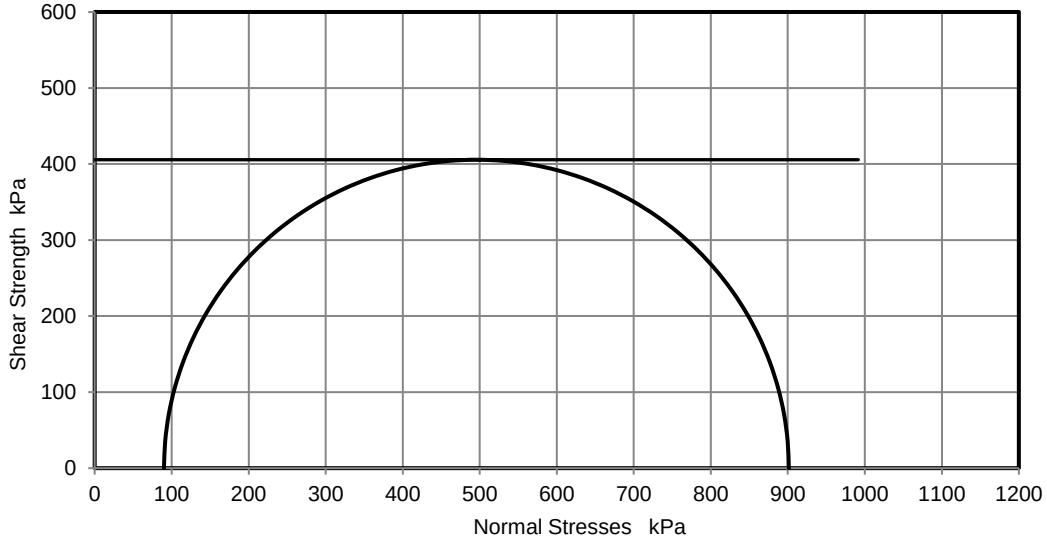
CAUSEWAY GEOTECH	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	21-0403S
				Borehole/Pit No.	RC11
Site Name	NASAH South Apron GI Kilwex			Sample No.	2
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	4.95
				Base	6.15
Specimen Reference	3	Specimen Depth	4.95 m	Sample Type	C
Specimen Description	Very stiff greyish brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022101314
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	26/10/2022

Sample Condition		UNDISTURBED	
Test Number		1	
Length		210.1	mm
Diameter		106.3	mm
Bulk Density		2.22	Mg/m3
Moisture Content		8	%
Dry Density		2.05	Mg/m3
Rate of Strain		3.0	%/min
Cell Pressure		90	kPa
At failure	Axial Strain	14.6	%
	Deviator Stress, (σ1 - σ3)f	811	kPa
	Undrained Shear Strength, cu	406	kPa ½(σ1 - σ3)f
	Mode of Failure	Compound	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks

Approved	Printed
Stephen Watson	08/11/2022 17:08

UKAS TESTING
10122

LABORATORY RESTRICTION REPORT

Project Reference	21-0403S	To	Sean Ross
Project Name	NASAH North Apron & South Apron GI Kilwex - G01	Position	Project Manager
TR reference	21-0403S / G03	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
TP15	4	1.20	B	Atterberg limits, 5 point CBR	Unsuitable material for testing - GRAVEL	Sample used for PSD
TP23	4	0.50	B	Atterberg limits, 5 point CBR	Unsuitable material for testing - GRAVEL	Sample used for PSD
TP24	4	1.50	B	Atterberg limits, 5 point CBR	Unsuitable material for testing - GRAVEL	Sample used for PSD

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Sean Ross
Date	Date
27 October 2022	

CAUSEWAY GEOTECH

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Registered in Ireland.
Company Number: 633786

www.causewaygeotech.com

SOIL AND ROCK SAMPLE ANALYSIS
LABORATORY TEST REPORT

28 September 2022

Project Name:	Dublin Airport Authority
Project No.:	21-0403S
Client:	Kilwex Ltd
Engineer:	AECOM

We are pleased to attach the results of laboratory testing carried out for the above project. This memo and its attachments constitute a report of the results of tests as detailed in the Contents page(s). This testing was performed between 29/08/2022 and 28/09/2022.

The attached results complete the testing requested and we would therefore wish to confirm that samples will be retained without charge for a period of 28 days from the above date after which they will be appropriately disposed of unless we receive written instructions to the contrary prior to that date.

We trust our report meets with your approval but if you have any queries or require additional information, please do not hesitate to contact the undersigned.



Stephen Watson

Laboratory Manager

Signed for and on behalf of Causeway Geotech Ltd

Project Name: NASAH South Apron GI Kilwex

Report Reference: Schedule 1

The table below details the tests carried out, the specifications used, and the number of tests included in this report. The results contained in this report relate to the sample(s) as received

Tests marked with* in this report are not United Kingdom Accreditation Service (UKAS) accredited and are not included in Causeway Geotech Limited's scope of UKAS Accreditation Schedule of Tests. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
SOIL	Moisture Content of Soil	BS 1377-2: 1990: Cl 3.2	8
SOIL	Liquid and Plastic Limits of soil-1 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	8
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	2
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	1
SOIL	California Bearing Ratio (CBR) / Moisture Content Relationship	BS 1377-4: 1990: Cl 7	1

Summary of Classification Test Results

Project No.	Project Name
21-0403S	NASAH South Apron GI Kilwex

Hole No.	Sample				Specimen Description	Density bulk	Density dry	*w*	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH03	15	3.00	3.45	U	Greyish brown sandy slightly gravelly silty CLAY.			9.9	57	32 -1pt	18	14		CL
TP07	5	2.00		B	Dark brown sandy gravelly clayey SILT.			4.3	45	52 -1pt	34	18		MH
TP39	7	2.00		B	Brown sandy slightly gravelly silty CLAY.			24.0	84	45 -1pt	27	18		MI/CI
TP40	7	1.40		B	Dark brown sandy slightly gravelly silty CLAY.			6.7	43	28 -1pt	17	11		CL
TP42	7	1.30		B	Greyish brown sandy gravelly clayey SILT.			30.0	85	52 -1pt	32	20		MH
TP46	7	2.00		B	Dark brown sandy gravelly silty CLAY.			16.0	60	32 -1pt	18	14		CL
TP48	3	1.50		B	Dark brown sandy gravelly silty CLAY.			7.3	58	28 -1pt	17	11		CL
TP50	3	1.00		B	Dark brown sandy gravelly silty CLAY.			9.6	61	30 -1pt	15	15		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

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Key

Density test	Liquid Limit	Particle density
Linear measurement unless :	4pt cone unless :	sp - small pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

Date Printed

28/09/2022

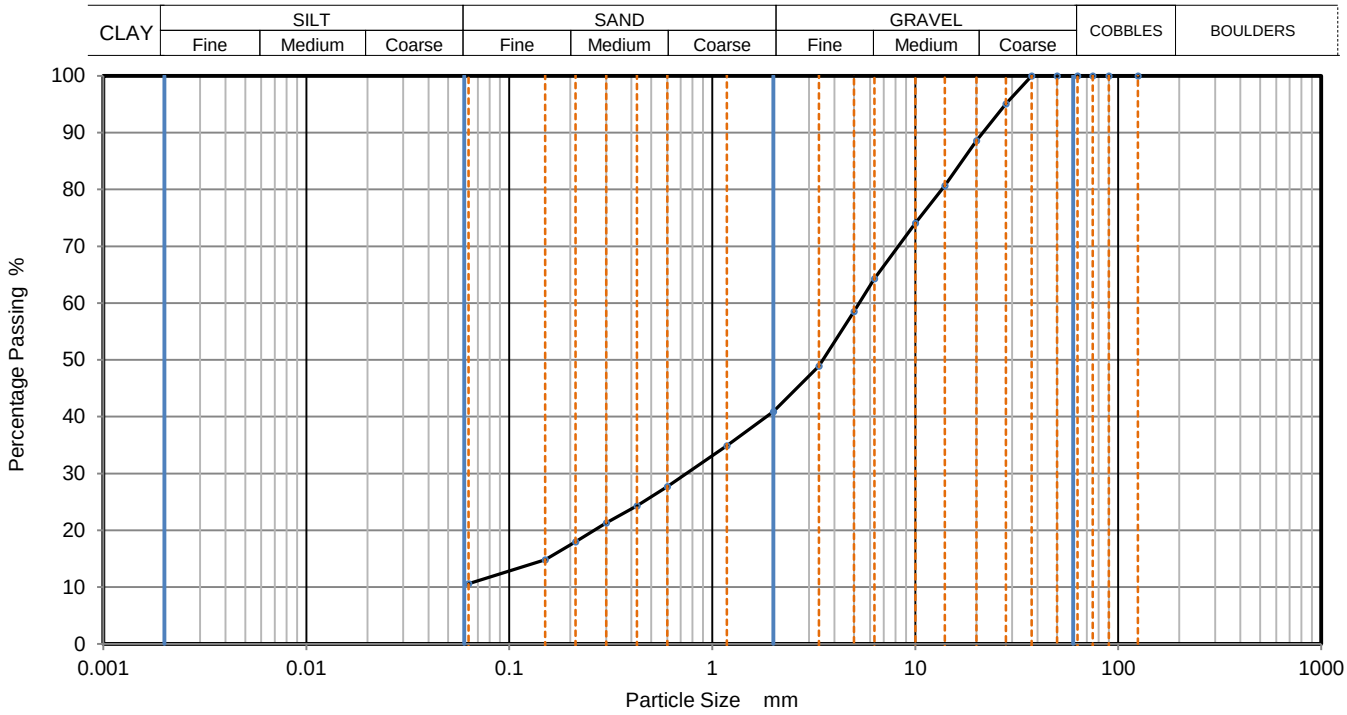
Approved By

Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-0403S**
				Borehole/Pit No.	TP39
Site Name	NASAH South Apron GI Kilwex			Sample No.	6
Specimen Description	Brown gravelly slightly silty fine to coarse SAND.			Sample Depth (m) Top	0.60
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	0.6 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus202208276



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	95		
20	89		
14	81		
10	74		
6.3	64		
5	59		
3.35	49		
2	41		
1.18	35		
0.6	28		
0.425	24		
0.3	21		
0.212	18		
0.15	15		
0.063	11		

Dry Mass of sample, g	3224

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	59.1
Sand	30.2
Fines <0.063mm	11.0

Grading Analysis		
D100	mm	
D60	mm	5.3
D30	mm	0.745
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

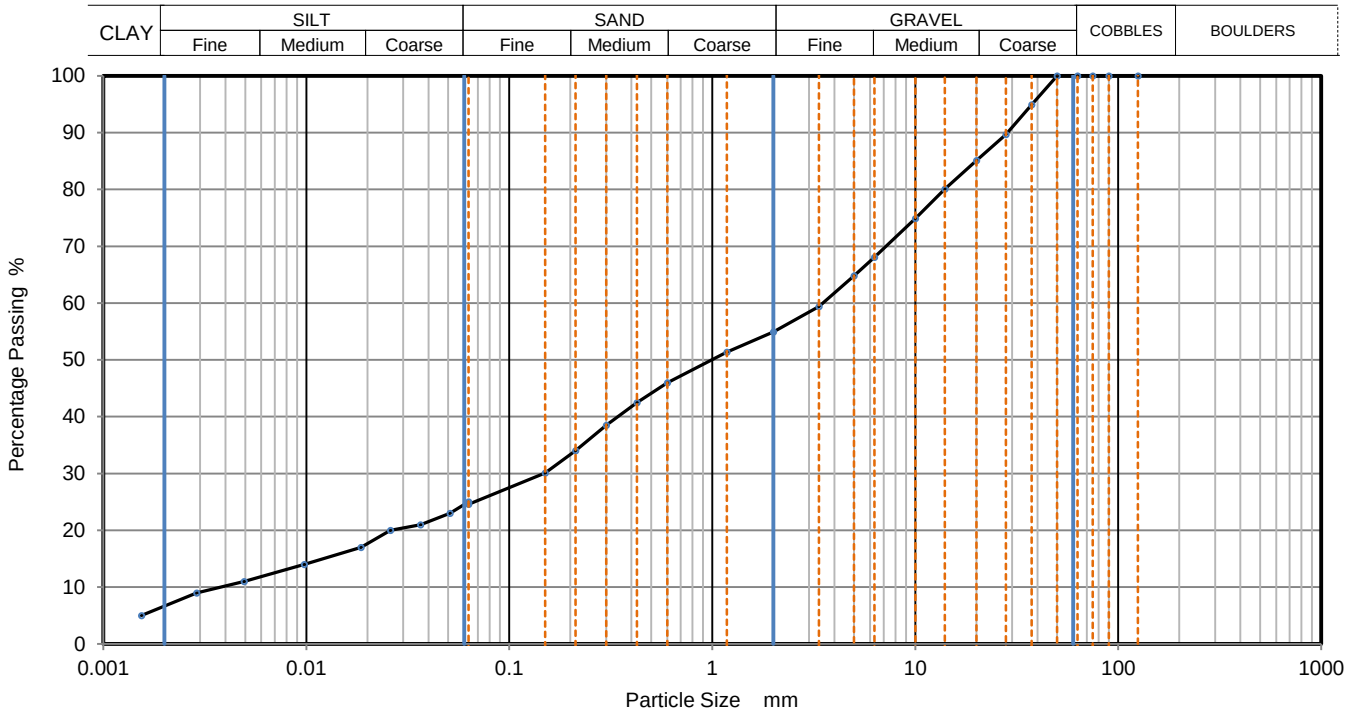
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

LAB 05R - Version 6

UKAS TESTING 10122

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**21-0403S**
				Borehole/Pit No.	TP42
Site Name	NASAH South Apron GI Kilwex			Sample No.	9
Specimen Description	Greyish brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.20
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	2.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022082712



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	25
90	100	0.05097	23
75	100	0.03649	21
63	100	0.02596	20
50	100	0.01857	17
37.5	95	0.00976	14
28	90	0.00493	11
20	85	0.00288	9
14	80	0.00154	5
10	75		
6.3	68		
5	65		
3.35	59		
2	55		
1.18	51		
0.6	46	Particle density	(assumed)
0.425	43	2.65	Mg/m3
0.3	39		
0.212	34		
0.15	30		
0.063	25		

Dry Mass of sample, g: 2692

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	45.1
Sand	30.2
Silt	18.2
Clay	6.5

Grading Analysis		
D100	mm	
D60	mm	3.5
D30	mm	0.148
D10	mm	0.0039
Uniformity Coefficient		900
Curvature Coefficient		1.6

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

LAB 05R - Version 6

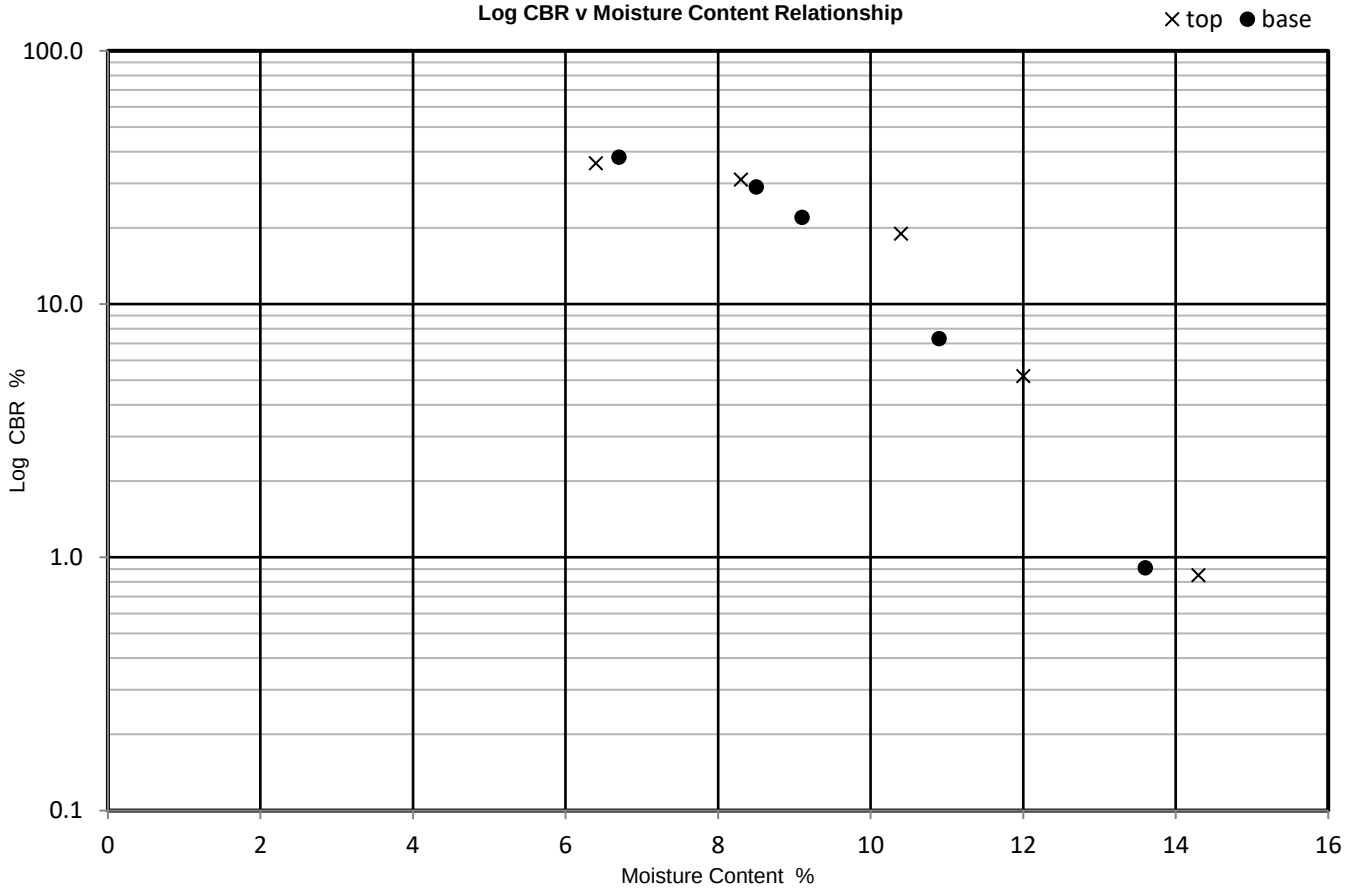
UKAS TESTING 10122

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)** **CBR v Moisture Content Relationship**	Job Ref	21-0403S
		Borehole/Pit No.	TP07
Site Name	NASAH South Apron GI Kilwex	Sample No.	5
Soil Description	Dark brown sandy gravelly clayey SILT.	Depth m	2
Test Method	BS1377 : Part 4 : 1990, clause 7	Sample Type	B
Preparation details	Recompacted with specified standard effort using 2.5kg rammer	KeyLAB ID	Caus202208274

Specimens listed in ascending order of initial moisture content

Spec Ref	Bulk density	Dry density	Moisture Content			CBR Value		Swell if soaked	Surcharge	Remarks
			Initial	Top	Base	Top	Base			
	Mg/m3	Mg/m3	%	%	%	%	%	mm	kPa	
1	1.93	1.81	6.5	6.4	6.7	36.0	38.0		3	
2	2.03	1.87	8.4	8.3	8.5	31.0	29.0		3	
3	2.09	1.90	9.8	10.4	9.1	19.0	22.0		3	
4	2.20	1.97	11.5	12.0	10.9	5.2	7.3		3	
5	2.14	1.88	13.9	14.3	13.6	0.9	0.9		3	

Log CBR v Moisture Content Relationship



General Remarks

Approved
Stephen.Watson

1

1

LABORATORY RESTRICTION REPORT

Project Reference	21-0403S	To	Sean Ross
Project Name	NASAH North Apron & South Apron GI Kilwex - G01	Position	Project Manager
TR reference	21-0403S / G01	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
BH03	15	3.00	U	UU triaxial	Insufficient intact material to obtain test specimen	CANCEL

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Sean Ross
Date	Date
26 September 2022	

CAUSEWAY GEOTECH

APPENDIX I

ENVIRONMENTAL LABORATORY TEST RESULTS



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

Final Report

Report No.:	22-22671-1
Initial Date of Issue:	28-Jun-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	3
Turnaround (Wkdays):	7
Date Approved:	28-Jun-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	17-Jun-2022
Date Instructed:	20-Jun-2022
Results Due:	28-Jun-2022

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

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-22671
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1450588
				Sample Location:		BH03
				Sample Type:		SOIL
				Top Depth (m):		0.50
				Date Sampled:		15-Jun-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**	
pH	U	1010	2:1		N/A	8.1
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.078
Nitrite	U	1220	2:1	mg/l	0.020	0.047
Nitrate	U	1220	2:1	mg/l	0.50	5.8
Sulphate	U	1220	2:1	mg/l	1.0	4.8
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	120
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	< 0.20
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	13
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	1.9
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	1.0
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	< 5.0
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	5.5
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671	22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450588	1450591
			Sample Location:		BH03	BH04
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.50	0.30
			Date Sampled:		15-Jun-2022	15-Jun-2022
			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	15	6.0
pH	U	2010		4.0	8.4	9.7
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.70	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.028	0.23
Total Sulphur	U	2175	%	0.010	0.068	0.35
Sulphur (Elemental)	U	2180	mg/kg	1.0	2.7	< 1.0
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	0.58	4.1
Sulphate (Total)	U	2430	%	0.010	0.086	0.64
Arsenic	U	2455	mg/kg	0.5	7.8	4.2
Cadmium	U	2455	mg/kg	0.10	1.2	0.44
Chromium	U	2455	mg/kg	0.5	11	7.4
Copper	U	2455	mg/kg	0.50	20	12
Mercury	U	2455	mg/kg	0.05	0.09	< 0.05
Nickel	U	2455	mg/kg	0.50	22	21
Lead	U	2455	mg/kg	0.50	36	7.4
Selenium	U	2455	mg/kg	0.25	0.33	0.59
Zinc	U	2455	mg/kg	0.50	71	43
Chromium (Trivalent)	N	2490	mg/kg	1.0	11	7.4
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	6.2	2.9
Total TPH >C6-C40	U	2670	mg/kg	10	77	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671	22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450588	1450591
			Sample Location:		BH03	BH04
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.50	0.30
			Date Sampled:		15-Jun-2022	15-Jun-2022
			Asbestos Lab:		NEW-ASB	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	
Dichlorodifluoromethane	N	2760	µg/kg	0.20	< 0.20	
Chloromethane	N	2760	µg/kg	0.20	< 0.20	
Vinyl Chloride	N	2760	µg/kg	0.20	< 0.20	
Bromomethane	N	2760	µg/kg	0.20	< 0.20	
Chloroethane	N	2760	µg/kg	0.20	< 0.20	
Trichlorofluoromethane	N	2760	µg/kg	0.20	< 0.20	
1,1-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	
Trans 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	
1,1-Dichloroethane	N	2760	µg/kg	0.20	< 0.20	
cis 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	
Bromochloromethane	N	2760	µg/kg	0.50	< 0.50	
Trichloromethane	N	2760	µg/kg	0.20	< 0.20	
1,1,1-Trichloroethane	N	2760	µg/kg	0.20	< 0.20	
Tetrachloromethane	N	2760	µg/kg	0.20	< 0.20	
1,1-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	
Benzene	N	2760	µg/kg	0.20	< 0.20	
Benzene	U	2760	µg/kg	1.0	< 1.0	
1,2-Dichloroethane	N	2760	µg/kg	0.20	< 0.20	
Trichloroethene	N	2760	µg/kg	0.20	< 0.20	
1,2-Dichloropropane	N	2760	µg/kg	0.20	< 0.20	
Dibromomethane	N	2760	µg/kg	0.20	< 0.20	
Bromodichloromethane	N	2760	µg/kg	0.20	< 0.20	
cis-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	
Toluene	N	2760	µg/kg	0.20	< 0.20	
Toluene	U	2760	µg/kg	1.0	< 1.0	
Trans-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	
1,1,2-Trichloroethane	N	2760	µg/kg	0.20	< 0.20	
Tetrachloroethene	N	2760	µg/kg	0.20	< 0.20	
1,3-Dichloropropane	N	2760	µg/kg	0.20	< 0.20	
Dibromochloromethane	N	2760	µg/kg	0.20	< 0.20	
1,2-Dibromoethane	N	2760	µg/kg	0.20	< 0.20	
Chlorobenzene	N	2760	µg/kg	0.20	< 0.20	

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671	22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450588	1450591
			Sample Location:		BH03	BH04
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.50	0.30
			Date Sampled:		15-Jun-2022	15-Jun-2022
			Asbestos Lab:		NEW-ASB	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
1,1,1,2-Tetrachloroethane	N	2760	µg/kg	0.20	< 0.20	
Ethylbenzene	N	2760	µg/kg	0.20	< 0.20	
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	
m & p-Xylene	N	2760	µg/kg	0.20	< 0.20	
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	
o-Xylene	N	2760	µg/kg	0.20	< 0.20	
o-Xylene	U	2760	µg/kg	1.0	< 1.0	
Styrene	N	2760	µg/kg	0.20	< 0.20	
Tribromomethane	N	2760	µg/kg	0.20	< 0.20	
Isopropylbenzene	N	2760	µg/kg	0.20	< 0.20	
Bromobenzene	N	2760	µg/kg	0.20	< 0.20	
1,2,3-Trichloropropane	N	2760	µg/kg	0.20	< 0.20	
N-Propylbenzene	N	2760	µg/kg	0.20	< 0.20	
2-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20	
1,3,5-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20	
4-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20	
Tert-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	
1,2,4-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20	
Sec-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	
1,3-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	
4-Isopropyltoluene	N	2760	µg/kg	0.20	< 0.20	
1,4-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	
N-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	
1,2-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	0.20	< 0.20	
1,2,4-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20	
Hexachlorobutadiene	N	2760	µg/kg	0.20	< 0.20	
1,2,3-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20	
Methyl Tert-Butyl Ether	N	2760	µg/kg	0.20	< 0.20	
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	< 0.050	
Phenol	N	2790	mg/kg	0.050	< 0.050	
2-Chlorophenol	N	2790	mg/kg	0.050	< 0.050	
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	< 0.050	
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	
2-Methylphenol	N	2790	mg/kg	0.050	< 0.050	
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	< 0.050	
Hexachloroethane	N	2790	mg/kg	0.050	< 0.050	

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671	22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450588	1450591
			Sample Location:		BH03	BH04
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.50	0.30
			Date Sampled:		15-Jun-2022	15-Jun-2022
			Asbestos Lab:		NEW-ASB	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	< 0.050	
4-Methylphenol	N	2790	mg/kg	0.050	< 0.050	
Nitrobenzene	N	2790	mg/kg	0.050	< 0.050	
Isophorone	N	2790	mg/kg	0.050	< 0.050	
2-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	
2,4-Dimethylphenol	N	2790	mg/kg	0.050	< 0.050	
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	< 0.050	
2,4-Dichlorophenol	N	2790	mg/kg	0.050	< 0.050	
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	< 0.050	
Naphthalene	N	2790	mg/kg	0.050	< 0.050	
4-Chloroaniline	N	2790	mg/kg	0.050	< 0.050	
Hexachlorobutadiene	N	2790	mg/kg	0.050	< 0.050	
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050	< 0.050	
2-Methylnaphthalene	N	2790	mg/kg	0.050	< 0.050	
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050	< 0.050	
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	
2-Chloronaphthalene	N	2790	mg/kg	0.050	< 0.050	
2-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	
Acenaphthylene	N	2790	mg/kg	0.050	0.19	
Dimethylphthalate	N	2790	mg/kg	0.050	< 0.050	
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	
Acenaphthene	N	2790	mg/kg	0.050	< 0.050	
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	
Dibenzofuran	N	2790	mg/kg	0.050	< 0.050	
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	< 0.050	
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	
Fluorene	N	2790	mg/kg	0.050	< 0.050	
Diethyl Phthalate	N	2790	mg/kg	0.050	< 0.050	
4-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	< 0.050	
Azobenzene	N	2790	mg/kg	0.050	< 0.050	
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	< 0.050	
Hexachlorobenzene	N	2790	mg/kg	0.050	< 0.050	
Pentachlorophenol	N	2790	mg/kg	0.050	< 0.050	
Phenanthrene	N	2790	mg/kg	0.050	0.18	
Anthracene	N	2790	mg/kg	0.050	0.083	
Carbazole	N	2790	mg/kg	0.050	< 0.050	
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	0.071	

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671	22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450588	1450591
			Sample Location:		BH03	BH04
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.50	0.30
			Date Sampled:		15-Jun-2022	15-Jun-2022
			Asbestos Lab:		NEW-ASB	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Fluoranthene	N	2790	mg/kg	0.050	0.39	
Pyrene	N	2790	mg/kg	0.050	0.34	
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	< 0.050	
Benzo[a]anthracene	N	2790	mg/kg	0.050	0.25	
Chrysene	N	2790	mg/kg	0.050	0.25	
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	< 0.050	
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050	
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	0.37	
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	0.13	
Benzo[a]pyrene	N	2790	mg/kg	0.050	0.22	
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	< 0.050	
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	< 0.050	
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	0.21	
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	
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	0.51	< 0.10
Pyrene	U	2800	mg/kg	0.10	0.47	< 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
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
Demeton-O	N	2820	mg/kg	0.20	< 0.20	
Phorate	N	2820	mg/kg	0.20	< 0.20	
Demeton-S	N	2820	mg/kg	0.20	< 0.20	
Disulfoton	N	2820	mg/kg	0.20	< 0.20	
Fenthion	N	2820	mg/kg	0.20	< 0.20	
Trichloronate	N	2820	mg/kg	0.20	< 0.20	
Prothiofos	N	2820	mg/kg	0.20	< 0.20	
Fensulphothion	N	2820	mg/kg	0.20	< 0.20	

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671	22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450588	1450591
			Sample Location:		BH03	BH04
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.50	0.30
			Date Sampled:		15-Jun-2022	15-Jun-2022
			Asbestos Lab:		NEW-ASB	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Sulprofos	N	2820	mg/kg	0.20	< 0.20	
Azinphos-Methyl	N	2820	mg/kg	0.20	< 0.20	
Coumaphos	N	2820	mg/kg	0.20	< 0.20	
Alpha-HCH	N	2840	mg/kg	0.20	< 0.20	
Gamma-HCH (Lindane)	N	2840	mg/kg	0.20	< 0.20	
Beta-HCH	N	2840	mg/kg	0.20	< 0.20	
Delta-HCH	N	2840	mg/kg	0.20	< 0.20	
Heptachlor	N	2840	mg/kg	0.20	< 0.20	
Aldrin	N	2840	mg/kg	0.20	< 0.20	
Heptachlor Epoxide	N	2840	mg/kg	0.20	< 0.20	
Gamma-Chlordane	N	2840	mg/kg	0.20	< 0.20	
Alpha-Chlordane	N	2840	mg/kg	0.20	< 0.20	
Endosulfan I	N	2840	mg/kg	0.20	< 0.20	
4,4-DDE	N	2840	mg/kg	0.20	< 0.20	
Dieldrin	N	2840	mg/kg	0.20	< 0.20	
Endrin	N	2840	mg/kg	0.20	< 0.20	
4,4-DDD	N	2840	mg/kg	0.20	< 0.20	
Endosulfan II	N	2840	mg/kg	0.20	< 0.20	
Endrin Aldehyde	N	2840	mg/kg	0.20	< 0.20	
4,4-DDT	N	2840	mg/kg	0.20	< 0.20	
Endosulfan Sulphate	N	2840	mg/kg	0.20	< 0.20	
Methoxychlor	N	2840	mg/kg	0.20	< 0.20	
Endrin Ketone	N	2840	mg/kg	0.20	< 0.20	
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10

Results - Water

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450593
			Sample Location:		BH04
			Sample Type:		WATER
			Top Depth (m):		0.55
			Date Sampled:		15-Jun-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	7.6
Ammonia (Free)	N	1220	mg/l	0.050	0.18
Ammoniacal Nitrogen	U	1220	mg/l	0.050	9.4
Nitrite	U	1220	mg/l	0.020	0.71
Nitrate	U	1220	mg/l	0.50	24
Sulphate	U	1220	mg/l	1.0	36
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050
Total Hardness as CaCO3	U	1270	mg/l	15	250
Arsenic (Dissolved)	U	1455	µg/l	0.20	1.4
Boron (Dissolved)	U	1455	µg/l	10.0	34
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	< 0.50
Copper (Dissolved)	U	1455	µg/l	0.50	1.1
Iron (Dissolved)	N	1455	µg/l	5.0	< 5.0
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05
Nickel (Dissolved)	U	1455	µg/l	0.50	< 0.50
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	2.8
Zinc (Dissolved)	U	1455	µg/l	2.5	18
Chromium (Trivalent)	N	1490	µg/l	20	[B] < 20
Chromium (Hexavalent)	U	1490	µg/l	20	[B] < 20
Total Organic Carbon	U	1610	mg/l	2.0	2.4
Total TPH >C6-C40	U	1670	µg/l	10	< 10
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	75

Results - Water

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450593
			Sample Location:		BH04
			Sample Type:		WATER
			Top Depth (m):		0.55
			Date Sampled:		15-Jun-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	75
Total Petroleum Hydrocarbons	N	1675	µg/l	10	75
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5
Chloroethane	U	1760	µg/l	2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5
Trichloromethane	U	1760	µg/l	1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10
Bromodichloromethane	U	1760	µg/l	5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5
Chlorobenzene	N	1760	µg/l	1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0

Results - Water

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450593
			Sample Location:		BH04
			Sample Type:		WATER
			Top Depth (m):		0.55
			Date Sampled:		15-Jun-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Bromobenzene	U	1760	µg/l	1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0
N-Nitrosodimethylamine	N	1790	µg/l	0.50	< 0.50
Phenol	N	1790	µg/l	0.50	< 0.50
2-Chlorophenol	N	1790	µg/l	0.50	< 0.50
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.50	< 0.50
1,3-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50
1,4-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50
1,2-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.50	< 0.50
Hexachloroethane	N	1790	µg/l	0.50	< 0.50
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.50	< 0.50
4-Methylphenol	N	1790	µg/l	0.50	< 0.50
Nitrobenzene	N	1790	µg/l	0.50	< 0.50
Isophorone	N	1790	µg/l	0.50	< 0.50
2-Nitrophenol	N	1790	µg/l	0.50	< 0.50
2,4-Dimethylphenol	N	1790	µg/l	0.50	< 0.50
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.50	< 0.50
2,4-Dichlorophenol	N	1790	µg/l	0.50	< 0.50
1,2,4-Trichlorobenzene	N	1790	µg/l	0.50	< 0.50
Naphthalene	N	1790	µg/l	0.50	< 0.50
4-Chloroaniline	N	1790	µg/l	0.50	< 0.50

Results - Water

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450593
			Sample Location:		BH04
			Sample Type:		WATER
			Top Depth (m):		0.55
			Date Sampled:		15-Jun-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Hexachlorobutadiene	N	1790	µg/l	0.50	< 0.50
4-Chloro-3-Methylphenol	N	1790	µg/l	0.50	< 0.50
2-Methylnaphthalene	N	1790	µg/l	0.50	< 0.50
Hexachlorocyclopentadiene	N	1790	µg/l	0.50	< 0.50
2,4,6-Trichlorophenol	N	1790	µg/l	0.50	< 0.50
2,4,5-Trichlorophenol	N	1790	µg/l	0.50	< 0.50
2-Chloronaphthalene	N	1790	µg/l	0.50	< 0.50
2-Nitroaniline	N	1790	µg/l	0.50	< 0.50
Acenaphthylene	N	1790	µg/l	0.50	< 0.50
Dimethylphthalate	N	1790	µg/l	0.50	< 0.50
2,6-Dinitrotoluene	N	1790	µg/l	0.50	< 0.50
Acenaphthene	N	1790	µg/l	0.50	< 0.50
3-Nitroaniline	N	1790	µg/l	0.50	< 0.50
Dibenzofuran	N	1790	µg/l	0.50	< 0.50
4-Chlorophenylphenylether	N	1790	µg/l	0.50	< 0.50
2,4-Dinitrotoluene	N	1790	µg/l	0.50	< 0.50
Fluorene	N	1790	µg/l	0.50	< 0.50
Diethyl Phthalate	N	1790	µg/l	0.50	< 0.50
4-Nitroaniline	N	1790	µg/l	0.50	< 0.50
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.50	< 0.50
Azobenzene	N	1790	µg/l	0.50	< 0.50
4-Bromophenylphenyl Ether	N	1790	µg/l	0.50	< 0.50
Hexachlorobenzene	N	1790	µg/l	0.50	< 0.50
Pentachlorophenol	N	1790	µg/l	0.50	< 0.50
Phenanthrene	N	1790	µg/l	0.50	< 0.50
Anthracene	N	1790	µg/l	0.50	< 0.50
Carbazole	N	1790	µg/l	0.50	< 0.50
Di-N-Butyl Phthalate	N	1790	µg/l	0.50	< 0.50
Fluoranthene	N	1790	µg/l	0.50	< 0.50
Pyrene	N	1790	µg/l	0.50	< 0.50
Butylbenzyl Phthalate	N	1790	µg/l	0.50	< 0.50
Benzo[a]anthracene	N	1790	µg/l	0.50	< 0.50
Chrysene	N	1790	µg/l	0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.50	< 0.50
Di-N-Octyl Phthalate	N	1790	µg/l	0.50	< 0.50
Benzo[b]fluoranthene	N	1790	µg/l	0.50	< 0.50
Benzo[k]fluoranthene	N	1790	µg/l	0.50	< 0.50
Benzo[a]pyrene	N	1790	µg/l	0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.50	< 0.50
Dibenz(a,h)Anthracene	N	1790	µg/l	0.50	< 0.50

Results - Water

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-22671
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1450593
			Sample Location:		BH04
			Sample Type:		WATER
			Top Depth (m):		0.55
			Date Sampled:		15-Jun-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Benzo[g,h,i]perylene	N	1790	µg/l	0.50	< 0.50
4-Nitrophenol	N	1790	µg/l	0.50	< 0.50
Naphthalene	N	1800	µg/l	0.010	< 0.010
Acenaphthylene	N	1800	µg/l	0.010	< 0.010
Acenaphthene	N	1800	µg/l	0.010	< 0.010
Fluorene	N	1800	µg/l	0.010	< 0.010
Phenanthrene	N	1800	µg/l	0.010	< 0.010
Anthracene	N	1800	µg/l	0.010	< 0.010
Fluoranthene	N	1800	µg/l	0.010	< 0.010
Pyrene	N	1800	µg/l	0.010	< 0.010
Benzo[a]anthracene	N	1800	µg/l	0.010	< 0.010
Chrysene	N	1800	µg/l	0.010	< 0.010
Benzo[b]fluoranthene	N	1800	µg/l	0.010	< 0.010
Benzo[k]fluoranthene	N	1800	µg/l	0.010	< 0.010
Benzo[a]pyrene	N	1800	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	µg/l	0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	µg/l	0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	µg/l	0.010	< 0.010
Total Of 16 PAH's	N	1800	µg/l	0.20	< 0.20
Total Phenols	U	1920	mg/l	0.030	< 0.030

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1450593			BH04	15-Jun-2022	B	Coloured Winchester 1000ml
1450593			BH04	15-Jun-2022	B	EPA Vial 40ml
1450593			BH04	15-Jun-2022	B	Plastic Bottle 1000ml

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection

Test Methods

SOP	Title	Parameters included	Method summary
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
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
2820	Organophosphorus (O-P) Pesticides in Soils by GC-MS	Organophosphorus pesticide representative suite including Parathion, Malathion etc, plus client specific determinands	Dichloromethane extraction / GC-MS
2840	Organochlorine (O-Cl) Pesticides in Soils by GC-MS	Organochlorine pesticide representative suite including DDT and its metabolites, 'drins' and HCH etc, plus client specific determinands	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.
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

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

Final Report

Report No.:	22-29102-1
Initial Date of Issue:	26-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Rachel White
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	2
Turnaround (Wkdays):	7
Date Approved:	26-Aug-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	01-Aug-2022
Date Instructed:	18-Aug-2022
Results Due:	26-Aug-2022

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

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-29102	22-29102
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1479232	1479233
				Sample Location:		TP40	TP40
				Sample Type:		SOIL	SOIL
				Top Depth (m):		0.3	0.5
				Date Sampled:		27-Jul-2022	27-Jul-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**		
pH	U	1010	2:1		N/A	8.5	8.5
Ammonia (Free)	N	1220	2:1	mg/l	0.050	0.096	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.68	0.12
Nitrite	U	1220	2:1	mg/l	0.020	2.3	1.0
Nitrate	U	1220	2:1	mg/l	0.50	6.2	2.7
Sulphate	U	1220	2:1	mg/l	1.0	140	110
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	230	190
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	1.9	1.6
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	21	15
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	9.7	6.1
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	2.0	1.3
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	5.3	4.4
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	2.6	< 2.5
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	13	21
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20	< 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20	< 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	25	23
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-29102	22-29102
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1479232	1479233
			Sample Location:		TP40	TP40
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.3	0.5
			Date Sampled:		27-Jul-2022	27-Jul-2022
			Asbestos Lab:		COVENTRY	COVENTRY
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	5.3	5.0
pH	U	2010		4.0	8.0	8.2
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.74	0.71
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.26	0.20
Total Sulphur	U	2175	%	0.010	0.063	0.10
Sulphur (Elemental)	U	2180	mg/kg	1.0	9.5	9.7
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	< 0.50	0.72
Sulphate (Total)	U	2430	%	0.010	0.22	0.21
Arsenic	U	2455	mg/kg	0.5	10	8.3
Cadmium	U	2455	mg/kg	0.10	0.87	0.74
Chromium	U	2455	mg/kg	0.5	13	9.9
Copper	U	2455	mg/kg	0.50	26	22
Mercury	U	2455	mg/kg	0.05	0.17	0.15
Nickel	U	2455	mg/kg	0.50	26	20
Lead	U	2455	mg/kg	0.50	49	34
Selenium	U	2455	mg/kg	0.25	1.4	1.2
Zinc	U	2455	mg/kg	0.50	71	57
Chromium (Trivalent)	N	2490	mg/kg	1.0	13	9.9
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.1	3.2
Total TPH >C6-C40	U	2670	mg/kg	10	[B] < 10	[B] < 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[B] < 5.0	[B] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-29102	22-29102
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1479232	1479233
			Sample Location:		TP40	TP40
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.3	0.5
			Date Sampled:		27-Jul-2022	27-Jul-2022
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[B] < 5.0	[B] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[B] < 10	[B] < 10
Benzene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0
Toluene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 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	2.4	< 0.10
Anthracene	U	2800	mg/kg	0.10	0.51	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	3.0	1.1
Pyrene	U	2800	mg/kg	0.10	2.5	1.3
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
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	8.4	2.4
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1479232			TP40	27-Jul-2022	B	Amber Glass 250ml
1479232			TP40	27-Jul-2022	B	Amber Glass 60ml
1479232			TP40	27-Jul-2022	B	Plastic Tub 500g
1479233			TP40	27-Jul-2022	B	Amber Glass 250ml
1479233			TP40	27-Jul-2022	B	Amber Glass 60ml
1479233			TP40	27-Jul-2022	B	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

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

Final Report

Report No.:	22-29677-1
Initial Date of Issue:	24-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Rachel White
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	1
Turnaround (Wkdays):	7
Date Approved:	24-Aug-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	04-Aug-2022
Date Instructed:	16-Aug-2022
Results Due:	24-Aug-2022

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

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-29677
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1481667
				Sample Location:		TP39
				Sample Type:		SOIL
				Top Depth (m):		0.3
				Date Sampled:		27-Jul-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**	
pH	U	1010	2:1		N/A	8.3
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.16
Nitrite	U	1220	2:1	mg/l	0.020	0.70
Nitrate	U	1220	2:1	mg/l	0.50	0.56
Sulphate	U	1220	2:1	mg/l	1.0	12
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	26
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	110
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	11
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	3.8
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	1.3
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	1.0
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	0.97
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	4.3
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	270
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	5.1
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-29677
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1481667
			Sample Location:		TP39
			Sample Type:		SOIL
			Top Depth (m):		0.3
			Date Sampled:		27-Jul-2022
			Asbestos Lab:		DURHAM
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	5.3
pH	U	2010		4.0	9.4
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.039
Sulphur (Elemental)	U	2180	mg/kg	1.0	3.0
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	[B] < 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	[B] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	0.040
Arsenic	U	2455	mg/kg	0.5	59
Cadmium	U	2455	mg/kg	0.10	0.12
Chromium	U	2455	mg/kg	0.5	6.0
Copper	U	2455	mg/kg	0.50	8.3
Mercury	U	2455	mg/kg	0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	5.8
Lead	U	2455	mg/kg	0.50	21
Selenium	U	2455	mg/kg	0.25	< 0.25
Zinc	U	2455	mg/kg	0.50	33
Chromium (Trivalent)	N	2490	mg/kg	1.0	6.0
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	U	2625	%	0.40	< 0.40
Total TPH >C6-C40	U	2670	mg/kg	10	[B] 60
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[B] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[B] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[B] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[B] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[B] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[B] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[B] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[B] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[B] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[B] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[B] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[B] < 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-29677
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1481667
			Sample Location:		TP39
			Sample Type:		SOIL
			Top Depth (m):		0.3
			Date Sampled:		27-Jul-2022
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[B] < 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[B] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[B] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[B] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[B] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[B] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[B] < 10
Benzene	U	2760	µg/kg	1.0	[B] < 1.0
Toluene	U	2760	µg/kg	1.0	[B] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[B] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[B] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[B] < 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
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

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1481667			TP39	27-Jul-2022	B	Amber Glass 250ml
1481667			TP39	27-Jul-2022	B	Amber Glass 60ml
1481667			TP39	27-Jul-2022	B	Plastic Tub 1000g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

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

Final Report

Report No.:	22-29871-1
Initial Date of Issue:	24-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Rachel White
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	6
Turnaround (Wkdays):	7
Date Approved:	24-Aug-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	05-Aug-2022
Date Instructed:	16-Aug-2022
Results Due:	24-Aug-2022

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

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-29871	22-29871	22-29871	22-29871	22-29871	22-29871
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1482515	1482516	1482517	1482519	1482520	1482521
				Sample Location:		TP42	TP42	TP42	TP46	TP46	TP46
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.30	0.5	1.50	0.30	0.50	1.50
				Date Sampled:		29-Jul-2022	29-Jul-2022	29-Jul-2022	29-Jul-2022	29-Jul-2022	29-Jul-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**						
pH	U	1010	2:1		N/A	7.4	7.4	7.5	7.5	7.6	7.5
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.076	0.52	0.11	0.078	0.093	0.30
Nitrite	U	1220	2:1	mg/l	0.020	0.089	1.3	0.092	0.40	0.37	0.10
Nitrate	U	1220	2:1	mg/l	0.50	2.0	5.1	3.9	1.6	1.4	3.9
Sulphate	U	1220	2:1	mg/l	1.0	52	120	59	23	21	25
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	110	210	130	110	120	110
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	2.0	4.4	1.6	0.67	0.57	1.1
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	14	110	46	26	24	33
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	3.9	6.7	1.1	2.1	1.2	2.7
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	1.8	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	1.7	< 0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	5.2	1.8	3.1	2.1	1.9	3.9
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	2.8	2.9	< 2.5	5.6	< 2.5	< 2.5
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	27	< 5.0	20	< 5.0	< 5.0	58
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20	< 20	< 20	< 20	< 20	< 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20	< 20	< 20	< 20	< 20	< 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	6.5	15	10	6.1	5.9	11
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-29871	22-29871	22-29871	22-29871	22-29871	22-29871
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1482515	1482516	1482517	1482519	1482520	1482521
			Sample Location:		TP42	TP42	TP42	TP46	TP46	TP46
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.30	0.5	1.50	0.30	0.50	1.50
			Date Sampled:		29-Jul-2022	29-Jul-2022	29-Jul-2022	29-Jul-2022	29-Jul-2022	29-Jul-2022
			Asbestos Lab:		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
Moisture	N	2030	%	0.020	4.5	11	18	6.3	5.5	14
pH	U	2010		4.0	8.7	8.6	8.4	8.7	8.6	8.9
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	1.3	0.53	< 0.40	< 0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	0.046	0.068	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.23	0.11	0.13	0.27	0.11	0.13
Sulphur (Elemental)	U	2180	mg/kg	1.0	4.8	10	2.2	3.5	3.3	5.5
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	0.013	< 0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	0.34	0.11	0.13	0.24	0.11	0.070
Arsenic	U	2455	mg/kg	0.5	7.5	6.2	6.8	9.3	8.1	9.0
Cadmium	U	2455	mg/kg	0.10	0.85	0.94	1.0	1.1	0.94	1.7
Chromium	U	2455	mg/kg	0.5	14	5.0	14	12	9.9	12
Copper	U	2455	mg/kg	0.50	16	11	16	23	20	20
Mercury	U	2455	mg/kg	0.05	0.09	0.11	0.14	0.16	0.13	0.08
Nickel	U	2455	mg/kg	0.50	19	11	21	26	23	30
Lead	U	2455	mg/kg	0.50	25	26	32	37	34	22
Selenium	U	2455	mg/kg	0.25	1.1	0.34	0.73	1.4	1.1	1.1
Zinc	U	2455	mg/kg	0.50	48	75	58	68	57	60
Chromium (Trivalent)	N	2490	mg/kg	1.0	14	5.0	14	12	9.9	12
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	1.8	7.9	2.1	2.9	2.3	0.83
Total TPH >C6-C40	U	2670	mg/kg	10	[B] 100	[B] 220	[B] < 10	[B] < 10	[B] < 10	[B] < 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-29871	22-29871	22-29871	22-29871	22-29871	22-29871
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1482515	1482516	1482517	1482519	1482520	1482521
			Sample Location:		TP42	TP42	TP42	TP46	TP46	TP46
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.30	0.5	1.50	0.30	0.50	1.50
			Date Sampled:		29-Jul-2022	29-Jul-2022	29-Jul-2022	29-Jul-2022	29-Jul-2022	29-Jul-2022
			Asbestos Lab:		NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[B] < 10	[B] < 10	[B] < 10	[B] < 10	[B] < 10	[B] < 10
Benzene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Toluene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Naphthalene	U	2800	mg/kg	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
Acenaphthene	U	2800	mg/kg	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
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	0.66	0.52	< 0.10	0.37	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	0.20	0.12	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	0.67	2.2	0.73	0.86	0.55	< 0.10
Pyrene	U	2800	mg/kg	0.10	0.55	1.9	0.62	0.73	0.49	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	0.36	1.3	< 0.10	0.47	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	0.34	1.1	< 0.10	0.45	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	2.0	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	0.69	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	1.6	< 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
Dibenz(a,h)Anthracene	N	2800	mg/kg	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
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	12	< 2.0	2.5	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1482515			TP42	29-Jul-2022	B	Amber Glass 250ml
1482515			TP42	29-Jul-2022	B	Amber Glass 60ml
1482515			TP42	29-Jul-2022	B	Plastic Tub 1000g
1482516			TP42	29-Jul-2022	B	Amber Glass 250ml
1482516			TP42	29-Jul-2022	B	Amber Glass 60ml
1482516			TP42	29-Jul-2022	B	Plastic Tub 1000g
1482517			TP42	29-Jul-2022	B	Amber Glass 250ml
1482517			TP42	29-Jul-2022	B	Amber Glass 60ml
1482517			TP42	29-Jul-2022	B	Plastic Tub 1000g
1482519			TP46	29-Jul-2022	B	Amber Glass 250ml
1482519			TP46	29-Jul-2022	B	Amber Glass 60ml
1482519			TP46	29-Jul-2022	B	Plastic Tub 500g
1482520			TP46	29-Jul-2022	B	Amber Glass 250ml
1482520			TP46	29-Jul-2022	B	Amber Glass 60ml
1482520			TP46	29-Jul-2022	B	Plastic Tub 500g
1482521			TP46	29-Jul-2022	B	Amber Glass 250ml
1482521			TP46	29-Jul-2022	B	Amber Glass 60ml
1482521			TP46	29-Jul-2022	B	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

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

Final Report

Report No.:	22-30015-1
Initial Date of Issue:	24-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Rachel White
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	4
Turnaround (Wkdays):	7
Date Approved:	24-Aug-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	08-Aug-2022
Date Instructed:	16-Aug-2022
Results Due:	24-Aug-2022

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

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-30015	22-30015	22-30015	22-30015
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1483182	1483183	1483184	1483185
				Sample Location:		TP41	TP41	TP41	TP41
				Sample Type:		SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.30	0.50	1.50	2.50
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**				
pH	U	1010	2:1		N/A	7.5	7.6	7.5	7.6
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.086	0.086	0.074	0.086
Nitrite	U	1220	2:1	mg/l	0.020	0.064	0.078	0.025	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	1.9	2.5	2.1	< 0.50
Sulphate	U	1220	2:1	mg/l	1.0	20	16	21	16
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	99	110	100	74
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	0.58	0.45	0.40	0.23
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	22	20	21	15
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	1.7	1.3	< 0.50	< 0.50
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	3.3	3.3	2.6	2.9
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	< 2.5	< 2.5	< 2.5
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	< 5.0	13	< 5.0	< 5.0
Chromium (Trivalent)	N	1490	2:1	µg/l	20	[A] < 20	[A] < 20	[A] < 20	[A] < 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	[A] < 20	[A] < 20	[A] < 20	[A] < 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	5.9	7.5	6.9	4.5
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30015	22-30015	22-30015	22-30015
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1483182	1483183	1483184	1483185
			Sample Location:		TP41	TP41	TP41	TP41
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.30	0.50	1.50	2.50
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY
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
Moisture	N	2030	%	0.020	7.9	8.5	11	7.4
pH	U	2010		4.0	[A] 8.8	[A] 9.0	[A] 8.7	[A] 9.1
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] 0.41	[A] < 0.40	[A] 0.56	[A] 0.84
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Total Sulphur	U	2175	%	0.010	[A] 0.10	[A] 0.36	[A] 0.068	[A] 0.056
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] 5.8	[A] 4.6	[A] 3.7	[A] 1.7
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 2.6	[A] 4.8	[A] 4.9	[A] 5.0
Sulphate (Total)	U	2430	%	0.010	[A] 0.31	[A] 0.11	[A] 0.13	[A] 0.064
Arsenic	U	2455	mg/kg	0.5	4.1	9.7	9.5	2.6
Cadmium	U	2455	mg/kg	0.10	0.44	1.5	1.1	0.34
Chromium	U	2455	mg/kg	0.5	6.0	12	10	3.3
Copper	U	2455	mg/kg	0.50	10	23	24	5.8
Mercury	U	2455	mg/kg	0.05	0.05	0.16	0.09	< 0.05
Nickel	U	2455	mg/kg	0.50	13	29	29	10
Lead	U	2455	mg/kg	0.50	12	40	27	4.5
Selenium	U	2455	mg/kg	0.25	0.39	0.82	0.79	0.72
Zinc	U	2455	mg/kg	0.50	25	61	55	18
Chromium (Trivalent)	N	2490	mg/kg	1.0	6.0	12	10	3.3
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	[A] 2.1	[A] 4.3	[A] 2.3	[A] 1.2
Total TPH >C6-C40	U	2670	mg/kg	10	[A] 63	[A] 68	[A] 140	[A] 63
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30015	22-30015	22-30015	22-30015
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1483182	1483183	1483184	1483185
			Sample Location:		TP41	TP41	TP41	TP41
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.30	0.50	1.50	2.50
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10	[A] < 10	[A] < 10	[A] < 10
Benzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Toluene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Naphthalene	U	2800	mg/kg	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
Acenaphthene	U	2800	mg/kg	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
Phenanthrene	U	2800	mg/kg	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
Fluoranthene	U	2800	mg/kg	0.10	0.41	0.72	0.43	< 0.10
Pyrene	U	2800	mg/kg	0.10	0.37	0.58	0.40	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	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
Benzo[b]fluoranthene	U	2800	mg/kg	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
Benzo[a]pyrene	U	2800	mg/kg	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
Dibenz(a,h)Anthracene	N	2800	mg/kg	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
Total Of 16 PAH's	N	2800	mg/kg	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

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1483182			TP41		A	Amber Glass 250ml
1483182			TP41		A	Amber Glass 60ml
1483182			TP41		A	Plastic Tub 500g
1483183			TP41		A	Amber Glass 250ml
1483183			TP41		A	Amber Glass 60ml
1483183			TP41		A	Plastic Tub 500g
1483184			TP41		A	Amber Glass 250ml
1483184			TP41		A	Amber Glass 60ml
1483184			TP41		A	Plastic Tub 500g
1483185			TP41		A	Amber Glass 250ml
1483185			TP41		A	Amber Glass 60ml
1483185			TP41		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

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

Final Report

Report No.:	22-30049-1
Initial Date of Issue:	24-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Rachel White
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	3
Turnaround (Wkdays):	7
Date Approved:	24-Aug-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	08-Aug-2022
Date Instructed:	16-Aug-2022
Results Due:	24-Aug-2022

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

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-30049	22-30049	22-30049
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1483316	1483317	1483318
				Sample Location:		TP49	TP49	TP49
				Sample Type:		SOIL	SOIL	SOIL
				Top Depth (m):		2.00	0.50	1.00
				Date Sampled:		08-Apr-2022	08-Apr-2022	08-Apr-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**			
pH	U	1010	2:1		N/A	7.8	7.7	7.7
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.078	0.054	0.072
Nitrite	U	1220	2:1	mg/l	0.020	< 0.020	< 0.020	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	< 0.50	< 0.50	< 0.50
Sulphate	U	1220	2:1	mg/l	1.0	1.6	< 1.0	1.6
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	55	49	55
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	0.22	< 0.20	0.23
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	18	13	16
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	< 2.5	< 2.5
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	< 5.0	< 5.0	< 5.0
Chromium (Trivalent)	N	1490	2:1	µg/l	20	[B] < 20	[B] < 20	[B] < 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	[B] < 20	[B] < 20	[B] < 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	5.7	5.2	5.1
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30049	22-30049	22-30049
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1483316	1483317	1483318
			Sample Location:		TP49	TP49	TP49
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		2.00	0.50	1.00
			Date Sampled:		08-Apr-2022	08-Apr-2022	08-Apr-2022
			Asbestos Lab:		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
Moisture	N	2030	%	0.020	5.6	7.8	7.2
pH	U	2010		4.0	[B] 9.1	[B] 9.2	[B] 9.1
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[B] 0.95	[B] 2.8	[B] 0.66
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[B] < 0.010	[B] 1.8	[B] < 0.010
Total Sulphur	U	2175	%	0.010	[B] 0.074	[B] 0.042	[B] 0.056
Sulphur (Elemental)	U	2180	mg/kg	1.0	[B] 2.3	[B] 2.1	[B] 1.9
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[B] 8.8	[B] 7.5	[B] 9.3
Sulphate (Total)	U	2430	%	0.010	[B] 0.16	[B] 0.050	[B] 0.081
Arsenic	U	2455	mg/kg	0.5	4.2	7.9	10
Cadmium	U	2455	mg/kg	0.10	0.96	1.5	1.9
Chromium	U	2455	mg/kg	0.5	7.4	9.3	11
Copper	U	2455	mg/kg	0.50	13	19	24
Mercury	U	2455	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	18	38	37
Lead	U	2455	mg/kg	0.50	8.0	13	18
Selenium	U	2455	mg/kg	0.25	0.83	0.68	1.3
Zinc	U	2455	mg/kg	0.50	27	54	65
Chromium (Trivalent)	N	2490	mg/kg	1.0	7.4	9.3	11
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	[B] 0.91	[B] 0.71	[B] 0.72
Total TPH >C6-C40	U	2670	mg/kg	10	[B] 11000	[B] 58	[B] 55
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30049	22-30049	22-30049
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1483316	1483317	1483318
			Sample Location:		TP49	TP49	TP49
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		2.00	0.50	1.00
			Date Sampled:		08-Apr-2022	08-Apr-2022	08-Apr-2022
			Asbestos Lab:		DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[B] < 10	[B] < 10	[B] < 10
Benzene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Toluene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	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
Dibenz(a,h)Anthracene	N	2800	mg/kg	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
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1483316			TP49	08-Apr-2022	B	Amber Glass 250ml
1483316			TP49	08-Apr-2022	B	Amber Glass 60ml
1483316			TP49	08-Apr-2022	B	Plastic Tub 500g
1483317			TP49	08-Apr-2022	B	Amber Glass 250ml
1483317			TP49	08-Apr-2022	B	Amber Glass 60ml
1483317			TP49	08-Apr-2022	B	Plastic Tub 500g
1483318			TP49	08-Apr-2022	B	Amber Glass 250ml
1483318			TP49	08-Apr-2022	B	Amber Glass 60ml
1483318			TP49	08-Apr-2022	B	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

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

Final Report

Report No.:	22-30192-1
Initial Date of Issue:	23-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	3
Turnaround (Wkdays):	7
Date Approved:	23-Aug-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	09-Aug-2022
Date Instructed:	16-Aug-2022
Results Due:	24-Aug-2022

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-30192	22-30192	22-30192
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1484008	1484009	1484010
				Sample Location:		TP56	TP56	TP56
				Sample Type:		SOIL	SOIL	SOIL
				Top Depth (m):		0.3	0.5	1.5
				Date Sampled:		08-Aug-2022	08-Aug-2022	08-Aug-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**			
pH	U	1010	2:1		N/A	7.6	7.6	7.6
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.078	0.086	0.066
Nitrite	U	1220	2:1	mg/l	0.020	0.41	0.30	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	5.8	7.8	2.3
Sulphate	U	1220	2:1	mg/l	1.0	32	38	25
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	120	120	89
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	0.74	0.42	< 0.20
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	12	12	15
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	2.9	3.2	< 0.50
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	0.68	< 0.50
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	4.0	5.1	2.5
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	32	< 2.5
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	59	62	110
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20	< 20	< 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20	< 20	< 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	5.9	5.9	4.1
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30192	22-30192	22-30192
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1484008	1484009	1484010
			Sample Location:		TP56	TP56	TP56
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.3	0.5	1.5
			Date Sampled:		08-Aug-2022	08-Aug-2022	08-Aug-2022
			Asbestos Lab:		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
Moisture	N	2030	%	0.020	5.8	6.0	17
pH	U	2010		4.0	8.3	9.7	8.4
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.56	1.9	0.49
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.017	< 0.010	0.020
Total Sulphur	U	2175	%	0.010	0.12	0.14	0.084
Sulphur (Elemental)	U	2180	mg/kg	1.0	33	3.8	< 1.0
Nitrate (Water Soluble)	N	2220	g/l	0.010	0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	0.17	0.14	0.054
Arsenic	U	2455	mg/kg	0.5	9.8	8.7	8.1
Cadmium	U	2455	mg/kg	0.10	1.2	1.1	0.77
Chromium	U	2455	mg/kg	0.5	12	11	16
Copper	U	2455	mg/kg	0.50	25	23	14
Mercury	U	2455	mg/kg	0.05	0.13	0.14	0.05
Nickel	U	2455	mg/kg	0.50	31	27	28
Lead	U	2455	mg/kg	0.50	42	40	16
Selenium	U	2455	mg/kg	0.25	1.0	0.94	0.60
Zinc	U	2455	mg/kg	0.50	70	62	49
Chromium (Trivalent)	N	2490	mg/kg	1.0	12	11	16
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	7.5	3.5	1.8
Total TPH >C6-C40	U	2670	mg/kg	10	260	86	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30192	22-30192	22-30192
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1484008	1484009	1484010
			Sample Location:		TP56	TP56	TP56
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.3	0.5	1.5
			Date Sampled:		08-Aug-2022	08-Aug-2022	08-Aug-2022
			Asbestos Lab:		DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	5.2	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	130	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	140	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	140	< 10	< 10
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	0.78	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	0.27	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	2.7	0.79	< 0.10
Pyrene	U	2800	mg/kg	0.10	2.2	0.73	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	1.3	0.50	< 0.10
Chrysene	U	2800	mg/kg	0.10	1.0	0.35	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	1.8	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	0.63	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10	1.5	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	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
Total Of 16 PAH's	N	2800	mg/kg	2.0	12	2.4	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

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

Final Report

Report No.:	22-30641-1
Initial Date of Issue:	24-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	6
Turnaround (Wkdays):	7
Date Approved:	24-Aug-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	11-Aug-2022
Date Instructed:	16-Aug-2022
Results Due:	24-Aug-2022

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-30641	22-30641	22-30641	22-30641	22-30641	22-30641
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1485987	1485988	1485991	1485992	1485994	1485995
				Sample Location:		TP47	TP47	TP50	TP50	TP48	TP48
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.5	1.0	0.5	1.0	0.5	1.2
				Date Sampled:		05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**						
pH	U	1010	2:1		N/A	7.7	7.8	7.7	7.8	7.7	7.8
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.093	0.078	0.067	0.086	0.060	0.071
Nitrite	U	1220	2:1	mg/l	0.020	< 0.020	< 0.020	0.022	< 0.020	< 0.020	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	0.55	0.81	1.2	0.83	9.6	0.87
Sulphate	U	1220	2:1	mg/l	1.0	22	32	< 1.0	1.3	1.5	2.2
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	75	80	63	56	73	58
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	12	13	< 10	< 10	15	11
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	0.58	< 0.50	< 0.50	< 0.50	0.81
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	< 2.5	2.8	5.1	< 2.5	< 2.5
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	55	11	35	21	100	14
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20	< 20	< 20	< 20	< 20	< 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20	< 20	< 20	< 20	< 20	< 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	3.3	3.0	4.2	3.3	4.8	3.1
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30641	22-30641	22-30641	22-30641	22-30641	22-30641
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1485987	1485988	1485991	1485992	1485994	1485995
			Sample Location:		TP47	TP47	TP50	TP50	TP48	TP48
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.5	1.0	0.5	1.0	0.5	1.2
			Date Sampled:		05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022
			Asbestos Lab:		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
Moisture	N	2030	%	0.020	7.0	6.8	6.7	6.5	6.4	4.5
pH	U	2010		4.0	9.1	8.6	9.2	8.8	9.2	9.0
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	1.4	< 0.40	1.3	< 0.40	2.0	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	0.011	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.11	0.11	0.095	0.074	0.070	0.094
Sulphur (Elemental)	U	2180	mg/kg	1.0	2.7	< 1.0	< 1.0	< 1.0	3.3	< 1.0
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	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
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	< 0.50	< 0.50	3.0	< 0.50	< 0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	0.095	0.069	0.062	0.062	0.052	0.068
Arsenic	U	2455	mg/kg	0.5	11	9.8	7.2	7.9	8.6	8.0
Cadmium	U	2455	mg/kg	0.10	1.8	1.7	1.7	1.8	1.2	1.5
Chromium	U	2455	mg/kg	0.5	12	11	10	10	12	9.5
Copper	U	2455	mg/kg	0.50	27	24	20	20	18	20
Mercury	U	2455	mg/kg	0.05	< 0.05	< 0.05	0.05	< 0.05	0.08	< 0.05
Nickel	U	2455	mg/kg	0.50	42	39	31	36	26	35
Lead	U	2455	mg/kg	0.50	22	18	17	15	23	14
Selenium	U	2455	mg/kg	0.25	1.5	0.78	0.78	0.78	0.53	1.1
Zinc	U	2455	mg/kg	0.50	77	56	65	59	59	56
Chromium (Trivalent)	N	2490	mg/kg	1.0	12	11	10	10	12	9.5
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	0.98	< 0.40	1.2	0.41	1.2	1.5
Total TPH >C6-C40	U	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30641	22-30641	22-30641	22-30641	22-30641	22-30641
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1485987	1485988	1485991	1485992	1485994	1485995
			Sample Location:		TP47	TP47	TP50	TP50	TP48	TP48
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.5	1.0	0.5	1.0	0.5	1.2
			Date Sampled:		05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10	< 10	< 10
Benzene	U	2760	µg/kg	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
Ethylbenzene	U	2760	µg/kg	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
o-Xylene	U	2760	µg/kg	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
Acenaphthylene	N	2800	mg/kg	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
Fluorene	U	2800	mg/kg	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
Anthracene	U	2800	mg/kg	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
Pyrene	U	2800	mg/kg	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
Chrysene	U	2800	mg/kg	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
Benzo[k]fluoranthene	U	2800	mg/kg	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
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
Dibenz(a,h)Anthracene	N	2800	mg/kg	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
Total Of 16 PAH's	N	2800	mg/kg	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

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

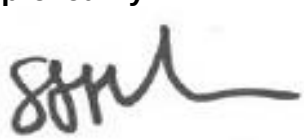
If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

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

Final Report

Report No.:	22-30645-1
Initial Date of Issue:	24-Aug-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	4
Turnaround (Wkdays):	7
Date Approved:	24-Aug-2022
Approved By:	

Date Received:	11-Aug-2022
Date Instructed:	16-Aug-2022
Results Due:	24-Aug-2022



Details: Stuart Henderson, Technical Manager

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-30645	22-30645	22-30645	22-30645
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1486009	1486010	1486011	1486012
				Sample Location:		TP07	TP07	TP07	TP07
				Sample Type:		SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.5	0.7	1.5	2.5
				Date Sampled:		05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**				
pH	U	1010	2:1		N/A	7.6	7.7	7.6	7.5
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	0.089	< 0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.41	3.7	0.11	0.078
Nitrite	U	1220	2:1	mg/l	0.020	0.53	1.0	< 0.020	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	4.9	2.2	< 0.50	< 0.50
Sulphate	U	1220	2:1	mg/l	1.0	21	25	26	120
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	140	160	78	190
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	0.58	1.2	< 0.20	< 0.20
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	26	52	< 10	< 10
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	0.75	4.2	< 0.50	< 0.50
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	6.0	7.6	< 0.50	< 0.50
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	0.69	1.1	11	77
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	< 2.5	< 2.5	< 2.5
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	0.12	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	13	42	7.4	< 5.0
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20	< 20	< 20	< 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20	< 20	< 20	< 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	7.1	13	3.3	3.6
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30645	22-30645	22-30645	22-30645
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1486009	1486010	1486011	1486012
			Sample Location:		TP07	TP07	TP07	TP07
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.5	0.7	1.5	2.5
			Date Sampled:		05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY
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
Moisture	N	2030	%	0.020	11	16	10	9.7
pH	U	2010		4.0	9.1	8.6	9.2	8.4
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	2.1	0.68	1.4	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	0.11
Total Sulphur	U	2175	%	0.010	0.11	0.13	0.14	0.87
Sulphur (Elemental)	U	2180	mg/kg	1.0	3.6	12	2.4	3.8
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	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
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	0.065	0.086	0.17	1.6
Arsenic	U	2455	mg/kg	0.5	9.3	7.8	8.9	5.9
Cadmium	U	2455	mg/kg	0.10	1.8	1.3	2.0	1.2
Chromium	U	2455	mg/kg	0.5	12	8.9	13	9.0
Copper	U	2455	mg/kg	0.50	24	18	22	18
Mercury	U	2455	mg/kg	0.05	0.06	< 0.05	0.10	< 0.05
Nickel	U	2455	mg/kg	0.50	38	31	35	29
Lead	U	2455	mg/kg	0.50	21	12	27	13
Selenium	U	2455	mg/kg	0.25	0.65	2.1	0.89	2.7
Zinc	U	2455	mg/kg	0.50	64	53	71	44
Chromium (Trivalent)	N	2490	mg/kg	1.0	12	8.9	13	9.0
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	1.2	1.4	1.4	1.3
Total TPH >C6-C40	U	2670	mg/kg	10	71	200	59	67
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-30645	22-30645	22-30645	22-30645
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1486009	1486010	1486011	1486012
			Sample Location:		TP07	TP07	TP07	TP07
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.5	0.7	1.5	2.5
			Date Sampled:		05-Aug-2022	05-Aug-2022	05-Aug-2022	05-Aug-2022
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Benzene	U	2760	µg/kg	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
Ethylbenzene	U	2760	µg/kg	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
o-Xylene	U	2760	µg/kg	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
Acenaphthylene	N	2800	mg/kg	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
Fluorene	U	2800	mg/kg	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
Anthracene	U	2800	mg/kg	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
Pyrene	U	2800	mg/kg	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
Chrysene	U	2800	mg/kg	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
Benzo[k]fluoranthene	U	2800	mg/kg	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
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	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
Benzo[g,h,i]perylene	U	2800	mg/kg	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
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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
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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 Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	22-31068-1
Initial Date of Issue:	08-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	3
Turnaround (Wkdays):	7
Date Approved:	08-Sep-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	15-Aug-2022
Date Instructed:	30-Aug-2022
Results Due:	07-Sep-2022

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-31068	22-31068	22-31068
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1487819	1487820	1487821
				Sample Location:		TP06	TP06	TP06
				Sample Type:		SOIL	SOIL	SOIL
				Bottom Depth (m):		0.30	1.00	1.70
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**			
pH	U	1010	2:1		N/A	8.9	8.6	8.1
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Nitrite	U	1220	2:1	mg/l	0.020	< 0.020	< 0.020	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	< 0.50	< 0.50	< 0.50
Sulphate	U	1220	2:1	mg/l	1.0	4.4	2.3	77
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	33	54	360
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	0.40	< 0.20	< 0.20
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	15	11	< 10
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	0.57	0.53	1.3
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	0.08
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	1.6
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	180
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	< 2.5	2.8
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	89	27	5.9
Chromium (Trivalent)	N	1490	2:1	µg/l	20	[A] < 20	[A] < 20	[A] < 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	[A] < 20	[A] < 20	[A] < 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	14	17	13
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd		**Chemtest Job No.:**			22-31068	22-31068	22-31068
Quotation No.: Q21-23509		**Chemtest Sample ID.:**			1487819	1487820	1487821
			Sample Location:		TP06	TP06	TP06
			Sample Type:		SOIL	SOIL	SOIL
			Bottom Depth (m):		0.30	1.00	1.70
			Asbestos Lab:		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
Moisture	N	2030	%	0.020	2.6	7.8	11
pH	U	2010		4.0	[A] 9.4	[A] 8.8	[A] 8.9
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] 0.82	[A] < 0.40	[A] < 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] < 0.010	[A] 0.015	[A] 0.24
Total Sulphur	U	2175	%	0.010	[A] 0.14	[A] 0.063	[A] 0.28
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] < 1.0	[A] 3.4	[A] 5.9
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 6.1	[A] 23	[A] 6.9
Sulphate (Total)	U	2430	%	0.010	[A] 0.19	[A] 0.079	[A] 0.58
Arsenic	U	2455	mg/kg	0.5	6.1	6.1	11
Cadmium	U	2455	mg/kg	0.10	0.64	0.18	1.8
Chromium	U	2455	mg/kg	0.5	6.8	13	13
Copper	U	2455	mg/kg	0.50	9.4	140	27
Mercury	U	2455	mg/kg	0.05	< 0.05	0.08	0.05
Nickel	U	2455	mg/kg	0.50	15	12	47
Lead	U	2455	mg/kg	0.50	8.0	64	22
Selenium	U	2455	mg/kg	0.25	0.78	0.58	4.2
Zinc	U	2455	mg/kg	0.50	30	56	73
Chromium (Trivalent)	N	2490	mg/kg	1.0	6.8	13	13
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	[A] 0.41	[A] 1.3	[A] 1.7
Total TPH >C6-C40	U	2670	mg/kg	10	[A] < 10	[A] 17	[A] < 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-31068	22-31068	22-31068
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1487819	1487820	1487821
			Sample Location:		TP06	TP06	TP06
			Sample Type:		SOIL	SOIL	SOIL
			Bottom Depth (m):		0.30	1.00	1.70
			Asbestos Lab:		DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10	[A] < 10	[A] < 10
Benzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Toluene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] 3.5
o-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] 1.2
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	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
Dibenz(a,h)Anthracene	N	2800	mg/kg	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
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1487819			TP06		A	Amber Glass 250ml
1487819			TP06		A	Amber Glass 60ml
1487819			TP06		A	Plastic Tub 500g
1487820			TP06		A	Amber Glass 250ml
1487820			TP06		A	Amber Glass 60ml
1487820			TP06		A	Plastic Tub 500g
1487821			TP06		A	Amber Glass 250ml
1487821			TP06		A	Amber Glass 60ml
1487821			TP06		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

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U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

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

Final Report

Report No.:	22-31392-1
Initial Date of Issue:	08-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Date Received:	17-Aug-2022
Order No.:	
Date Instructed:	30-Aug-2022
No. of Samples:	3
Turnaround (Wkdays):	7
Results Due:	07-Sep-2022
Date Approved:	08-Sep-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-31392	22-31392	22-31392
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1489402	1489403	1489404
				Sample Location:		TP08	TP08	TP08
				Sample Type:		SOIL	SOIL	SOIL
				Top Depth (m):		0.3	0.9	1.5
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**			
pH	U	1010	2:1		N/A	8.5	8.3	8.9
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050	0.075
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.070	0.32	0.26
Nitrite	U	1220	2:1	mg/l	0.020	< 0.020	0.47	2.2
Nitrate	U	1220	2:1	mg/l	0.50	2.2	2.9	10
Sulphate	U	1220	2:1	mg/l	1.0	28	230	9.8
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	80	410	85
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	2.0	2.8	0.47
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	18	98	23
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	2.9	4.3	1.8
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	1.1	5.4	1.2
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	0.54	0.65	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	2.4	2.8	0.82
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	3.0	3.8	< 2.5
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	180	38	7.7
Chromium (Trivalent)	N	1490	2:1	µg/l	20	[A] < 20	[A] < 20	[A] < 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	[A] < 20	[A] < 20	[A] < 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	23	52	28
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd		**Chemtest Job No.:**			22-31392	22-31392	22-31392
Quotation No.: Q21-23509		**Chemtest Sample ID.:**			1489402	1489403	1489404
				Sample Location:	TP08	TP08	TP08
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.3	0.9	1.5
				Asbestos Lab:	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
Moisture	N	2030	%	0.020	5.1	17	11
pH	U	2010		4.0	[A] 9.1	[A] 8.5	[A] 9.0
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] < 0.40	[A] 2.1	[A] < 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] 0.024	[A] 0.26	[A] 0.010
Total Sulphur	U	2175	%	0.010	[A] 0.18	[A] 0.098	[A] 0.021
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] 3.6	[A] 290	[A] 11
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	0.015	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 12	[A] 13	[A] 4.0
Sulphate (Total)	U	2430	%	0.010	[A] 0.17	[A] 0.13	[A] 0.055
Arsenic	U	2455	mg/kg	0.5	13	6.3	5.2
Cadmium	U	2455	mg/kg	0.10	1.6	0.90	0.93
Chromium	U	2455	mg/kg	0.5	5.7	9.6	5.3
Copper	U	2455	mg/kg	0.50	18	14	12
Mercury	U	2455	mg/kg	0.05	0.15	0.06	< 0.05
Nickel	U	2455	mg/kg	0.50	17	22	18
Lead	U	2455	mg/kg	0.50	66	23	9.0
Selenium	U	2455	mg/kg	0.25	0.41	0.46	0.41
Zinc	U	2455	mg/kg	0.50	260	48	33
Chromium (Trivalent)	N	2490	mg/kg	1.0	5.7	9.6	5.3
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	[A] 28	[A] 0.97	[A] 2.8
Total TPH >C6-C40	U	2670	mg/kg	10	[A] 12	[A] < 10	[A] 14
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-31392	22-31392	22-31392
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1489402	1489403	1489404
			Sample Location:		TP08	TP08	TP08
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.3	0.9	1.5
			Asbestos Lab:		NEW-ASB	NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10	[A] < 10	[A] < 10
Benzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Toluene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	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
Dibenz(a,h)Anthracene	N	2800	mg/kg	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
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1489402			TP08		A	Amber Glass 250ml
1489402			TP08		A	Amber Glass 60ml
1489402			TP08		A	Plastic Tub 500g
1489403			TP08		A	Amber Glass 250ml
1489403			TP08		A	Amber Glass 60ml
1489403			TP08		A	Plastic Tub 500g
1489404			TP08		A	Amber Glass 250ml
1489404			TP08		A	Amber Glass 60ml
1489404			TP08		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

Eurofins Chemtest Ltd
Depot Road
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Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	22-31605-1
Initial Date of Issue:	08-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Rachel White
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	3
Turnaround (Wkdays):	7
Date Approved:	08-Sep-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	18-Aug-2022
Date Instructed:	30-Aug-2022
Results Due:	07-Sep-2022

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Email: info@chemtest.com

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-31605	22-31605	22-31605
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1490306	1490307	1490308
				Sample Location:		TP12	TP12	TP12
				Sample Type:		SOIL	SOIL	SOIL
				Top Depth (m):		0.5	1	1.5
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**			
pH	U	1010	2:1		N/A	8.7	8.3	8.5
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Nitrite	U	1220	2:1	mg/l	0.020	0.082	0.020	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	< 0.50	< 0.50	< 0.50
Sulphate	U	1220	2:1	mg/l	1.0	5.7	4.5	7.9
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	78	87	74
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	2.0	1.1	0.71
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	14	13	15
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	2.2	2.2	2.9
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	1.1	1.8	1.8
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	0.59	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	2.3	1.9	2.0
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	4.0	< 2.5
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	0.13	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	270	870	78
Chromium (Trivalent)	N	1490	2:1	µg/l	20	[A] < 20	[A] < 20	[A] < 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	[A] < 20	[A] < 20	[A] < 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	22	30	18
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd		**Chemtest Job No.:**			22-31605	22-31605	22-31605
Quotation No.: Q21-23509		**Chemtest Sample ID.:**			1490306	1490307	1490308
				Sample Location:	TP12	TP12	TP12
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.5	1	1.5
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY
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
Moisture	N	2030	%	0.020	7.9	13	11
pH	U	2010		4.0	[A] 8.8	[A] 8.7	[A] 8.8
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] 1.0	[A] 0.76	[A] < 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] 0.023	[A] 0.019	[A] 0.014
Total Sulphur	U	2175	%	0.010	[A] 0.072	[A] 0.043	[A] 0.021
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] 2.1	[A] 2.3	[A] 2.3
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 2.5	[A] 4.6	[A] 6.8
Sulphate (Total)	U	2430	%	0.010	[A] 0.081	[A] 0.029	[A] 0.051
Arsenic	U	2455	mg/kg	0.5	9.8	4.4	7.6
Cadmium	U	2455	mg/kg	0.10	1.1	0.86	1.2
Chromium	U	2455	mg/kg	0.5	12	6.9	7.7
Copper	U	2455	mg/kg	0.50	19	9.1	18
Mercury	U	2455	mg/kg	0.05	0.07	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	27	15	32
Lead	U	2455	mg/kg	0.50	32	11	14
Selenium	U	2455	mg/kg	0.25	0.89	0.26	0.73
Zinc	U	2455	mg/kg	0.50	62	31	50
Chromium (Trivalent)	N	2490	mg/kg	1.0	12	6.9	7.7
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	[A] 1.4	[A] 0.52	[A] 1.1
Total TPH >C6-C40	U	2670	mg/kg	10	[A] 21	[A] < 10	[A] < 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-31605	22-31605	22-31605
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1490306	1490307	1490308
			Sample Location:		TP12	TP12	TP12
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.5	1	1.5
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10	[A] < 10	[A] < 10
Benzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Toluene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	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
Dibenz(a,h)Anthracene	N	2800	mg/kg	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
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1490306			TP12		A	Amber Glass 250ml
1490306			TP12		A	Amber Glass 60ml
1490306			TP12		A	Plastic Tub 500g
1490307			TP12		A	Amber Glass 250ml
1490307			TP12		A	Amber Glass 60ml
1490307			TP12		A	Plastic Tub 500g
1490308			TP12		A	Amber Glass 250ml
1490308			TP12		A	Amber Glass 60ml
1490308			TP12		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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)

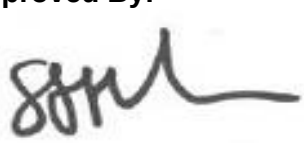
Sample Retention and Disposal

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

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

Final Report

Report No.:	22-32836-1
Initial Date of Issue:	08-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Ciaran Dohert
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	7
Turnaround (Wkdays):	7
Date Approved:	08-Sep-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	26-Aug-2022
Date Instructed:	30-Aug-2022
Results Due:	07-Sep-2022

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

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-32836	22-32836	22-32836	22-32836	22-32836	22-32836	22-32836
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1495687	1495688	1495689	1495690	1495691	1495692	1495693
Order No.:				Client Sample Ref.:		1	2	3	4	1	2	3
				Sample Location:		TP18	TP18	TP18	TP18	TP19	TP19	TP19
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.5	0.8	1.5	2.5	0.3	1.0	1.5
				Date Sampled:		24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**							
pH	U	1010	2:1		N/A	8.6	8.4	8.3	8.3	8.6	8.4	8.4
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.086	0.093	0.39	0.093	0.12	0.10	0.093
Nitrite	U	1220	2:1	mg/l	0.020	0.040	< 0.020	2.0	< 0.020	< 0.020	0.30	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	4.7	3.9	6.8	< 0.50	< 0.50	3.0	< 0.50
Sulphate	U	1220	2:1	mg/l	1.0	4.8	20	18	77	10	21	5.4
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	60	92	120	130	45	88	63
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	0.66	1.9	2.0	0.33	0.51	1.9	< 0.20
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	< 10	22	48	14	18	28	14
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	1.9	3.1	6.1	1.2	0.70	2.3	1.4
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	0.63	2.4	4.1	0.71	< 0.50	1.5	0.93
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	0.79	1.5	3.8	27	0.82	1.6	0.95
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	3.3	6.4	2.5	< 2.5	4.4	4.4
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	93	36	130	62	10	80	32
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	19	26	36	16	11	23	30
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-32836	22-32836	22-32836	22-32836	22-32836	22-32836	22-32836
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1495687	1495688	1495689	1495690	1495691	1495692	1495693
Order No.:			Client Sample Ref.:		1	2	3	4	1	2	3
			Sample Location:		TP18	TP18	TP18	TP18	TP19	TP19	TP19
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.5	0.8	1.5	2.5	0.3	1.0	1.5
			Date Sampled:		24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
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
Moisture	N	2030	%	0.020	2.2	6.2	15	7.5	0.19	8.9	9.6
pH	U	2010		4.0	9.1	8.9	8.5	8.9	9.1	9.0	8.9
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	< 0.40	1.2	< 0.40	< 0.40	< 0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	0.012	0.039	0.010	0.017	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.040	< 0.010	0.028	0.029	0.021	0.025	0.014
Sulphur (Elemental)	U	2180	mg/kg	1.0	2.1	4.9	11	3.3	5.6	5.1	2.8
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	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
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	5.5	2.2	6.9	7.0	6.7	3.5	6.8
Sulphate (Total)	U	2430	%	0.010	0.043	0.030	0.062	0.54	0.062	0.019	0.033
Arsenic	U	2455	mg/kg	0.5	8.9	9.7	5.7	5.6	5.6	6.3	5.7
Cadmium	U	2455	mg/kg	0.10	0.78	0.43	0.92	1.1	0.29	0.23	1.2
Chromium	U	2455	mg/kg	0.5	8.3	10	7.8	6.0	3.2	7.2	6.2
Copper	U	2455	mg/kg	0.50	15	15	14	14	7.5	9.7	15
Mercury	U	2455	mg/kg	0.05	< 0.05	< 0.05	0.07	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	21	23	21	24	8.8	14	23
Lead	U	2455	mg/kg	0.50	17	11	18	9.8	11	5.4	11
Selenium	U	2455	mg/kg	0.25	0.46	0.56	0.76	1.3	< 0.25	< 0.25	0.42
Zinc	U	2455	mg/kg	0.50	69	36	40	39	44	20	38
Chromium (Trivalent)	N	2490	mg/kg	1.0	8.3	10	7.8	6.0	3.2	7.2	6.2
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	1.0	0.95	< 0.40	1.9	1.3	0.48	0.79
Total TPH >C6-C40	U	2670	mg/kg	10	< 10	< 10	< 10	< 10	110	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-32836	22-32836	22-32836	22-32836	22-32836	22-32836	22-32836
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1495687	1495688	1495689	1495690	1495691	1495692	1495693
Order No.:			Client Sample Ref.:		1	2	3	4	1	2	3
			Sample Location:		TP18	TP18	TP18	TP18	TP19	TP19	TP19
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.5	0.8	1.5	2.5	0.3	1.0	1.5
			Date Sampled:		24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022	24-Aug-2022
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzene	U	2760	µg/kg	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
Ethylbenzene	U	2760	µg/kg	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
o-Xylene	U	2760	µg/kg	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	0.31	< 0.10	< 0.10	0.14
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.11	< 0.10	< 0.10	0.11
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.10	< 0.10	0.13	0.10
Fluorene	U	2800	mg/kg	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
Anthracene	U	2800	mg/kg	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
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	0.20	< 0.10	0.12	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.12	< 0.10
Chrysene	U	2800	mg/kg	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	0.16	< 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
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.13	< 0.10	0.14	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	0.13	0.20	0.21	< 0.10	0.11
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	0.12	< 0.10	0.11	< 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
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
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

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

UKAS TESTING
2183

Final Report

Report No.:	22-33017-1
Initial Date of Issue:	12-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Ciaran Dohert
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Date Received:	30-Aug-2022
Order No.:	
Date Instructed:	30-Aug-2022
No. of Samples:	2
Turnaround (Wkdays):	7
Results Due:	07-Sep-2022
Date Approved:	12-Sep-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

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

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-33017	22-33017
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1496526	1496527
Order No.:				Client Sample Ref.:		1	2
				Sample Location:		TP17	TP17
				Sample Type:		SOIL	SOIL
				Top Depth (m):		0.3	1.0
				Date Sampled:		25-Aug-2022	25-Aug-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**		
pH	U	1010	2:1		N/A	8.2	8.2
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.24	0.093
Nitrite	U	1220	2:1	mg/l	0.020	0.19	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	5.2	6.3
Sulphate	U	1220	2:1	mg/l	1.0	4.0	4.6
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	87	88
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	0.69	0.71
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	19	26
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	22	20
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	0.06
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	1.8	1.8
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	1.7	1.4
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	5.2	4.4
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	250	320
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20	< 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20	< 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	32	32
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-33017	22-33017
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1496526	1496527
Order No.:			Client Sample Ref.:		1	2
			Sample Location:		TP17	TP17
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.3	1.0
			Date Sampled:		25-Aug-2022	25-Aug-2022
			Asbestos Lab:		COVENTRY	COVENTRY
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	8.1	13
pH	U	2010		4.0	8.8	8.7
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.60	0.86
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.011	0.017
Total Sulphur	U	2175	%	0.010	0.035	0.026
Sulphur (Elemental)	U	2180	mg/kg	1.0	2.6	2.8
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	1.1	1.1
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	4.9	3.7
Sulphate (Total)	U	2430	%	0.010	0.072	0.093
Arsenic	U	2455	mg/kg	0.5	7.6	7.6
Cadmium	U	2455	mg/kg	0.10	1.2	1.1
Chromium	U	2455	mg/kg	0.5	9.5	9.0
Copper	U	2455	mg/kg	0.50	20	19
Mercury	U	2455	mg/kg	0.05	0.08	0.11
Nickel	U	2455	mg/kg	0.50	25	23
Lead	U	2455	mg/kg	0.50	31	33
Selenium	U	2455	mg/kg	0.25	0.63	0.55
Zinc	U	2455	mg/kg	0.50	59	54
Chromium (Trivalent)	N	2490	mg/kg	1.0	9.5	9.0
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	1.9	2.7
Total TPH >C6-C40	U	2670	mg/kg	10	57	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-33017	22-33017
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1496526	1496527
Order No.:			Client Sample Ref.:		1	2
			Sample Location:		TP17	TP17
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.3	1.0
			Date Sampled:		25-Aug-2022	25-Aug-2022
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10
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	0.12
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	0.16
Anthracene	U	2800	mg/kg	0.10	< 0.10	0.17
Fluoranthene	U	2800	mg/kg	0.10	0.13	0.20
Pyrene	U	2800	mg/kg	0.10	< 0.10	0.20
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	0.16
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	0.18
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10	0.11	0.11
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	0.17	0.15
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

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

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

UKAS TESTING
2183

Final Report

Report No.:	22-33417-1
Initial Date of Issue:	08-Sep-2022
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Alistair McQuat Colm Hurley Darren O'Mahony Gabriella Horan Joe Gervin John Cameron Lucy Newland Martin Gardiner Matthew Gilbert Neil Haggan Paul Dunlop Sean Ross Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister Ciaran Dohert
Project	21-0403S DAA South Apron
Quotation No.:	Q21-23509
Order No.:	
No. of Samples:	6
Turnaround (Wkdays):	7
Date Approved:	08-Sep-2022
Approved By:	
Details:	Stuart Henderson, Technical Manager

Date Received:	01-Sep-2022
Date Instructed:	01-Sep-2022
Results Due:	09-Sep-2022

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Tel: 01638 606070
Email: info@chemtest.com

Results - Leachate

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd				**Chemtest Job No.:**		22-33417	22-33417	22-33417	22-33417	22-33417	22-33417
Quotation No.: Q21-23509				**Chemtest Sample ID.:**		1498434	1498435	1498436	1498437	1498438	1498439
Order No.:				Client Sample Ref.:		1	2	3	4	5	6
				Sample Location:		TP05	TP05	TP05	TP05	TP05	TP05
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.3	0.5	0.7	1	2	2.9
				Date Sampled:		22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**						
pH	U	1010	2:1		N/A	8.5	8.4	8.2	8.1	8.2	8.1
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.17	< 0.050
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.19	0.086	0.26	0.26	2.3	0.72
Nitrite	U	1220	2:1	mg/l	0.020	< 0.020	< 0.020	3.5	0.27	< 0.020	0.073
Nitrate	U	1220	2:1	mg/l	0.50	0.68	< 0.50	2.0	< 0.50	< 0.50	< 0.50
Sulphate	U	1220	2:1	mg/l	1.0	28	47	6.9	7.9	58	130
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hardness	U	1415	2:1	mg/l	15	60	86	97	110	180	230
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	0.61	0.95	0.76	0.41	7.7	1.2
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	150	31	29	35	88	25
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	0.77	0.56	5.7	4.8	2.8	2.8
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	1.7	0.72	1.6	1.3	11	2.1
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	4.0	5.3	4.5	3.3	9.6	180
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	< 2.5	3.3	4.7	4.7	3.2
Cadmium (Total)	N	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	41	5.9	23	44	< 5.0	10
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20	< 20	< 20	< 20	< 20	< 20
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20	< 20	< 20	< 20	< 20	< 20
Total Organic Carbon	U	1610	2:1	mg/l	2.0	16	15	32	37	50	2.4
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-33417	22-33417	22-33417	22-33417	22-33417	22-33417
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1498434	1498435	1498436	1498437	1498438	1498439
Order No.:			Client Sample Ref.:		1	2	3	4	5	6
			Sample Location:		TP05	TP05	TP05	TP05	TP05	TP05
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.3	0.5	0.7	1	2	2.9
			Date Sampled:		22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022
			Asbestos Lab:		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
Moisture	N	2030	%	0.020	4.0	4.5	25	18	21	7.7
pH	U	2010		4.0	8.4	8.5	8.3	8.1	8.2	8.2
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	1.1	0.42	< 0.40	0.81	0.77	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.021	< 0.010	< 0.010	0.025	0.039	0.18
Total Sulphur	U	2175	%	0.010	0.070	0.060	0.069	0.53	0.17	0.80
Sulphur (Elemental)	U	2180	mg/kg	1.0	2.0	30	9.9	6.5	200	3.9
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	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
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	3.9	3.1	3.7	21	16	17
Sulphate (Total)	U	2430	%	0.010	0.12	0.078	0.097	0.19	0.59	0.18
Arsenic	U	2455	mg/kg	0.5	5.2	4.7	3.9	3.7	5.1	4.3
Cadmium	U	2455	mg/kg	0.10	0.76	1.1	0.85	0.68	1.0	0.64
Chromium	U	2455	mg/kg	0.5	6.1	11	8.5	8.2	7.2	5.1
Copper	U	2455	mg/kg	0.50	10	15	12	10	13	10
Mercury	U	2455	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	16	17	14	13	21	18
Lead	U	2455	mg/kg	0.50	9.3	11	9.0	8.6	11	8.8
Selenium	U	2455	mg/kg	0.25	0.88	0.73	0.54	0.46	1.3	1.4
Zinc	U	2455	mg/kg	0.50	25	54	44	41	48	31
Chromium (Trivalent)	N	2490	mg/kg	1.0	6.1	11	8.5	8.2	7.2	5.1
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	0.57	1.6	1.2	1.5	4.5	1.6
Total TPH >C6-C40	U	2670	mg/kg	10	14	86	71	42	32	36
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 21-0403S DAA South Apron

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		22-33417	22-33417	22-33417	22-33417	22-33417	22-33417
Quotation No.: Q21-23509			**Chemtest Sample ID.:**		1498434	1498435	1498436	1498437	1498438	1498439
Order No.:			Client Sample Ref.:		1	2	3	4	5	6
			Sample Location:		TP05	TP05	TP05	TP05	TP05	TP05
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.3	0.5	0.7	1	2	2.9
			Date Sampled:		22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10	< 10	< 10
Benzene	U	2760	µg/kg	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
Ethylbenzene	U	2760	µg/kg	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
o-Xylene	U	2760	µg/kg	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
Acenaphthylene	N	2800	mg/kg	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
Fluorene	U	2800	mg/kg	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
Anthracene	U	2800	mg/kg	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
Pyrene	U	2800	mg/kg	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
Chrysene	U	2800	mg/kg	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
Benzo[k]fluoranthene	U	2800	mg/kg	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
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
Dibenz(a,h)Anthracene	N	2800	mg/kg	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
Total Of 16 PAH's	N	2800	mg/kg	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

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurememrnt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Test Methods

SOP	Title	Parameters included	Method summary
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane 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.
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.
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

CAUSEWAY GEOTECH

APPENDIX J

SPT HAMMER ENERGY MEASUREMENT REPORT



Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	0197
Test Date:	12/02/2022
Report Date:	14/02/2022
File Name:	0197.spt
Test Operator:	NPB

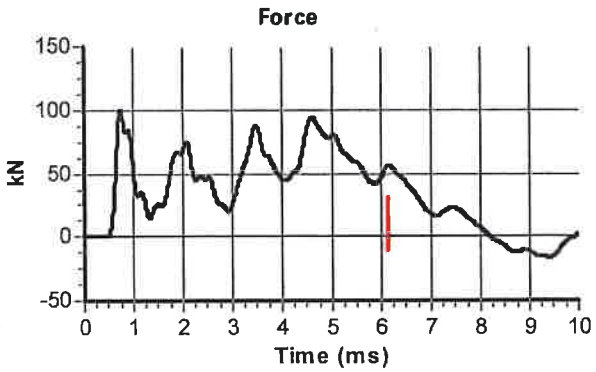
Instrumented Rod Data

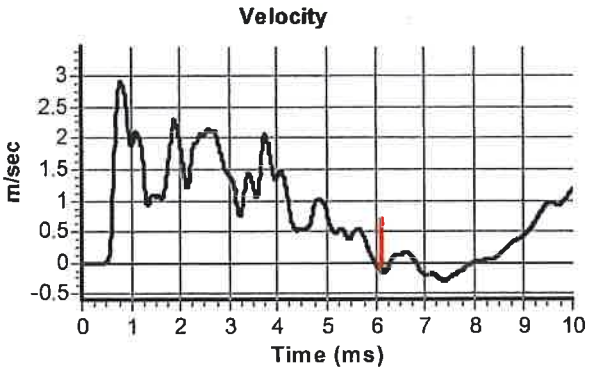
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	64786
Accelerometer No.2:	64789

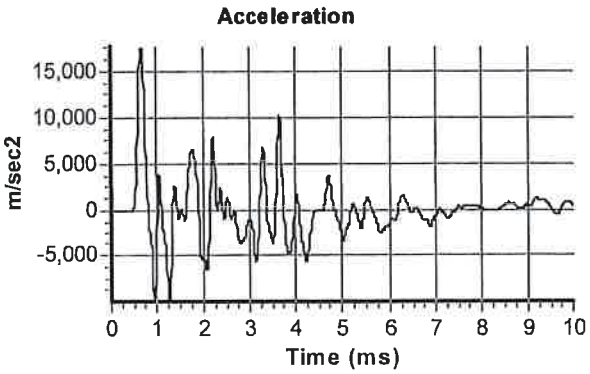
SPT Hammer Information

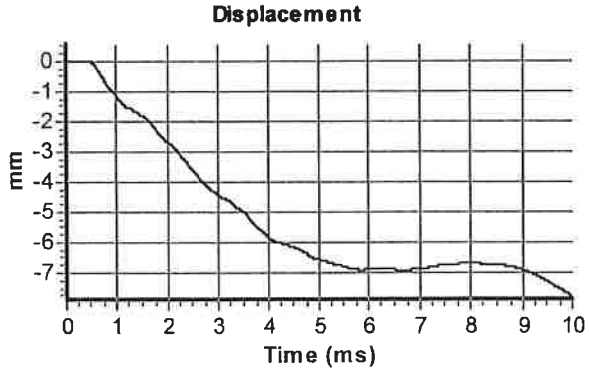
Hammer Mass m (kg):	63.0
Falling Height h (mm):	760
SPT String Length L (m):	12.0

Comments / Location
CAUSEWAY









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	379

Energy Ratio E_r (%): **80**

The recommended calibration interval is 12 months

N Burrows

Signed: N Burrows
Title: FOC Manager

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Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	0208
Test Date:	12/02/2022
Report Date:	14/02/2022
File Name:	0208.spt
Test Operator:	NPB

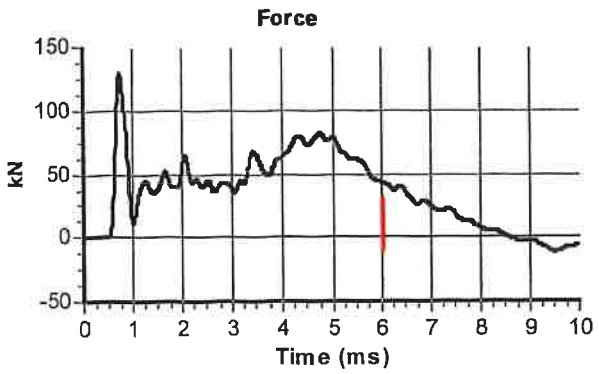
Instrumented Rod Data

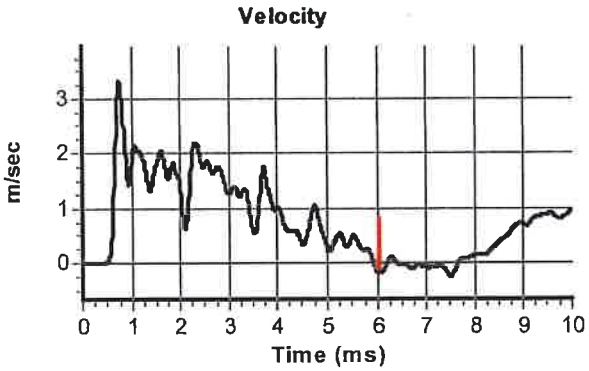
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Accelerometer No.1:	64786
Accelerometer No.2:	64789

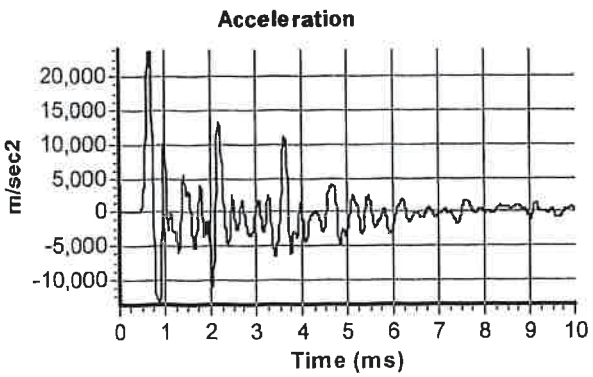
SPT Hammer Information

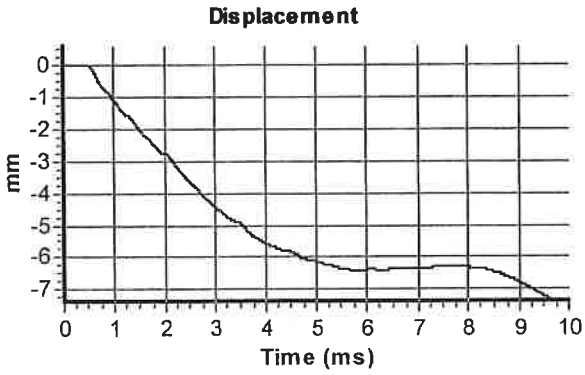
Hammer Mass m (kg):	63.0
Falling Height h (mm):	760
SPT String Length L (m):	12.0

Comments / Location
CAUSEWAY









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	357

Energy Ratio E_r (%): **76**

N Burrows

Signed: N Burrows
Title: FOC Manager

The recommended calibration interval is 12 months

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Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	1387
Test Date:	12/02/2022
Report Date:	14/02/2022
File Name:	1387.spt
Test Operator:	NPB

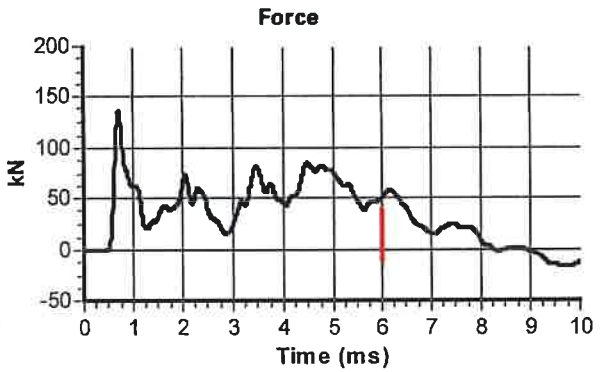
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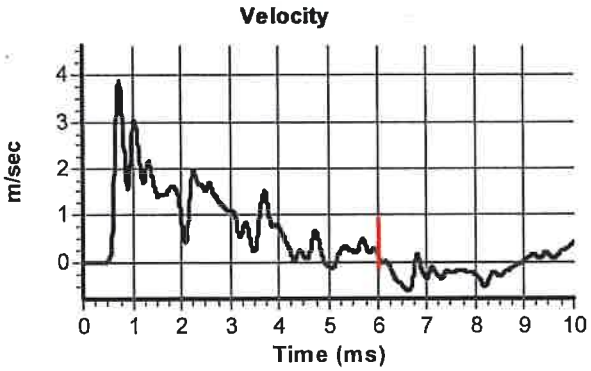
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	64786
Accelerometer No.2:	64789

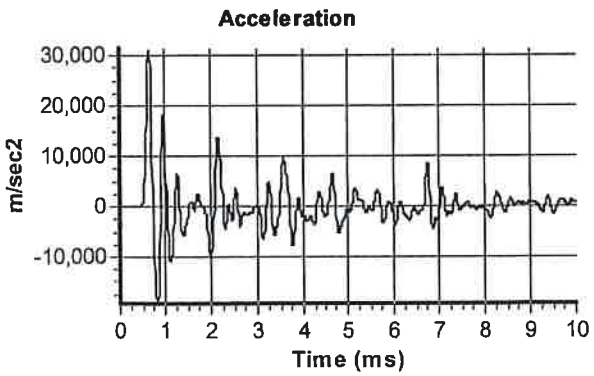
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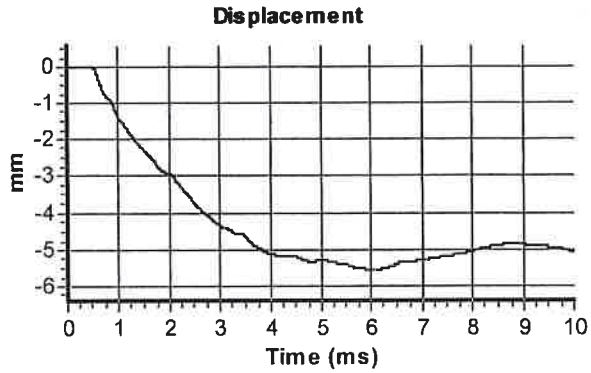
Hammer Mass m (kg):	63.0
Falling Height h (mm):	760
SPT String Length L (m):	12.0

Comments / Location
CAUSEWAY









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	308

Energy Ratio E_r (%): **65**

The recommended calibration interval is 12 months

Signed: N Burrows
Title: FOC Manager

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CAUSEWAY GEOTECH

APPENDIX K

PFAS SOIL SAMPLING METHODOLOGY



METHOD STATEMENT – NASAH PROJECT

Date: 15/07/2022

From: Fehily Timoney and Company

To: Dublin Airport Authority

Subject: PFAS Soil Sampling Methodology – NASAH Project

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1 Introduction

Dublin Airport Authority (daa) have retained the services of Fehily Timoney and Company (FT) to coordinate with their selected S.I Contractor(s) to instruct and facilitate the collection of soil, surface water and groundwater samples, as required, to determine the concentrations of per and poly-fluoroalkyl substances (PFAS) which may be present on a project by project basis.

The following sections outlines the methodology and approach for soil sampling, which is to be carried out by the selected S.I Contractor(s) during the completion of ground investigation works for the NASAH project. If surface water and groundwater samples are required, a separate sampling methodology will be prepared.

The selected S.I contractor(s), in accordance with this method statement, will obtain representative samples of soil at each trial pit location. Soil sampling and logging of the ground profile will be carried out at each trial pit location, which are to be pre-determined by daa personnel prior to commencement.

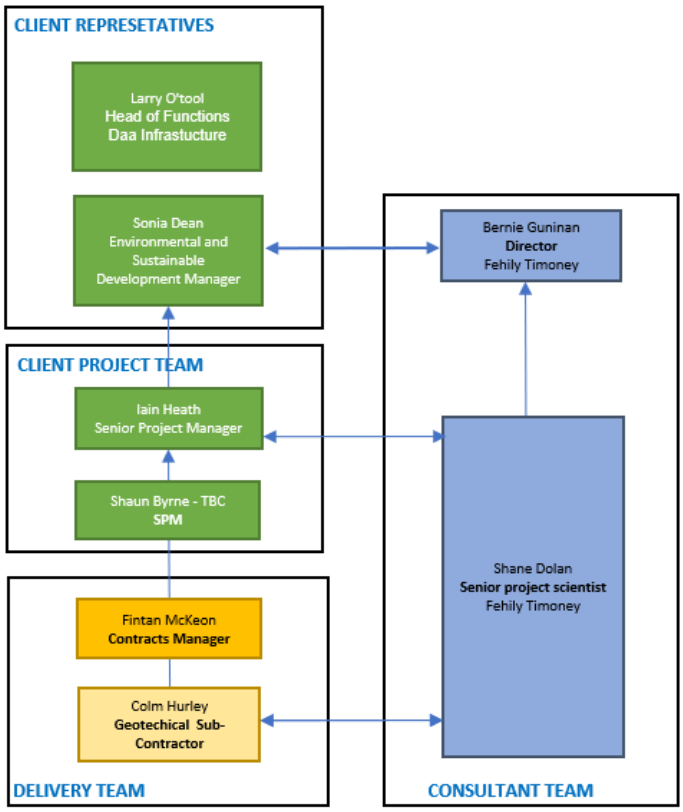
The soil samples will be placed in an appropriate container and securely stored in cooler boxes by the selected S.I contractor(s) prior to collection by FT personnel who will ship the samples to an accredited Testing Laboratory. Further details on sample collection can be found in Section 3.

In principle, the methodology describes herein should be followed for all site investigation works within the airport campus but the requirement for sampling, initial and secondary screening and soil testing may vary from project to project. Consequently, a PFAS soil sampling methodology should be generated for each project.

2 Communications

With any project of this nature, it is essential that it is managed effectively and efficiently. Figure 2.1 sets out the primary contacts relevant to this project, communication structure and communications plan.

2.1 Project Team – NASAH



2.2 Contact Directory - NASAH

Name	Company	Role	Email address	Phone No.
Client Team				
Sonia Dean	daa	Environmental and Sustainable Development Manager	sonia.dean.cw@dublinairport.com	-
Iain Heath	daa	Senior Project Manager	iain.heath@daa.ie	01 944 9457
Shaun Byrne	daa	Resident Engineer	shaun.byrne@daa.ie	01 944 9451
Contractor - Kilwex				
Fintan McKeon	Kilwex	Contracts Manager	fintan.mckeon@kilwex.ie	086 108 1029
Patrick Isaacs	Kilwex	Site manager	patrick.isaacs@kilwex.ie	-
Specialist Geo Sub - Contractor - Causeway				
Colm Hurley	Causeway Geotech	Regional manager	colm.hurley@causewaygeotech.com	0044 7387126 423
PFAS testing consultants - Fehily Timoney				
Bernie Guinan	FTC	Director	bernie.guinan@ftco.ie	086 3819160
Shane Dolan	FTC	Senior Project Scientist	shane.dolan@ftco.ie	087 627 3099

2.3 Communications

- Day to day Project communications will be via telephone and email for general coordination matters.
- Key project contacts will be the S.I Contractor and Consultant Representative from FT. The client project manager and main contractor contracts manager should be copied on all relevant correspondence
- All ground investigation data, logs, sample reports, test results etc are to be submitted and recorded via the clients CDE. Currently the daa operate project control via BIM. All documentation must comply with the daa document control procedures for document numbering and referencing.
- Progress / coordination meetings are to be held on a weekly between the SI contractor and FT. It is the S.I contractors' responsibility for the coordination of these meetings.
    - The S. I Contractor should provide a written report for each meeting to confirm progress of but not limited to:
    - Total number of testing locations
    - Locations started / in progress / complete
    - Total samples taken per location
    - Samples in storage
    - Samples issued for testing

3 Sampling Methodology

This method statement should be read, understood and adhered to by the selected contractor(s) to ensure the correct procedures are followed. The collection, storage, and coordination of PFAS sampling is the full responsibility of the contractor(s).

PFAS is detected at extremely low concentrations and is susceptible to cross contamination, therefore it is important that this sampling methodology is followed during the soil sampling at each designated testing location.

It is required that all soil sampling is undertaken by a person trained in line with this procedure and has been approved by the Project Manager.

3.1 Sample Equipment

The following equipment specific to PFAS sampling is required:

- Disposable Nitrile Gloves
- 1kg Laboratory Supplied Plastic Containers

Acceptable materials for sample collection include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. No sampling equipment components or sample containers should come in to contact with aluminium foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions:

- stainless steel spoon
- stainless steel bowl
- steel shovel/trowel without any coatings

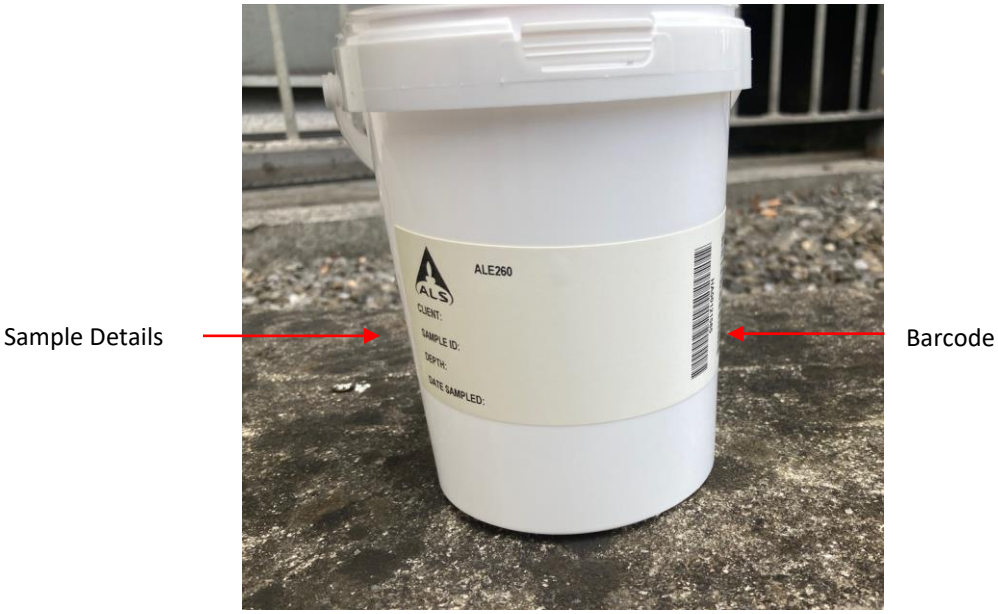
Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should be laundered multiple times. Appropriate rain gear should be used that does not contain PFAS e.g. PVC, polyurethane, or rubber rain gear is acceptable. Random oversight and spot checks will be conducted to ensure these procedures are being adhered to during the ground investigation works.

On the day of sample collection do not use cosmetics, moisturisers, hand cream, sunscreen or insect repellent. In summer months, where possible, the S.I contractor should adopt wrist to ankle cover and utilise sun hats to avoid the use of sunscreen.

3.2 Sample Container

1kg laboratory grade plastic sample containers will be supplied to the selected contractor by FT personnel upon request. It is the responsibility of the selected contractor(s) to contact FT when sample containers need to be restocked. A two week lead in time will be required to allow for containers to be shipped from ALS Global in the UK. FT will deliver sample containers to the site compound of the selected contractor unless an alternative location is specified.

Image 1: Typical Sample Container



3.3 Sample Labelling

The contractor is required to label the supplied sample containers as per the agreed labelling sequence for the project prior to the commencement of sampling works. The general labelling sequence for the sampling containers:

Client: FT

Project Number: P21-195

Sampling Location: TP14, TP15, etc. as appropriate

Depth: As appropriate, e.g. 0.0 – 0.5, 0.5 - 1.0m, 1.0 – 1.5m, etc.

Date: As appropriate

Do not label the sampling containers with waterproof markers (Sharpies) as they may contain PFAS, ballpoint pens are acceptable.

For each sample, the detachable barcode labels from each 1kg sample pot should be fixed to a separate sheet with the following details corresponding to the sample – Sample ID, Depth Range, Date. This sheet should be presented to FT upon completion to facilitate registering samples with the laboratory.

Image 2: Sample Logging Example



3.4 Sample Collection

The sampling method employed will require the collection of representative samples of the soil profile at depths of 0.5m below ground level (BGL) or where a change in soil strata is observed through made ground until the required depth of test location has been achieved. Once natural ground has been encountered, the frequency of sampling can be increased to every 1.0m BGL. The location and depth of the PFAS testing locations will be predetermined by the daa's project team prior to work commencing.

- Containers should only be opened immediately prior to sampling.
- Representative samples collected from each test location will be prepared, as outlined below and placed directly into the appropriate laboratory container (1kg Laboratory grade plastic tub).
- Representative samples should be deposited into a stainless steel bowl (circa 3L) for mixing prior to filling the sampling container. The soil should be placed directly into the bowl and mixed thoroughly the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.
- The collection and mixing of samples can be completed by hand using nitrile gloves, which are to be replaced for each sample collected or by pre-cleaned trowel or shovel. The container should be filled to ensure there is sufficient sample to complete the laboratory analysis.
- Decontamination of all sampling equipment must be completed between each sample event to avoid cross contamination. Further details on sample collection can be found in Section 3.5.
- The sampling method employed will require the collection of representative samples of the soil profile at depths of 0.5m BGL or where a change in soil strata is observed through made ground until the required depth of test location has been achieved. Once natural ground has been encountered, the frequency of sampling can be increased to every 1.0m BGL.
- As with all other samples, do not place the sample container lid on any surface when collecting the sample, and avoid all contact with the inside of the sample container or its lid.

- Ensure clean nitrile gloves are worn when handling each sample.
- All soil sampling is to be undertaken by a person trained in line with this procedure and has been approved by the client to ensure these procedures are followed at each test location.
- All sample will be submitted for PFAS analysis to ALS Global, an ISO 17025:2017 approved laboratory. All samples will be submitted via courier under Chain of Custody procedures.

3.5 Equipment Decontamination

Special handling and care must be taken when collecting samples for PFAS analysis to avoid cross contamination of the samples. PFAS is detected at extremely low concentrations and is susceptible to cross contamination.

Decontamination procedures should include the scrubbing of all sampling equipment using polyethylene or polyvinylchloride (PVC) brush to ensure that all residual soils are removed followed by triple rinsing of equipment with PFAS-free water between each sample event. Commercially available deionized water in a HDPE container may be used for decontamination if the water is verified to be PFAS-free.

The excavator/drill rig undertaking the S.I works should be thoroughly cleaned prior to and following the completion of the trial pit investigation to avoid the potential for cross contamination with other areas of the airport.

Cleaning procedures should be conducted in such a manner as to ensure that all residual soils are removed from the excavator/drill rig, in particular the excavator bucket between test locations. Any equipment that was in contact with the contaminated material should be thoroughly cleaned at the point of excavation to avoid transporting potentially contaminated soil to the next test location.

3.6 Sample Packaging

All sample containers are to be placed directly into the laboratory cooler box following the collection of the sample in order to protect samples from damage. The samples will be packaged with appropriate packing material to avoid breakages during transport and the lid of the cooler box securely closed and sealed using packing tape.

3.7 Storage

The laboratory cooler box and samples are to be stored in a safe and secure location within the site compound or contractors facility. Samples do not require to be kept on ice, but coolers should be stored in a cool, dry location. FT will organise with the selected contractor to collect the samples on a regular basis, depending on the rate of sample collection. FT will be responsible for the dispatch of samples under strict chain of custody procedures to the laboratory for analysis. The contact details for FT personnel are provided in Section 2.2 above.

3.8 Disposing of samples

Following receipt of the laboratory results and report being issued, FT personnel will instruct on whether or not the remaining samples can be disposed of or if further analysis is required.

Samples not sent for analysis are to be held for a period of 12 months unless specified by the client. Any samples which are to be disposed of will be instructed by FT and will be subject to client approval prior to disposal.

4 Quality Assurance/Quality Control

A minimum of 1 duplicate per 20 samples collected in the field is required for quality assurance/quality control purposes. The duplicate shall consist of an additional sample collected from the sample substrate at a given location. The purpose of the duplicate sample is to assess the variance in the sampling method undertaken in the field as well as the analysis in the laboratory. The duplicate sample is to be labelled identically to it corresponding sample.

5 Soil Testing Schedule

As outlined in Section 3, representative samples of the soil profile will be collected at depths of 0.5m BGL or where a change in soil strata is observed, however not all samples will be analysed in the first instance. A breakdown of the screening processes in outlined below.

5.1 Initial screening

Based on the distribution of test locations across the NASAH Project, FT propose to initially select random locations which are representative of the project area and send a number of surface samples for laboratory analysis. The remaining samples will be held by the contractor in a secure location until receipt of the first round of screening is completed. Should PFAS be detected, FT will make a determination on the number of the remaining samples are to be analysed in order to determine the distribution of PFAS contamination throughout the soil profile.

5.2 Secondary Screening

Following the initial screening process, FT will review and validate the laboratory results. Should PFAS be detected, FT will recommend additional samples to be analysed in order to determine the distribution of PFAS within the soil profile across the project site. The number of additional samples to be analysed will be notified to daa prior to laboratory analysis.

5.3 Soil testing

Samples will be dispatched to ALS Global and analysed for the PFAS Extended Soils Suite LCMS (S-PFCLMS02).

5.4 Test results

All test results, once received will be validated by FT before being uploaded to the clients CDE by FT. The test results will be summarized and presented in a final report for each project completed. The results of the lab testing will determine if further samples require analysis. This will be advised by FT to the client and the contractor.

5.5 Test reports

A summary report of the ground investigation works carried out, including locations and depths of the sample locations and the number of samples collected will be prepared for each project. This report will also present a summary and interpretation of the results and outline recommendations and conclusions and the requirement for further work if necessary. Appropriate disposal/management options of soils potentially contaminated with PFAS will also be presented.

5.6 Documentation

All laboratory analysis and reports will be uploaded to the clients CDE following the clients document control procedures to the relevant site investigation folder documenting PFAS.

END OF DOCUMENT