St. Kevin's Asylum, Cork – Ground Investigation

Client:	Reddy Architecture + Urbanism *For services for the LDA*
Client's Representative:	Barrett Mahony Consulting Engineers
Report No.:	20-0105
Date:	July 2020
Status:	Final for Issue

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APPENDICES

Document Control Sheet

Report No.:		20-0105			
Project Title:		St. Kevin's Asylum, Cork			
Client:		Reddy Architecture + Urbanism (*For services for the LDA*)			
Client's Representative:		Barrett Mahony Consulting Engineers			
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Prepared by:		**Reviewed by:**		**Approved by:**	
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The works were conducted in accordance with:

British Standards Institute (2015) BS 5930:2015, Code of practice for site 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, The Code of Practice for Site 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	
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.

St. Kevin's Asylum, Cork Report

1 AUTHORITY

On the instructions of Barrett Mahony Consulting Engineers, ("the Client's Representative"), acting on the behalf of Reddy Architecture + Urbanism ("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 a proposed residential development.

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. A discussion on the recommendations for construction is also provided.

All information given in this report is based upon the ground conditions encountered during the site 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, soil and rock core sampling, environmental sampling, in-situ and laboratory testing, and the preparation of a report on the findings including recommendations for construction.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted on the site of St. Kevin's Asylum, Shanakiel located 1km immediately west of Cork City on the northern bank of the River Lee. The site is bounded by the Atkins Hall development to the west, St. Annes Pitch and Putt club to the North, Irish Water storage and residential units to the East, and the Old Cork Waterworks to the south.

The site comprises several abandoned buildings which will be demolished as part of the development and is falls rapidly in elevation from north to south towards the River Lee.

4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between 2nd March and 26th March 2020, comprised:

- ten light cable percussion boreholes;
- three boreholes by rotary follow-on methods;
- a standpipe installation in one borehole;
- twenty machine dug trial pits; and
- an infiltration test performed in five trial pits.

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 ten 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 percussion boring using a Dando Terrier rig and rotary drilling by a Comacchio 205 tracked 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 Dynamic sampled boreholes

Seven boreholes (BH02, BH03, BH0 and BH07-BH10) were put down to completion by light percussion boring techniques using a Dando Terrier dynamic sampling rig. The boreholes were put down initially in 150mm diameter, reducing in diameter with depth as required, down to 50mm by use of the smallest sampler.

Hand dug inspection pits were carried out between ground level and depths ranging from 0.50 -1.20m to ensure boreholes were put down clear of services or subsurface obstructions. The boreholes were taken to depths ranging between 0.50m and 10.00m where they were terminated on encountering virtual refusal on obstructions above this depth.

Disturbed (bulk and small bag) samples were taken within the encountered strata.

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 K.

Groundwater was not noted during drilling at any of the locations.

Appendix B presents the borehole logs.

4.2.2 Boreholes by combined percussion boring and rotary follow-on drilling

Three boreholes (BH01, BH04 and BH06) were put down by a combination of light cable percussion boring and rotary follow-on drilling techniques using a Comacchio 205 tracked drilling rig, with core recovery in bedrock. Where the light cable percussion borehole had not been advanced onto competent bedrock, symmetrix-cased full hole rotary percussive drilling techniques were employed to advance the boreholes to bedrock, after which rotary coring was employed to recover core samples of the bedrock.

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 in the light cable percussion sections of the boreholes.

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 K.

Where coring was carried out within bedrock strata, conventional coring methods were used with a metric T2-101 core barre, which produced core of nominal 84mm diameter, and was placed in triple 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: 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 boreholes BH01.

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

Twenty trial pits (TP01–TP20) were excavated using a 3t tracked excavator fitted with a 600mm wide bucket, to a maximum depth of 2.15m.

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

Groundwater was not noted during excavation of any of the trial pits. 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 Infiltration tests

An infiltration/soakaway test was carried out at five locations (IF01- IF05) in accordance with BRE Digest 365 - Soakaways (BRE, 2016). The tests were conducted in similarly numbered trial pits.

Appendix F presents the results and analysis of the infiltration test.

4.6 Groundwater and ground gas monitoring

Following completion of site works, groundwater and ground gas monitoring was conducted on four rounds. Ground water monitoring was carried out using a water interface probe. Ground gas measurements were carried out using a GA5000 gas meter.

The monitoring records are presented in Appendix G.

4.7 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 R6 GPS system employing VRS and real time kinetic (RTK) techniques.

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

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.

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)
- Cyanides
- Asbestos screen
- pH.

Results of environmental laboratory testing are presented in Appendix I.

The results of the above tests were analysed by environmental consultant McCloy Consulting and a GQRA compiled which is presented in Appendix J.

6 GROUND CONDITIONS

6.1 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise Made Ground and Glacial Till. These deposits are underlain by sandstones and mudstones of the Cuskinny Member (Kinsale 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:** BH04 encountered 100mm of bitmac.
- **Topsoil:** encountered across the site with a thickness range of 50-300mm.
- **Made Ground (sub-base):** approximately 400mm of aggregate fill beneath the paved surface in BH04.
- **Made Ground (fill):** reworked sandy gravelly clay or sandy silty/clayey gravel encountered across the site, greatest in extent in the south of the site at TP18 to a depth of 2.15m. Varying amounts of glass, red brick, waste pipe, concrete wood and steel were encountered across the site.
- **Glacial Till:** sandy gravelly clay, frequently with low cobble content, typically firm or stiff in upper horizons, becoming very stiff with increasing depth. Generally only found in the south of the site.
- **Weathered bedrock**: generally, very dense encountered as sandy silty/clayey gravel encountered across the site to a maximum depth of 6.00m in BH06.
- **Bedrock (Sandstone):** Rockhead was encountered at depths ranging from 2.30m in BH01 to 6.00m in BH06.

6.3 Groundwater

Groundwater was not noted during drilling at any of the borehole. However, it should be noted that the casing used in supporting the borehole walls during drilling may have sealed out any groundwater strikes and the possibility of encountering groundwater during excavation works should not be ruled out.

It should be noted that any groundwater strikes within bedrock may have been masked by the fluid used as the drilling flush medium.

Groundwater was not encountered during excavation of any of the trial pits.

Seasonal variation in groundwater levels should also be factored into design considerations and continued monitoring of the installed standpipes will give an indication of the seasonal variation.

7 DISCUSSION

7.1 Proposed construction

It is proposed to construct a new residential development which will comprise a mix of townhouses, duplexes and apartments and associated infrastructure.

No further details were available to Causeway Geotech at the time of preparing this report and any designs based on the recommendations or conclusions within this report should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory holes. Causeway Geotech were commissioned to provide a geotechnical report, and it is outwith our remit to advise on structure design.

7.2 Recommendations for construction

7.2.1 Summary

Based on the presence of very dense gravel/weathered bedrock or stiff glacial till at relatively shallow depths across the footprint of the proposed building, the implementation of traditional shallow (spread) foundations (strip/pad and trench fill) are considered suitable.

However locally, the thickness of made ground and soft to firm glacial till deposits may make the implementation of traditional shallow (spread) foundations problematic and likely unsuitable. Consequently, the most practicable foundation solution across these areas involves the transfer of loading to depth by piling.

It should be noted that at the time of writing this report the full scope of works was not completed. It is recommended to return to site to complete rotary drilling in the south of the site to determine depth to bedrock.

7.2.2 Soil strength parameters

When estimating the shear strength of fine soils (silt/clay), reference is made to the results of Standard Penetration Tests (SPT's) carried out within the boreholes. The undrained shear strength of fine soils can be estimated using the correlation developed by Stroud & Butler:

$$C_u = f_1 \times N$$

where f_1 is typically in the range 4 to 6. A median f_1 value of 5 is adopted for this report.

For granular soils (sand/gravel), a graphical relationship between SPT "N" value and angle of shearing resistance, φ, has been developed by Peck, Hanson and Thorburn. This is published in *Foundation Design and Construction* (Tomlinson, 2001) and is referenced in this report when deriving angles of shearing resistance for the gravel soils.

7.2.3 Foundations and ground floor construction

Foundations should transfer loading to below any Made Ground or subsoil. The recommended foundation construction and allowable bearing pressure (ABP) at the borehole locations are presented in Table 1.

Table 1: Construction recommendations

Borehole	Depth below EGL* to suitable bearing stratum	Estimated ABP (kPa)	Strata description	Foundation type	Ground floor construction	Groundwater
BH01	0.10m	500	Weathered bedrock	Strip & Pad	Ground bearing	Not encountered
BH02	0.50m	300	Weathered bedrock	Strip & pad	Ground bearing	Not encountered
BH03	1.60m	300	Weathered bedrock	Strip & pad	Suspended	Not encountered
BH04	1.20m	500	Very dense GRAVEL	Strip & pad	Ground bearing	Not encountered
BH05	0.50m	300	Weathered bedrock	Strip & pad	Ground bearing	Not encountered

Borehole	Depth below EGL* to suitable bearing stratum	Estimated ABP (kPa)	Strata description	Foundation type	Ground floor construction	Groundwater
BH06	3.70m	>500	Weathered bedrock	Trench fill	Suspended	Not encountered
BH07	1.20m	300	Weathered bedrock	Strip & pad	Suspended	Not encountered
BH08	3.00m	200	Stiff Glacial Till	Trench fill	Suspended	Not encountered
BH09	1.20m	300	Very Stiff Glacial Till	Strip & pad	Suspended	Not encountered
BH10	1.20m	150	Stiff Glacial Till	Strip & pad	Suspended	Not encountered
	5.00	500	Weathered bedrock	Piled		

*Existing Ground Level

Based on the findings of the site investigation, spread foundations (strip/pad and trench fill) are considered suitable with estimated allowable bearing pressures between 300kPa and 500kPa at depths between 0.10m and 3.00m on very dense gravel/weathered bedrock or stiff glacial till

The base of foundation excavations should be thoroughly inspected and tested in accordance with the earthwork's specification; any soft or loose soils removed with the resultant void backfilled with ST1 concrete or engineered backfill. A consistent bearing stratum should be provided for any building unit to limit differential settlements.

Given the generally fine grained/cohesive nature of the soils throughout the proposed formation levels, excavations for foundations are likely to be relatively stable. However, any instability can be minimised by battering the side slopes at 2 vertical to 1 horizontal and by limiting the duration that the excavation is open. Groundwater control, where required, will be possible by pumping from sumps formed in the base of excavations.

7.2.4 Floor slabs

Floor slabs should not bear directly onto Made Ground or soft soils. Consequently, the use of ground bearing floor slabs is considered appropriate following the removal of any surface Made Ground and soft clay layers and their replacement using well-graded well-compacted granular fill. However, a suspended floor slab should be adopted where the difference in levels of the proposed floor and the base of Made Ground/soft soils is greater than 600mm.

Therefore, given the depth to the base of Made Ground and relative low strength of upper soil layers, a suspended floor slab may be required over parts of the site. The use of intermediate lines of support stub walls would reduce the spans required for flooring units.

7.2.5 Excavations for services

For the installation of services ducts/trenches, it is suggested that open trenching will be the most practicable construction method. Generally speaking, the ground conditions should render the use of open trenching by backhoe excavator possible, with some trench support required for the uppermost granular stratum.

Where working in open trenches, it is thought that trench support systems, by way of a trench box (or possibly sheet piles), will be required to maintain trench stability and safe working conditions. Groundwater control at these locations should be possible by means of sump pumping.

To preclude the eventuality of differential settlements in pipes, they should be laid on a consistent stratum of appropriate allowable bearing capacity and protected with appropriate fill cover.

Where ducts and chambers must be installed in areas where localised soft spots are encountered, the use of geogrid reinforcement along the base of the excavation on is recommended. This will stiffen the base of the trench and help control longitudinal differential settlement.

Backfilling of trenches may be completed by using compacted Cl 804 granular fill and reinstated as appropriate.

7.2.6 Soil aggressivity

An assessment of the Aggressive Chemical Environment for Concrete (ACEC) was undertaken through reference to the Building Research Establishment (BRE) Special Digest 1 (2017).

As noted by BRE Special Digest 1, sulphates in the soil and groundwater are the chemical agents most likely to attack concrete. The extent to which sulphates affect concrete is linked to their concentrations, the type of ground, the presence of groundwater, the type of concrete and the form of construction in which concrete is used.

BRE Special Digest 1 identifies four different categories of site which require specific procedures for investigation for aggressive ground conditions:

- Sites not subjected to previous industrial development and not perceived as containing pyrite;
- Sites not subjected to previous industrial development and perceived as containing pyrite;
- Brownfield sites not perceived as containing pyrite;
- Brownfield sites perceived as containing pyrite.

For the purposes of this report the site was classified as not having been subject to previous industrial development and not perceived as containing pyrite.

The results of chemical tests (pH and water soluble sulphate contents) on soil samples indicate Design Sulphate Class DS-1 and ACEC Class AC-1 – reference Table C1 of BRE Special Digest 1 (Building Research Establishment, 2005). The Special Digest does not require any measures to protect underground concrete elements greater that 140mm thick. The Special Digest requires additional design measures to be applied to increase protection from the elevated levels of sulphates and acidic soils present in parts of the site.

7.3 Infiltration drainage

In infiltration tests carried out in trial pits IF01, IF02 and IF05, the rate of infiltration was calculated ranging from 0.071 - 0.690m/hr. The rates of infiltration coupled with the soil descriptions imply that the subsoil may be considered suitable media for an infiltration drainage system. In IF04 the pit was unable to be filled due to the water draining away too fast. This would indicate that the stratum is highly permeable.

In IF03, the absence of the outflow from the pits precluded calculation of infiltration coefficients. The low-permeability soils are therefore considered to be poor infiltration media and would be deemed unsuitable for the implementation of infiltration drainage systems.

Reference should be made the Sustainable Drainage Systems (SuDS) design guidance, taking into account meteorological conditions and a hydrogeological assessment.

8 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.

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

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

BS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. 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 EN ISO 14689-1:2018: Geotechnical investigation and testing. Identification and classification of rock. Identification and description.

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

Building Research Establishment (2005) BRE Special Digest 1, Concrete in aggressive ground.

Building Research Establishment (2007), BRE Digest 365: Soakaways.

CAUSEWAY GEOTECH

Project No.:	20-0105	**Client:**	Land Development Agency
Project Name:	St. Kevin's Asylum, Cork	**Client's Representative:**	Barrett Mahony Consulting Engineers

Legend Key

Title:

Site Location Plan

Last Revised:	**Scale:**
06/04/2020	1:10000

CAUSEWAY GEOTECH

Project No.:	20-0105	**Client:**	Land Development Agency
Project Name:	St. Kevin's Asylum, Cork	**Client's Representative:**	Barrett Mahony Consulting Engineers

Legend Key

- Locations By Type - CP
- Locations By Type - CP+RC
- Locations By Type - TP

Title:
Exploratory Hole Location Plan

Last Revised:	**Scale:**
06/04/2020	1:2000

CAUSEWAY GEOTECH

APPENDIX B

BOREHOLE LOGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH01
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	0.10	
Rotary Drilling	Comacchio 205	0.10	2.50	164927.73 E
Rotary Coring	Comacchio 205	2.50	5.50	71833.41 N

Final Depth: 5.50 m	Start Date: 04/03/2020	Driller: JC+RS	Sheet 1 of 1 Scale: 1:50
Elevation: 63.56 mOD	End Date: 25/03/2020	Logger: SR+NP	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					63.46	0.10		TOPSOIL Very dense greenish grey sandy clayey subangular GRAVEL (Driller's description)		
					61.26	2.30		Grey SANDSTONE (Driller's description)		
		TCR 100 SCR 100 RQD 50 FI 9			61.06	2.50		Medium strong (locally weak) very thinly bedded fine grained well cemented grey SANDSTONE interbedded with very thin beds of sark grey MUDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing with patchy dark orangish brown discolouration. Discontinuities: 1. 10 to 20 degree bedding fracture closely spaced (50/105/>250) planar and slightly undulating, smooth with dark orangish brown staining on fracture surfaces. 2. At 3.3m to 3.40m >85 degree joint, undulating, smooth with patchy dark orangish brown staining on fracture surfaces.		
3.60		TCR 100 SCR 100 RQD 44 FI 7			59.76	3.80		Medium strong (locally weak) very thinly bedded fine grained well cemented grey SANDSTONE interbedded with very thin beds of dark grey mudstone. Partially weathered: slightly reduced strength, slightly closer fracture spacing with faint and patchy orangish brown staining. Discontinuities: 1. 0 to 15 degree joints medium spaced (100/235/300) planar, smooth with faint and patchy orangish brown staining on fracture surfaces.		
5.10		TCR 100 SCR 85 RQD 30 FI 10			59.06	4.50				
5.50					58.06	5.50		Medium strong (locally weak) very thinly bedded fine grained well cemented grey SANDSTONE interbedded with very thin beds of dark grey MUDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing with patchy and faint orangish brown discolouration. Discontinuities: 1. 10 to 20 degree bedding fractures closely spaced (110/125/220) planar, smooth with patchy orangish brown staining on fracture surfaces. 2.>85 degree joints medium spaced (360/500/>500) undulating, rough with faint and patchy dark orangish brown staining on fracture surfaces. *5.40m to 5.50m: Discontinuous quartz vein.* End of Borehole at 5.50m		

(1.30) (0.70) (1.00)

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	No groundwater encountered.

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
2.50	130		

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated at scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH02
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 0.50 m	Start Date: 04/03/2020	Driller: JC	Sheet 1 of 1
Light Percussion	Dando Terrier	0.00	0.50	165022.93 E 71828.17 N	Elevation: 65.82 mOD	End Date: 04/03/2020	Logger: SR	Scale: 1:40 FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 0.30	B1				65.61	0.20		TOPSOIL		
0.30 - 0.50	B2				65.52	0.30		Soft light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of mixed lithologies.		
0.50 - 0.60	SPT (C)	N=50 (25 for 75mm/50 for 30mm) Hammer SN = 0490			65.32	0.50		Very dense greenish grey sandy silty subangular fine to coarse GRAVEL of sandstone. Sand is fine to coarse.		
0.50		04-03-2020		Dry				End of Borehole at 0.50m		

Water Strikes

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

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Termination Reason

Terminated on possible bedrock.

Last Updated

04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH03
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 1.60 m	Start Date: 04/03/2020	Driller: JC	Sheet 1 of 1
Light Percussion	Dando Terrier	0.00	1.60	165029.09 E				Scale: 1:40
				71802.20 N	Elevation: 65.21 mOD	End Date: 04/03/2020	Logger: SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				65.01	0.20		TOPSOIL		
								MADE GROUND: Soft to firm light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20 - 1.60	B2				64.01	1.20		Soft to firm light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of mixed lithologies.		
1.60	D3				63.61	1.60		End of Borehole at 1.60m		
1.60 - 1.98	SPT (S)	N=49 (20,10/49 for 225mm) Hammer SN = 0490		Dry						
1.60		04-03-2020		Dry						

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

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH04
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	1.20	
Rotary Drilling	Comacchio 205	1.20	5.00	164949.82 E
Rotarty Coring	Comacchio 205	5.00	8.00	71765.55 N

Final Depth: 8.00 m	Start Date: 05/03/2020	Driller: JC+RS	Sheet 1 of 2 Scale: 1:50
Elevation: 58.42 mOD	End Date: 26/03/2020	Logger: SR+NP	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 0.50	B1				58.32	0.10		MADE GROUND: Bitmac		
0.50 - 1.20	B2				57.92	0.50		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL of mixed lithologies with low cobble content. Sand is fine to coarse. Cobbles are angular of mixed lithologies.		
								Firm light brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to medium of mixed lithologies.		
1.20	D3				57.22	1.20		Very dense greenish grey sandy clayey subangular GRAVEL (Driller's description)		
1.20 - 1.65	SPT (S)	N=44 (20,10/9,11,12,12) Hammer SN = 0490		Dry						
1.20		05-03-2020		Dry						
					53.92	4.50		Greenish grey SANDSTONE (Driller's description)		
		TCR 100 SCR 69 RQD 13 FI 6			53.42	5.00		Medium strong thinly bedded grey fine to medium grained well cemented SANDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing, with dark grey and brown discolouration. Discontinuities: 1.>80 degree joint from 5.00m to 5.50m, undulating, rough with patchy orangish brown staining on fracture surface.		
						(0.50)				
					52.92	5.50				
		TCR 100 SCR 69 RQD 13 FI >20				(0.30)				
		TCR 100 SCR 69 RQD 13 FI 10			52.62	5.80				
5.80		TCR 100 SCR 51 RQD 0 FI 13				(0.47)		Medium strong (locally weak) very thinly bedded fine grained well cemented SANDSTONE interbedded with very thin beds of mudstone. Partially weathered: reduced strength, closer fracture spacing with faint patchy orangish brown discolouration. Discontinuities: 1. 55 to 70 degree bedding fractures, medium spaced (160/250/ >500) slightly undulating, smooth with pervasive orangish brown staining on fracture surfaces.		
					52.15	6.27				
		TCR 100 SCR 51 RQD 0 FI 18								
6.50		TCR 100 SCR 80 RQD 50 FI 8				(0.83)				
					51.32	7.10				
7.20		TCR 100 SCR 43 RQD 0 FI 11						Weak (locally medium strong) very thinly bedded dark grey MUDSTONE interbedded with very thin beds of sandstone. Partially weathered: slightly reduced strength. slightly closer fracture spacing with purplish brown discolouration. Discontinuities: 1. 75 to 90 degree bedding fractures closely spaced (30/115/145) slightly undulating, smooth with purplish brown staining on fracture surfaces.		
		TCR 100 SCR 43 RQD 0 FI 18				(0.90)				
8.00					50.42	8.00		Medium strong thinly bedded fine grained well cemented grey SANDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing with faint and patchy orangish brown discolouration. Discontinuities: 1. 35 to 45 degree bedding fractures closely spaced (90/115/290)		

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	No groundwater encountered.

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
5.00	130		

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated at scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
20-0105	St. Kevin's Asylum, Cork	BH04
	Client: Land Development Agency	
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)
Light Percussion	Dando Terrier	0.00	1.20
Rotary Drilling	Comacchio 205	1.20	5.00
Rotarty Coring	Comacchio 205	5.00	8.00

Coordinates
164949.82 E
71765.55 N

Final Depth: 8.00 m | **Start Date:** 05/03/2020 | **Driller:** JC+RS | Sheet 2 of 2 | Scale: 1:50

Elevation: 58.42 mOD | **End Date:** 26/03/2020 | **Logger:** SR+NP | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											Medium strong thinly bedded fine grained well cemented grey SANDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing with faint and patchy orangish brown discolouration. Discontinuities: 1. 35 to 45 degree bedding fractures closely spaced (90/115/290) slightly undulating, smooth with orangish brown staining on fracture surfaces. 2. 75 to 85 degree joint at 6045m to 6.65m: undulating, rough with orangish brown staining on fracture surface.		
											Medium strong (locally weak) very thinly bedded fine grained well cemented grey SANDSTONE interbedded with very thin beds of dark grey MUDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing with faint and patchy orangish brown discolouration. Discontinuities: 1. 10 to 20 degree bedding fractures medium spaced (95/225/230) slightly undulating, smooth with patchy orangish brown staining on fracture surfaces. 2. At 7.25m to 8.00m: 85 to 90 degree joint, undulating, rough with patchy orangish brown staining. *7.25m to 7.57m: 90 quartz vein*		
											End of Borehole at 8.00m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

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

Chiselling Details

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

Remarks
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
5.00	130

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated at scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH05
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	0.80	164920.21 E 71741.29 N

Final Depth:	0.80 m	Start Date:	05/03/2020	Driller:	JC	Sheet 1 of 1 Scale: 1:40
Elevation:	53.90 mOD	End Date:	05/03/2020	Logger:	SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.30 - 0.80	B1				53.60	0.30		TOPSOIL		
0.80 - 1.12	SPT (S)	N=50 (11,13/50 for 170mm) Hammer SN = 0490		Dry	53.10	0.80		Very dense light brown sandy clayey angular fine to medium GRAVEL of sandstone. Sand is fine to coarse.		
0.80		05-03-2020		Dry				End of Borehole at 0.80m		

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

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH06
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	4.00	
Rotary Drilling	Comacchio 205	4.00	6.50	164950.16 E
Rotary Coring	Comacchio 205	6.50	9.50	71792.20 N

Final Depth: 9.50 m	Start Date: 04/03/2020	Driller: JC+RS	Sheet 1 of 2
Elevation: 63.27 mOD	End Date: 25/03/2020	Logger: SR+NP	Scale: 1:50
			FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				63.07	0.20		TOPSOIL		
								MADE GROUND: Soft to firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20	D6				62.07	1.20				
1.20 - 2.00	B2							MADE GROUND: Firm light brown slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20 - 1.65	SPT (S)	N=14 (4,4/3,2,4,5) Hammer SN = 0490		Dry						
2.00	D7				61.27	2.00				
2.00 - 3.00	B3							MADE GROUND: Soft light brown slightly gravelly sandy SILT. Sand is fine to coarse. Gravel is subangular fine to medium of mixed lithologies.		
2.00 - 2.45	SPT (S)	N=6 (1,1/2,1,2,1) Hammer SN = 0490		Dry						
3.00	D8				60.27	3.00				
3.00 - 3.70	B4							Soft light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
3.00 - 3.45	SPT (S)	N=5 (1,1/1,1,2,1) Hammer SN = 0490		Dry						
3.70 - 4.00	B5				59.57	3.70		Very dense greenish grey sandy clayey GRAVEL (Driller's description)		
4.00 - 4.11	SPT (S)	N=50 (30 for 75mm/50 for 30mm) Hammer SN = 0490		Dry						
4.00		04-03-2020		Dry						
					57.27	6.00		Greenish grey SANDSTONE (Driller's description)		
					56.77	6.50		Medium strong (locally weak) very thinly bedded fine grained well cemented SANDSTONE interbedded with very thin beds of dark grey MUDSTONE. Partially weathered: reduced strength, closer fracture spacing with patchy orangish brown discolouration. Discontinuities: 1. 0 to 15 degree bedding fractures closely spaced (35/155/480) slightly undulating, smooth with orangish brown staining fracture surfaces. 2. 80 to 90 degree fractures widely spaced (650/1000/1600) undulating, rough with patchy orangish brown staining on fracture surfaces. *6.50m to 7.90m: 85 quartz vein*		
8.00						(3.00)				

	TCR	SCR	RQD	FI
	100	73	0	4
	100	76	10	>20
				11

Water Strikes

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

Chiselling Details

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

Remarks

No groundwater encountered.

Casing Details

To (m)	Diam (mm)
6.50	130

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated at scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH06
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)
Light Percussion	Dando Terrier	0.00	4.00
Rotary Drilling	Comacchio 205	4.00	6.50
Rotary Coring	Comacchio 205	6.50	9.50

Coordinates: 164950.16 E, 71792.20 N

Final Depth: 9.50 m	Start Date: 04/03/2020	Driller: JC+RS	Sheet 2 of 2
Elevation: 63.27 mOD	End Date: 25/03/2020	Logger: SR+NP	Scale: 1:50
			FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.50								53.77	9.50		Medium strong (locally weak) very thinly bedded fine grained well cemented SANDSTONE interbedded with very thin beds of dark grey MUDSTONE. Partially weathered: reduced strength, closer fracture spacing with patchy orangish brown discolouration. Discontinuities: 1. 0 to 15 degree bedding fractures closely spaced (35/155/480) slightly undulating, smooth with orangish brown staining fracture surfaces. 2. 80 to 90 degree fractures widely spaced (650/1000/1600) undulating, rough with patchy orangish brown staining on fracture surfaces. End of Borehole at 9.50m		

TCR	SCR	RQD	FI

Water Strikes

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

Casing Details

To (m)	Diam (mm)
6.50	130

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated at scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH07
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 2.00 m	Start Date: 06/03/2020	Driller: JC	Sheet 1 of 1
Light Percussion	Dando Terrier	0.00	2.00	165005.24 E 71757.17 N	Elevation: 60.22 mOD	End Date: 06/03/2020	Logger: SR	Scale: 1:40 FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.30 - 1.20	B1				59.92	0.30		TOPSOIL		
								MADE GROUND: Soft light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20 - 2.00	B2				59.02	1.20				
1.20 - 1.65	SPT (S)	N=44 (4,5/8,8,14,14) Hammer SN = 0490		Dry				Dense light brown sandy clayey angular fine to medium GRAVEL of sandstone. Sand is fine to coarse.		
2.00	D3				58.22	2.00				
2.00 - 2.32	SPT (C)	N=50 (8,13/50 for 168mm) Hammer SN = 0490		Dry				End of Borehole at 2.00m		
2.00		06-03-2020		Dry						

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	No groundwater encountered.

Casing Details		Water Added	
To (m)	Diameter	From (m)	To (m)

Termination Reason	Last Updated
Terminated on refusal.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
20-0105	St. Kevin's Asylum, Cork	BH08
	Client: Land Development Agency	
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	3.80	
Rotary Drilling	Comacchio 405	3.80	5.00	164921.25 E
Rotary Coring	Comacchio 405	5.00	7.00	71663.55 N

Final Depth:	7.00 m	Start Date:	05/03/2020	Driller:	JC+SJ	Sheet 1 of 1
Elevation:	44.85 mOD	End Date:	21/05/2020	Logger:	SR	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				44.65	0.20		TOPSOIL		
								MADE GROUND: Soft locally firm dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20	D5				43.65	1.20				
1.20 - 2.00	B2							MADE GROUND: Soft light brown slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is angular fine to coarse of mixed lithologies.		
1.20 - 1.65	SPT (S)	N=6 (2,2/1,1,2,2) Hammer SN = 0490		Dry						
2.00	D6				42.85	2.00		Firm light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of mixed lithologies.		
2.00 - 3.00	B3									
2.00 - 2.45	SPT (S)	N=13 (4,4/4,3,3,3) Hammer SN = 0490		Dry						
3.00	D7				41.85	3.00		Stiff light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of mixed lithologies.		
3.00 - 3.80	B4									
3.00 - 3.45	SPT (S)	N=22 (4,5/5,6,6,5) Hammer SN = 0490		Dry						
3.80 - 3.99	SPT (C)	N=50 (25 for 75mm/50 for 115mm) Hammer SN = 0490		Dry	41.05	3.80		Brown clayey GRAVEL with cobbles (Driller's description)		
3.80		05-03-2020		Dry						
					40.35	4.50		Grey weathered SANDSTONE (Driller's description)		
		100 0 0			39.85	5.00		Weak thinly bedded fine grained well cemented grey SANDSTONE. Heavily weathered: slightly reduced strength, closer fracture spacing with faint and patchy brown discolouration. Multiple drilling induced fractures.		
5.30		100 0 0								
5.60		100 0 0 NI						Discontinuities:		
6.00		100 0 0				(2.00)		1. 35 to 45 degree bedding fractures closely spaced (80/100/300) planar, smooth with brown staining on fracture surfaces.		
6.20		100 0 0								
6.50		100 85 70 3						2. Sub-vertical fractures probably medium spaced, planar, with blackish brown staining on fracture surface.		
7.00					37.85	7.00		End of Borehole at 7.00m		
		TCR SCR RQD FI								

Water Strikes

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

Casing Details

To (m)	Diam (mm)
5.00	200

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated on scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH09
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	2.00	
Rotary Drilling	Comacchio 405	2.00	5.00	165088.04 E
Rotary Coring	Comacchio 405	5.00	5.70	71667.60 N

Final Depth: 5.70 m	Start Date: 05/03/2020	Driller: JC+SJ	Sheet 1 of 1 Scale: 1:50
Elevation: 49.44 mOD	End Date: 21/05/2020	Logger: SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				49.24	0.20		TOPSOIL		
								MADE GROUND: Soft light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of mixed lithologies.		
1.20	D3				48.24	1.20				
1.20 - 2.00	B2							Dense light brown sandy silty subangular to subrounded fine to coarse GRAVEL of mixed lithologies. Sand is fine to coarse.		
1.20 - 1.65	SPT (S)	N=37 (9,8/8,9,10,10) Hammer SN = 0490		Dry						
2.00	D4				47.44	2.00				
2.00 - 2.38	SPT (S)	N=50 (9,16/50 for 225mm) Hammer SN = 0490		Dry				Brown sandy gravelly CLAY with cobbles (Driller's description)		
2.00		05-03-2020		Dry						
					45.24	4.20		Grey weathered SANDSTONE (Driller's description)		
		100 0 0			44.44	5.00		Weak thinly bedded fine grained well cemented grey SANDSTONE. Heavily weathered: closer fracture spacing with faint and patchy brown discolouration. Multiple drilling induced fractures.		
5.30		100 0 0 NI				(0.70)				
5.70					43.74	5.70		Discontinuities: 1. 10 to 30 degree bedding fractures closely spaced (70/90/120) planar, smooth with brown staining on fracture surfaces. 2. Sub-vertical fracture from 5.00-5.70 planar, with blackish brown staining on fracture surface.		
								End of Borehole at 5.70m		
		TCR SCR RQD FI								

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	No groundwater encountered.

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
5.00	200		

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated on scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH10
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	5.00	165028.53 E 71612.34 N

Final Depth:	5.00 m	Start Date:	05/03/2020	Driller:	JC	Sheet 1 of 1 Scale: 1:40
Elevation:	40.79 mOD	End Date:	05/03/2020	Logger:	SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				40.59	0.20		TOPSOIL		
								MADE GROUND: Soft to firm dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of mixed lithologies.		
1.20	D6				39.59	1.20				
1.20 - 2.00	B2							Stiff dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20 - 1.65	SPT (S)	N=18 (2,1/6,4,4,4) Hammer SN = 0490		Dry						
2.00	D7				38.79	2.00				
2.00 - 3.00	B3							Firm dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
2.00 - 2.45	SPT (S)	N=10 (3,3/4,3,1,2) Hammer SN = 0490		Dry						
3.00	D8				37.79	3.00				
3.00 - 4.00	B4							Firm light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of mixed lithologies.		
3.00 - 3.45	SPT (S)	N=14 (2,1/3,3,4,4) Hammer SN = 0490		Dry						
4.00	D9				36.79	4.00				
4.00 - 5.00	B5							Very stiff light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of mixed lithologies of mixed lithologies.		
4.00 - 4.45	SPT (S)	N=31 (5,5/5,7,11,8) Hammer SN = 0490		Dry						
5.00	D10				35.79	5.00		End of Borehole at 5.00m		
5.00 - 5.42	SPT (S)	N=50 (19,19/50 for 275mm) Hammer SN = 0490		Dry						
5.00		05-03-2020		0.00						

Water Strikes

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

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

04/06/2020

AGS

CAUSEWAY GEOTECH

APPENDIX C

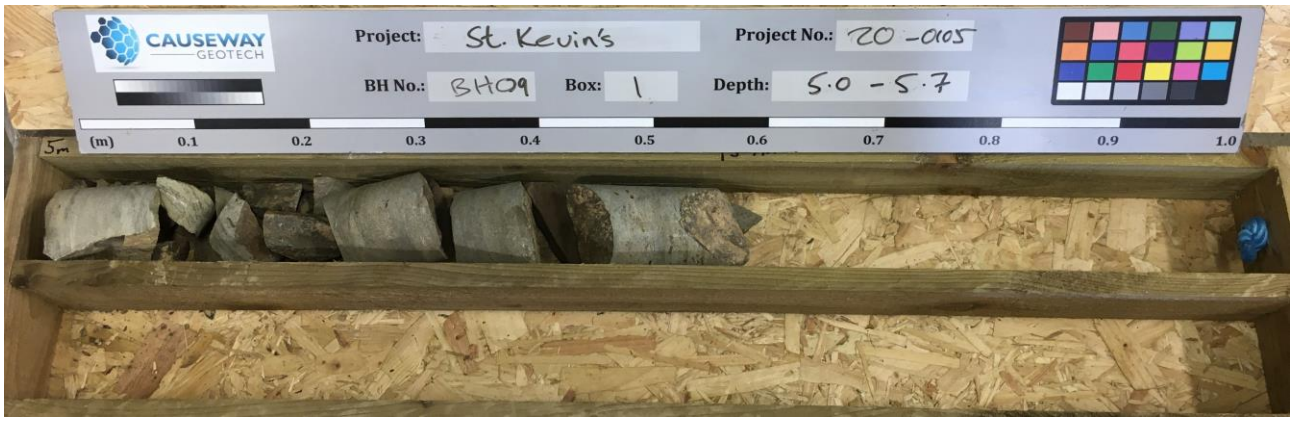
CORE PHOTOGRAPHS

BH01 Box 1 2.50-5.50m

BH04 Box 1 5.00-8.00m

BH06 Box 1 6.50-9.50m

BH08 Box 1 5.00-7.00m



BH09 Box 1 5.00-5.70m

CAUSEWAY GEOTECH

CAUSEWAY GEOTECH

APPENDIX D

TRIAL PIT LOGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP01
Coordinates 164978.43 E 71832.53 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 64.30 mOD	**Date:** 02/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.05	ES1		64.20	0.10		TOPSOIL	
						Pinkish brown sandy very silty subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobble are subrounded of sandstone.	
0.40	B3		63.90	0.40		End of trial pit at 0.40m	
0.40	ES2						

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: 0.40
Width: 0.60
Length: 1.20

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Unstable	Terminated on possible bedrock	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP02
Coordinates 165000.26 E 71824.91 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 65.71 mOD	**Date:** 02/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			65.66	0.05		TOPSOIL	
0.25	ES1					MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with coarse gravel sized pieces of broken glass. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies.	
			65.41	0.30		Orangish brown sandy very clayey subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subangular of sandstone.	
0.75	B3		64.96	0.75		End of trial pit at 0.75m	
0.75	ES2						

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: 0.75
Width: 0.60
Length: 1.70

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on possible bedrock	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP03
Coordinates 165056.71 E 71832.76 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 66.24 mOD	**Date:** 02/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1		66.04	0.20		TOPSOIL	
0.50	B3					Light orangish brown sandy silty subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone.	
0.50	ES2		65.49	0.75		End of trial pit at 0.75m	

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: 0.75
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP04
Coordinates 165042.85 E 71816.52 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 65.83 mOD	**Date:** 02/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			65.78	0.05		TOPSOIL Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
0.50	ES1		65.23	0.60		Orange sandy very clayey subangular fine to coarse GRAVEL of sandstone. Sand is fine to coarse.	
			65.13	0.70		Pink sandy very silty subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subangular of sandstone.	
1.50	B3						
1.50	ES2		64.23	1.60		End of trial pit at 1.60m	

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: 1.60
Width: 0.60
Length: 2.50

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP05
Coordinates 165013.29 E 71801.51 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 64.96 mOD	**Date:** 02/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1					TOPSOIL	
			64.66	0.30		Light brown sandy silty subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone.	
1.50	B3						
1.50	ES2		63.36	1.60		End of trial pit at 1.60m	

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: 1.60
Width: 0.60
Length: 2.30

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Unstable	Terminated on possible bedrock	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP06
Coordinates 164958.43 E 71818.90 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 63.48 mOD	**Date:** 02/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.20	ES1					MADE GROUND: Greyish brown very sandy slightly silty subrounded to subangular fine to coarse GRAVEL of mixed lithologies with low cobble content gravel sized pieces of waste pipe and concrete. Sand is fine to coarse. Cobbles are subrounded of mixed lithologies.	
0.40	B3		63.08	0.40		End of trial pit at 0.40m	
0.40	ES2						

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: 0.40
Width: 0.60
Length: 1.80

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Unstable	Terminated on concrete	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP07
Coordinates 164894.99 E 71778.27 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 56.17 mOD	**Date:** 02/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.05	ES1		56.07	0.10		TOPSOIL	
						Orange sandy silty subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone.	
0.65	B3		55.52	0.65		End of trial pit at 0.65m	
0.65	ES2						

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: 0.65
Width: 0.50
Length: 2.00

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP08
Coordinates 165008.57 E 71770.63 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 61.07 mOD	**Date:** 02/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1		60.87	0.20		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with medium coarse gravel sized pieces of glass. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
0.50	B3					Light brown sandy very silty subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subangular of sandstone.	
0.50	ES2		60.47	0.60		End of trial pit at 0.60m	

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: 0.60
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason: Terminated on possible bedrock

Last Updated 04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP09
Coordinates 165001.03 E 71743.68 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 59.64 mOD	**Date:** 02/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1		59.59	0.05		TOPSOIL MADE GROUND: Brown sandy very clayey subangular fine to coarse GRAVEL of sandstone with high cobble content, sheets of plastic and steel, coarse gravel sized pieces of glass and boulder sized pieces of concrete and wood. Sand is fine to coarse. Cobbles are subangular of sandstone.	
0.75 0.75	B3 ES2		58.89	0.75		End of trial pit at 0.75m	

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: 0.75
Width: 0.80
Length: 2.00

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Unstable	Terminated on concrete	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP10
Coordinates 164961.24 E 71733.38 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 52.48 mOD	**Date:** 03/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.05	ES1		52.38	0.10		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies. MADE GROUND: Pink sandy very clayey subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subangular of sandstone.	
0.80	B3		51.68	0.80		End of trial pit at 0.80m	
0.80	ES2						

Water Strikes	
Struck at (m)	Remarks

Depth: 0.80
Width: 0.60
Length: 1.60

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on refusal	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP11
Coordinates 164914.47 E 71696.31 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 50.09 mOD	**Date:** 03/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.20	ES1		49.78	0.30		MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
1.50	B3					MADE GROUND: Stiff yellowish brown slightly sandy gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium of sandstone. Cobbles are subrounded of sandstone.	
1.50	ES2		48.44	1.65		End of trial pit at 1.65m	

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: 1.65
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on refusal	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP12
Coordinates 164890.09 E 71745.49 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 51.58 mOD	**Date:** 02/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.05	ES1		51.48	0.10		TOPSOIL	
						Grey very sandy silty subangular fine to medium GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone.	
1.00	B3						
1.00	ES2		50.48	1.10		End of trial pit at 1.10m	

Water Strikes	
Struck at (m)	Remarks

Depth: 1.10
Width: 0.60
Length: 2.10

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason: Terminated on possible bedrock

Last Updated 04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP13
Coordinates 164960.72 E 71681.85 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 49.35 mOD	**Date:** 03/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.20	ES1		49.05	0.30		TOPSOIL	
0.50	ES2		48.75	0.60		Stiff yellowish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of sandstone. Cobbles are subangular of sandstone.	
						End of trial pit at 0.60m	

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: 0.60
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on possible bedrock	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP14
Coordinates 164987.80 E 71700.95 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 52.17 mOD	**Date:** 03/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1		52.12	0.05		TOPSOIL	
			51.97	0.20		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with cobble sized pieces of of red brick. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
0.50	B3					Brownish yellow sandy very clayey subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subangular of sandstone.	
0.50	ES2						
			51.27	0.90		End of trial pit at 0.90m	

Water Strikes	
Struck at (m)	Remarks

Depth: 0.90
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP15
Coordinates 165023.99 E 71697.79 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 52.43 mOD	**Date:** 03/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1		52.38	0.05		TOPSOIL MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
			52.18	0.25		MADE GROUND: Yellowish brown sandy very clayey subangular fine to coarse GRAVEL of sandstone with low cobble content and coarse gravel sized pieces of steel. Sand is fine to coarse. Cobbles are subangular of sandstone.	
1.00	B3						
1.50	ES2		50.92	1.50		End of trial pit at 1.50m	

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: 1.50
Width: 0.60
Length: 2.20

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP16
Coordinates 165046.41 E 71693.51 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 52.32 mOD	**Date:** 03/02/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			52.22	0.10		TOPSOIL	
0.50	ES1					MADE GROUND: Firm dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies.	
			51.72	0.60		MADE GROUND: Brown very sandy very silty subangular fine to coarse GRAVEL of sandstone with high cobble content. Sand is fine to coarse. Cobbles are subangular of sandstone.	
1.00	B3						
2.00	B4						
2.00	ES2		50.27	2.05		End of trial pit at 2.05m	

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: 2.05
Width: 0.60
Length: 2.00

Remarks: No groundwater encounetred

Stability:	Termination Reason:	Last Updated
Stable	Terminated due to pit walls collapsing	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP17
Coordinates 165091.94 E 71677.01 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 51.31 mOD	**Date:** 03/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			51.21	0.10		TOPSOIL	
0.20	ES1		51.01	0.30		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with medium gravel sized pieces of glass. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies.	
1.00	B3					MADE GROUND: Orangish brown sandy very silty subangular fine to coarse GRAVEL of sandstone with medium cobble content. Sand is fine to coarse. Cobbles are subangular of sandstone.	
1.00	ES2						
			49.66	1.65		End of trial pit at 1.65m	

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: 1.65
Width: 0.60
Length: 2.50

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Unstable	Terminated due to pit walls collapsing	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP18
Coordinates 165086.63 E 71645.90 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 46.35 mOD	**Date:** 03/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			46.25	0.10		TOPSOIL	
0.50	ES1					MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with cobble sized pieces of concrete and red brick. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
			45.65	0.70		MADE GROUND: Firm light yellowish brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of sandstone. Cobbles are subrounded of sandstone.	
1.00	B3						
2.00	B4						
2.00	ES2						
			44.20	2.15		End of trial pit at 2.15m	

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: 2.15
Width: 0.60
Length: 2.20

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated due to pit walls collapsing	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
20-0105	St. Kevin's Asylum, Cork	TP19
Coordinates 164937.88 E 71664.61 N	**Client:** Land Development Agency	
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers	Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 44.79 mOD / **Date:** 03/03/2020 / **Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			44.74	0.05		TOPSOIL	
0.10	ES1		44.64	0.15		MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
0.50	B3					MADE GROUND: Light brown sandy very clayey subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fin to coarse. Cobbles are subangular of sandstone.	
0.50	ES2						
			43.89	0.90		End of trial pit at 0.90m	

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: 0.90
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on possible bedrock	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP20
Coordinates 164916.18 E 71670.43 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 45.91 mOD	**Date:** 03/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			45.80	0.10		TOPSOIL	
0.20	ES1					MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
			45.56	0.35		MADE GROUND: Stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of sandstone. Cobbles are subangular of sandstone.	
1.00	B3						
1.00	ES2						
			44.76	1.15		End of trial pit at 1.15m	

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: 1.15
Width: 0.60
Length: 1.80

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on possible bedrock	04/06/2020

AGS

CAUSEWAY GEOTECH

APPENDIX E

TRIAL PIT PHOTOGRAPHS


CAUSEWAY
GEOTECH
Project Name
ST Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 01
(m) 0.1 0.2 0.3 0.4 0.5

TP01


20-0105
TP 01

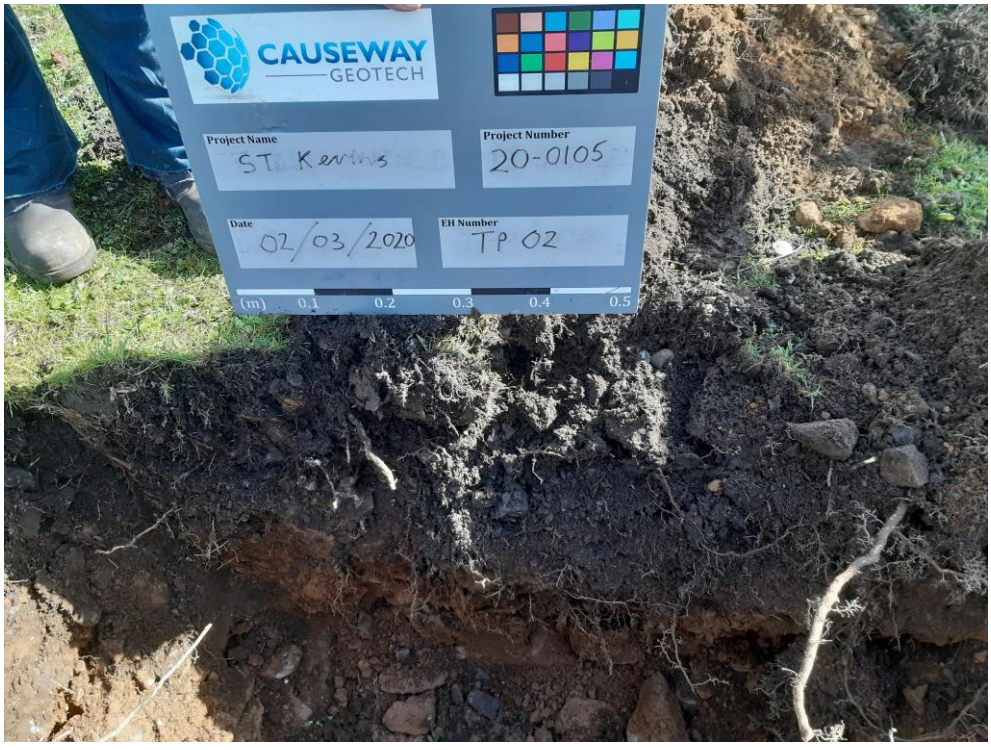
TP01


CAUSEWAY
GEOTECH
Project Name
ST Kevins
Project Number
20-0105
Date
02/03/2020
TP 01
(m) 0.1 0.2 0.3 0.4 0.5

TP01


CAUSEWAY
GEOTECH
Project Name
ST. Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 02
(m) 0.1 0.2 0.3 0.4 0.5

TP02


CAUSEWAY
GEOTECH
Project Name
ST. Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 02
(m) 0.1 0.2 0.3 0.4 0.5

TP02

TP02

TP03


CAUSEWAY
GEOTECH
Project Name
ST. Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 03
(m) 0.1 0.2 0.3 0.4 0.5

TP03


CAUSEWAY
GEOTECH
ST Kevins
20-0105
02/03/2020
TP 03
0.1
0.2
0.3
0.4
0.5

TP03


CAUSEWAY
GEOTECH
Project Name
St. Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 04
(m) 0.1 0.2 0.3 0.4 0.5

TP04


CAUSEWAY
GEOTECH
Project Name
ST. Kevins
Project Number
20-0105
Date
02/03/2020
Pit Number
TP 04
(m) 0.1 0.2 0.3 0.4 0.5

TP04


CAUSEWAY
GEOTECH
Project Name
ST. Kevins
Project Number
20-0105
Date
02/03/2020
Pit Number
TP 04
(m) 0.1 0.2 0.3 0.4 0.5

TP04


CAUSEWAY
Project Name
ST Kevin's
Project Number
20-0105
Date
02/03/2020
TP 05
(m) 0.1 0.2 0.3 0.4 0.5

TP05


CAUSEWAY
GEOTECH
Project Name
Project Number
20-0105
Date
02/03/2020
TP 05

TP05


CAUSEWAY
GEOTECH
Project Name
ST. Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 06
(m) 0.1 0.2 0.3 0.4

TP06


CAUSEWAY
GEOTECH
Project Name
ST. Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 06
(m) 0.1 0.2 0.3 0.4

TP06

TP06


CAUSEWAY
GEOTECH
Project Name
ST Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP07
(m) 0.1 0.2 0.3 0.4 0.5

TP07


GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP07
(m) 0.1 0.2 0.3 0.4 0.5

TP07


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP07
(m) 0.1 0.2 0.3 0.4 0.5

TP07


CAUSEWAY
GEOTECH
Project Name
ST. Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 08
(m) 0.1 0.2 0.3 0.4 0.5

TP08


CAUSEWAY
GEOTECH
Project Name
ST Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 08
(m) 0.1 0.2 0.3 0.4 0.5

TP08


CAUSEWAY
GEOTECH
Project Name
ST Kevins
Project Number
20-0105
Date
02/03/2020
TP 08
(m)
0.1
0.2
0.3
0.4

TP08


CAUSEWAY

TP09


CAUSEWAY
GEOTECH
Project Name
Project Number
20-0105
Date
02/03/2020
TP 09

TP09


CAUSEWAY
GEOTECH
ST. Kevins
20-0105
02/03/2020
TP 09

TP09


CAUSEWAY
St. Kevins
20-0105
03/03/2020
TP 10

TP10


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
TP 10
(m) 0.1 0.2 0.3 0.4 0.5

TP10


CAUSEWAY
GEOTECH
St Kevins
20-0105
03/03/2020
TP 10

TP10


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
TP 11
(m) 0.1 0.2 0.3 0.4 0.5

TP11


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 11
(m) 0.1 0.2 0.3 0.4 0.5

TP11


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 11
(m) 0.1 0.2 0.3 0.4 0.5

TP11


CAUSEWAY
GEOTECH
Project Name
ST. Kevin's
Project Number
20-0105
Date
02/03/2020
EH Number
TP 12
(m) 0.1 0.2 0.3 0.4 0.5

TP12


CAUSEWAY
GEOTECH
Project Name
ST Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 12
(m) 0.1 0.2 0.3 0.4 0.5

TP12


Project Name
ST Kevins
Project Number
20-0105
Date
02/03/2020
EH Number
TP 12

TP12


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 13
0.1
0.2
0.3
0.4
0.5

TP13


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 13
(m) 0.1 0.2 0.3 0.4 0.5

TP13


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 13

TP13


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 14
(m)
0.2
0.3
0.4

TP14


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 14
(m) 0.1 0.2 0.3 0.4 0.5

TP14


CAUSEWAY
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 14

TP14


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 15
(m) 0.1 0.2 0.3 0.4 0.5

TP15


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 15

TP15


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 15

TP15


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 16
(m) 0.1 0.2 0.3 0.4 0.5

TP16


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 16
(m) 0.1 0.2 0.3 0.4 0.5

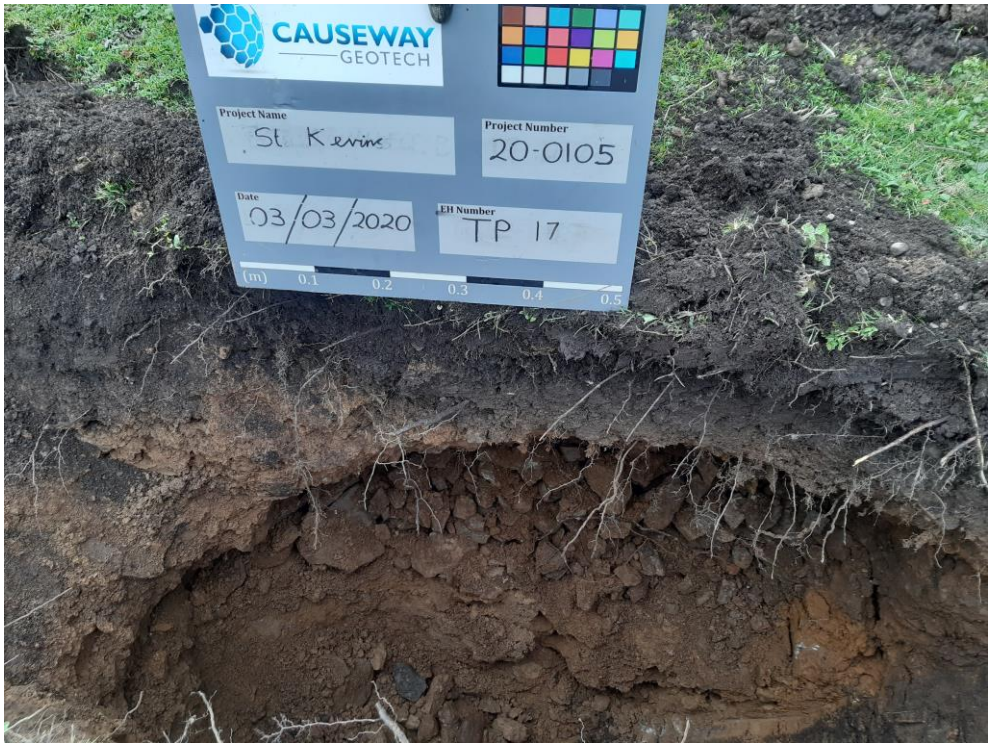
TP16


CAUSEWAY
GEOTECH
20-0105
TP 16
03/03/2020

TP16


CAUSEWAY
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
TP 17

TP17


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 17
(m) 0.1 0.2 0.3 0.4 0.5

TP17


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 17
(m) 0.1 0.2 0.3 0.4 0.5

TP17


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 18
(m) 0.1 0.2 0.3 0.4 0.5

TP18


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 18
(m) 0.1 0.2 0.3 0.4 0.5

TP18


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 18
(m) 0.1 0.2 0.3 0.4 0.5

TP18


CAUSEWAY
GEOTECH
Project Number
20-0105
Project Name
St Kevins
EH Number
TP 19
Date
03/03/2020
(m) 0.1 0.2 0.3 0.4 0.5

TP19


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 19
(m) 0.1 0.2 0.3 0.4 0.5

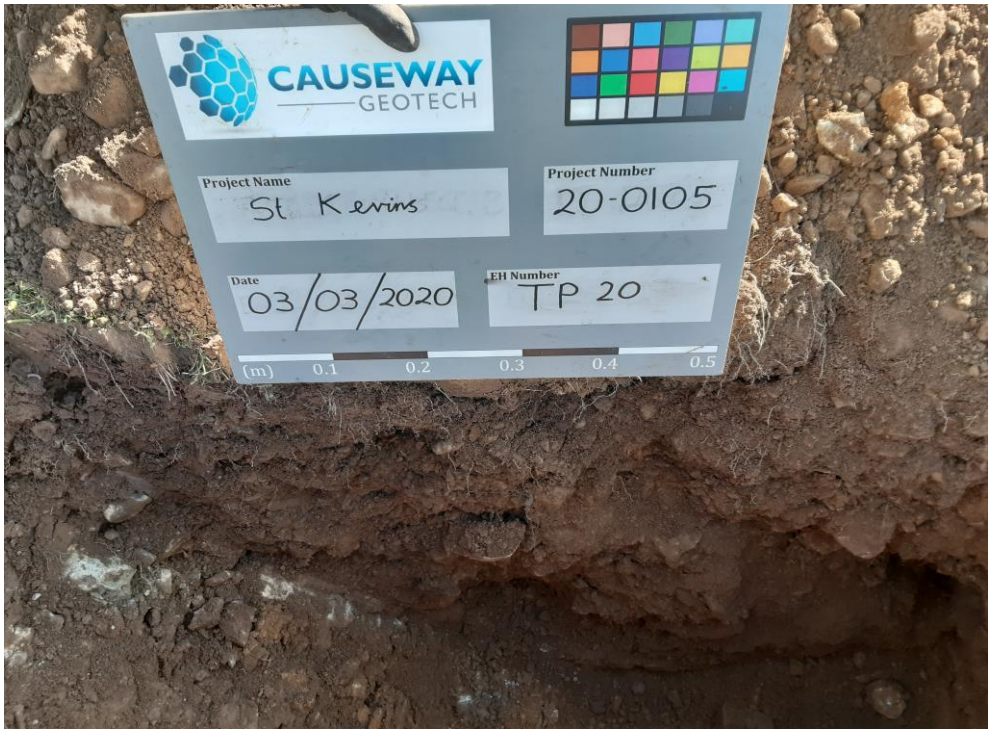
TP19


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 19
(m) 0.1 0.2 0.3 0.4 0.5

TP19


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 20
(m) 0.1 0.2 0.3 0.4 0.5

TP20


CAUSEWAY
GEOTECH
Project Name
St Kevins
Project Number
20-0105
Date
03/03/2020
EH Number
TP 20
(m) 0.1 0.2 0.3 0.4 0.5

TP20


CAUSEWAY
GEOTECH
St Kevins
20-0105
03/03/2020
TP 20

TP20

CAUSEWAY GEOTECH

APPENDIX F

SOAKAWAY TEST RESULTS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** IF01
Coordinates 164981.12 E 71817.24 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 63.98 mOD	**Date:** 04/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			63.78	0.20		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
0.50	B1					Brownish yellow sandy silty angular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subangular of sandstone.	
			63.28	0.70		End of trial pit at 0.70m	

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: 0.70
Width: 0.40
Length: 1.40

Remarks: No groundwater encountered

Stability:	**Termination Reason:**	**Last Updated**
Unstable	Terminated on refusal	04/06/2020

AGS

Soakaway Infiltration Test

Project No.: 20-0105
Site: St. Kevin's Asylum, Cork
Test Location: IF01
Test Date: 03 March 2020

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

	width (m)	length (m)
test pit top dimensions	0.40	1.40
test pit base dimensions	0.40	0.60

test pit depth (m) 0.70

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.46	0.24
1	0.49	0.21
2	0.52	0.18
4	0.55	0.15
6	0.58	0.12
8	0.60	0.10
10	0.62	0.08
12	0.64	0.06

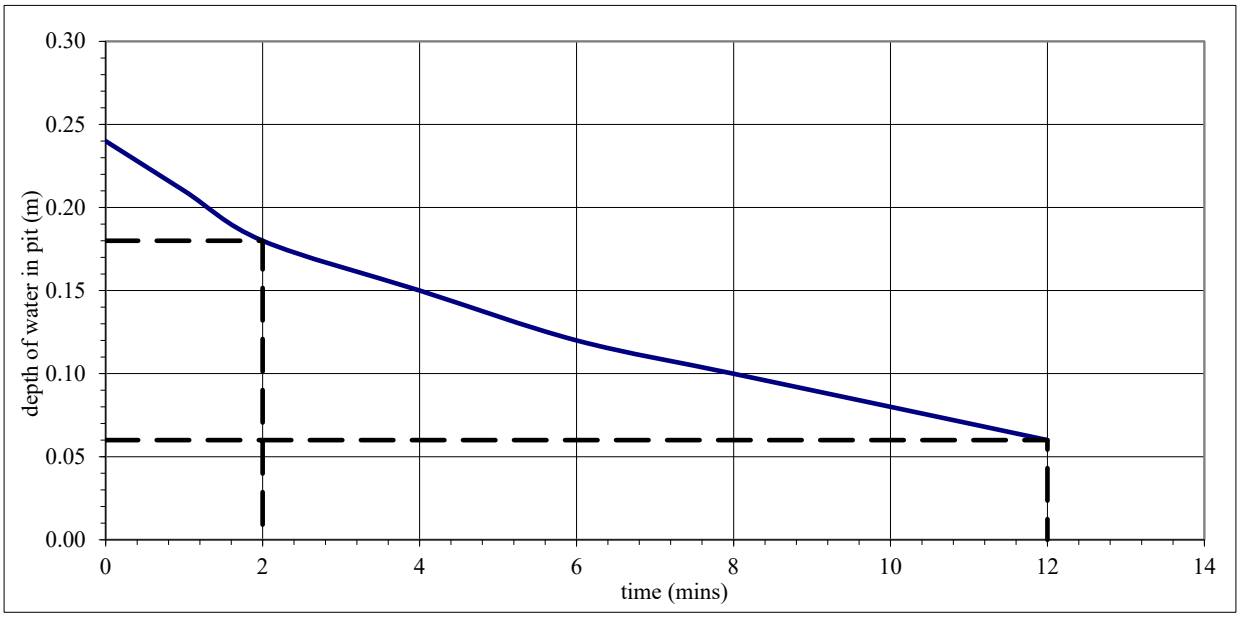
From graph below:

test start - 75% depth at
0.18 m water depth
time is 2.0 minutes

test end - 25% depth at
0.06 m water depth
time is 12.0 minutes

test infiltration rate (q) = 0.424 m/h

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
2	0.52	0.18	10	0.04	0.50	7.1E-03	0.424
12	0.64	0.06					



CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** IF02
Coordinates 165025.24 E 71813.00 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 65.49 mOD	**Date:** 04/02/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
			64.69	0.80		Soft orangish brown slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subangular fine to coarse of sandstone.	
1.00	B1		64.49	1.00		End of trial pit at 1.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.00
Width: 0.30
Length: 1.00

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on refusal	04/06/2020

AGS

Soakaway Infiltration Test

Project No.: 20-0105
Site: St. Kevin's Asylum, Cork
Test Location: IF02
Test Date: 03 March 2020

	width (m)	length (m)
test pit top dimensions	0.30	1.00
test pit base dimensions	0.30	0.80
test pit depth (m)	1.00	

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.54	0.46
1	0.56	0.44
2	0.58	0.43
4	0.60	0.41
6	0.62	0.38
8	0.64	0.37
10	0.65	0.35
15	0.68	0.32
60	0.85	0.15
105	0.93	0.07

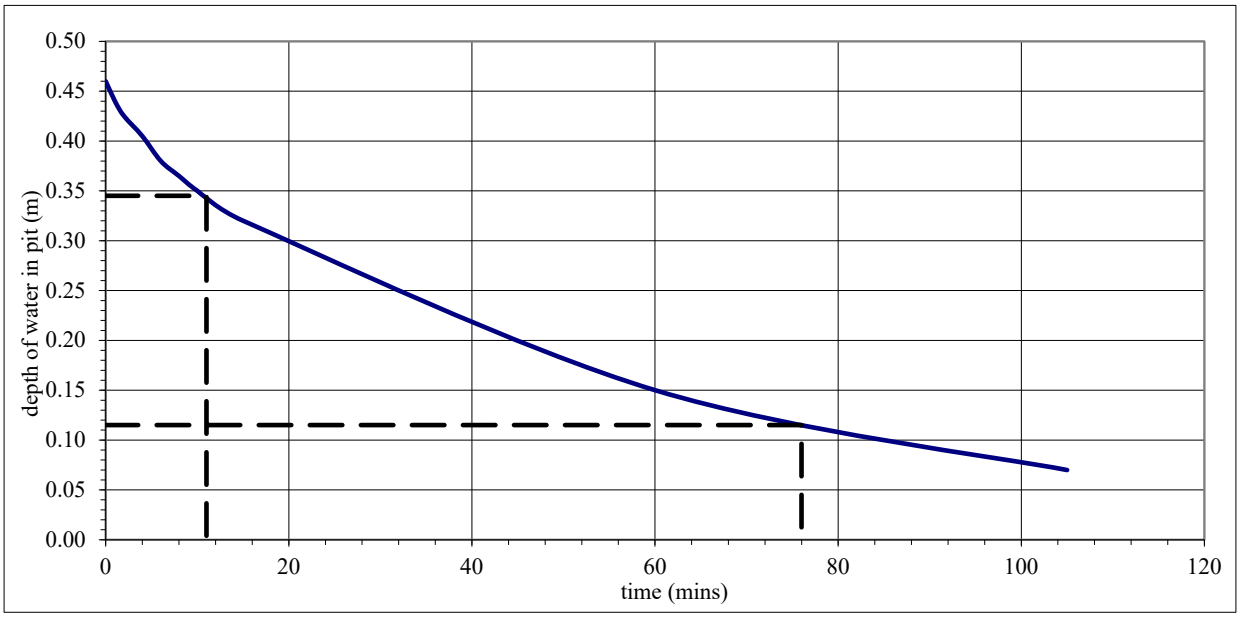
From graph below:

test start - 75% depth at
0.345 m water depth
time is 11.0 minutes

test end - 25% depth at
0.115 m water depth
time is 76.0 minutes

test infiltration rate (q) = 0.071 m/h

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
11	0.66	0.345	65	0.06	0.76	1.2E-03	0.071
76	0.89	0.115					



CAUSEWAY GEOTECH

Project No.	Project Name:	Trial Pit ID
20-0105	St. Kevin's Asylum, Cork	IF03
Coordinates 164990.75 E 71711.13 N	**Client:** Land Development Agency	
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers	Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 52.63 mOD / **Date:** 04/03/2020 / **Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			52.58	0.05		MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies.	
0.50	B1					MADE GROUND: Brown sandy very clayey subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone.	
			51.98	0.65		End of trial pit at 0.65m	

Water Strikes	
Struck at (m)	Remarks

Depth: 0.65
Width: 0.40
Length: 1.20

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason: Terminated on refusal

Last Updated 04/06/2020

AGS

Soakaway Infiltration Test

Project No.: 20-0105
Site: St. Kevin's Asylum, Cork
Test Location: IF03
Test Date: 03 March 2020

	width (m)	length (m)
test pit top dimensions	0.40	1.20
test pit base dimensions	0.40	0.60

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

test pit depth (m) 0.65

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.27	0.38
1	0.28	0.37
2	0.29	0.36
4	0.30	0.35
6	0.31	0.35
8	0.31	0.34
10	0.32	0.33
15	0.33	0.33
20	0.34	0.31
25	0.35	0.30
105	0.48	0.17
120	0.49	0.16
150	0.51	0.14

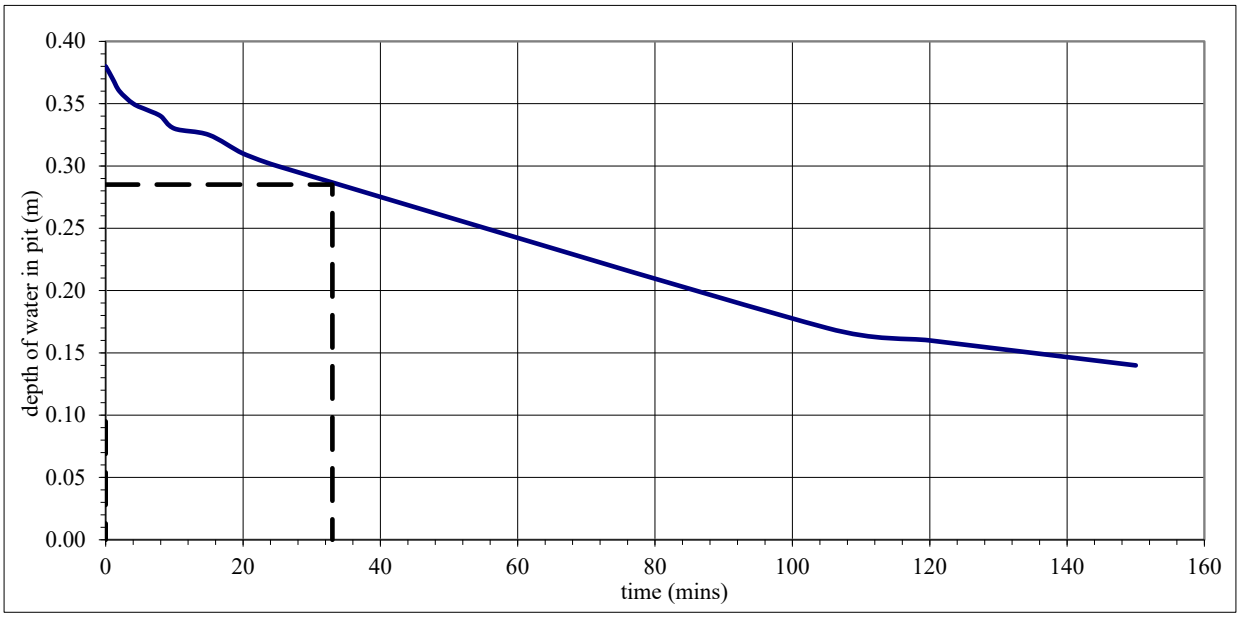
From graph below:

test start - 75% depth at
0.285 m water depth
time is 33.0 minutes

test end - 25% depth at
0.095 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
33	0.37	0.285					
	0.56	0.095					



CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** IF04
Coordinates 164983.30 E 71679.45 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 49.34 mOD	**Date:** 04/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			49.18	0.15		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
1.00	B1					MADE GROUND: Brown sandy very clayey subangular fine to coarse GRAVEL of sandstone with low cobble content and cobble sized pieces of red brick. Sand is fine to coarse. Cobbles are subrounded of sandstone.	
			48.14	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.60
Length: 1.30

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason: Terminated at scheduled depth

Last Updated 04/06/2020

AGS

Soakaway Infiltration Test

Project No.: 20-0105
Site: St. Kevin's Asylum, Cork
Test Location: IF04
Test Date: 03 March 2020

	width (m)	length (m)
test pit top dimensions	0.60	1.30
test pit base dimensions	0.60	0.90

test pit depth (m) 1.00

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0		
1		
2		
4		
6		
8		
10		
15		
60		
105		

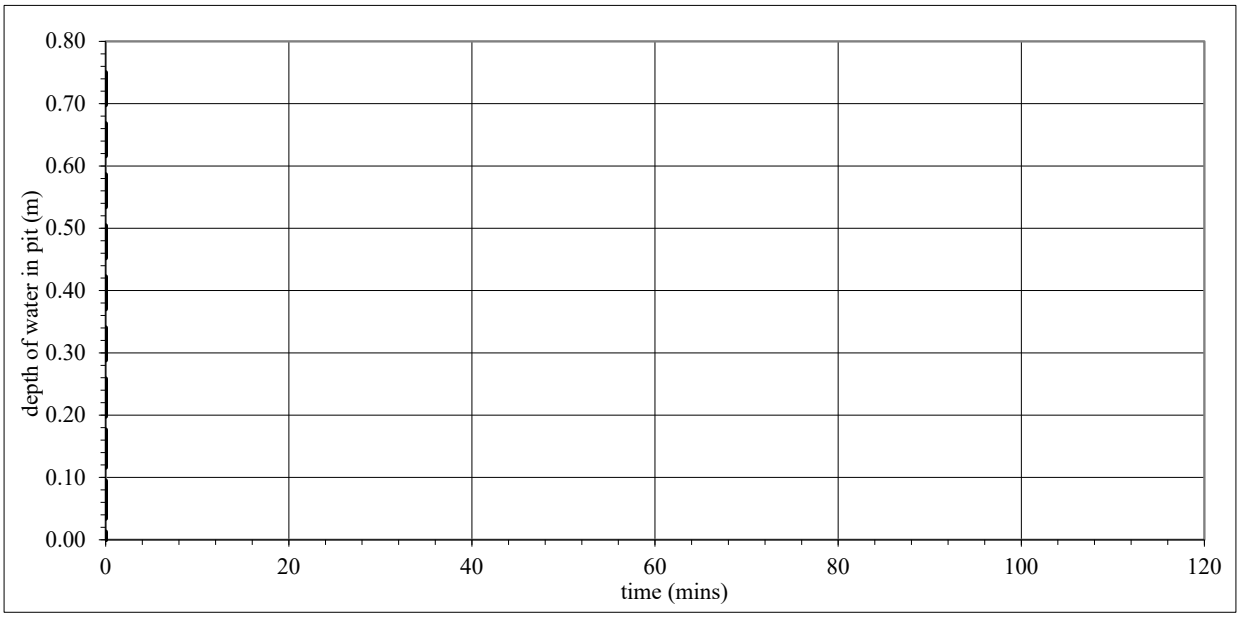
From graph below:

test start - 75% depth at
0.75 m water depth
time is not determined

test end - 25% depth at
0.25 m water depth
time is not determined

Soakaway Pit could not retain water long enough to undertaken test, indicating that the infiltration rate is high

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	0.25	0.75					
	0.75	0.25					



CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** IF05
Coordinates 165018.10 E 71613.71 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahony Consulting Engineers		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** 40.88 mOD	**Date:** 04/03/2020	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			40.58	0.30		MADE GROUND: Firm dark brown slightly sandy gravelly CLAY with medium gravel sized pieces of glass. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies.	
1.00	B1					MADE GROUND: Light brown sandy very clayey subrounded fine to coarse GRAVEL of mixed lithologies with low cobble content. Sand is fine to coarse. Cobbles are subangular of sandstone.	
			39.67	1.20		End of trial pit at 1.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.20
Width: 0.45
Length: 1.30

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason: Terminated at scheduled depth

Last Updated 04/06/2020

AGS

Soakaway Infiltration Test

Project No.: 20-0105
Site: St. Kevin's Asylum, Cork
Test Location: IF05
Test Date: 03 March 2020

	width (m)	length (m)
test pit top dimensions	0.45	1.30
test pit base dimensions	0.35	0.75

test pit depth (m) 1.20

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

depth to groundwater before adding water (m) = Dry

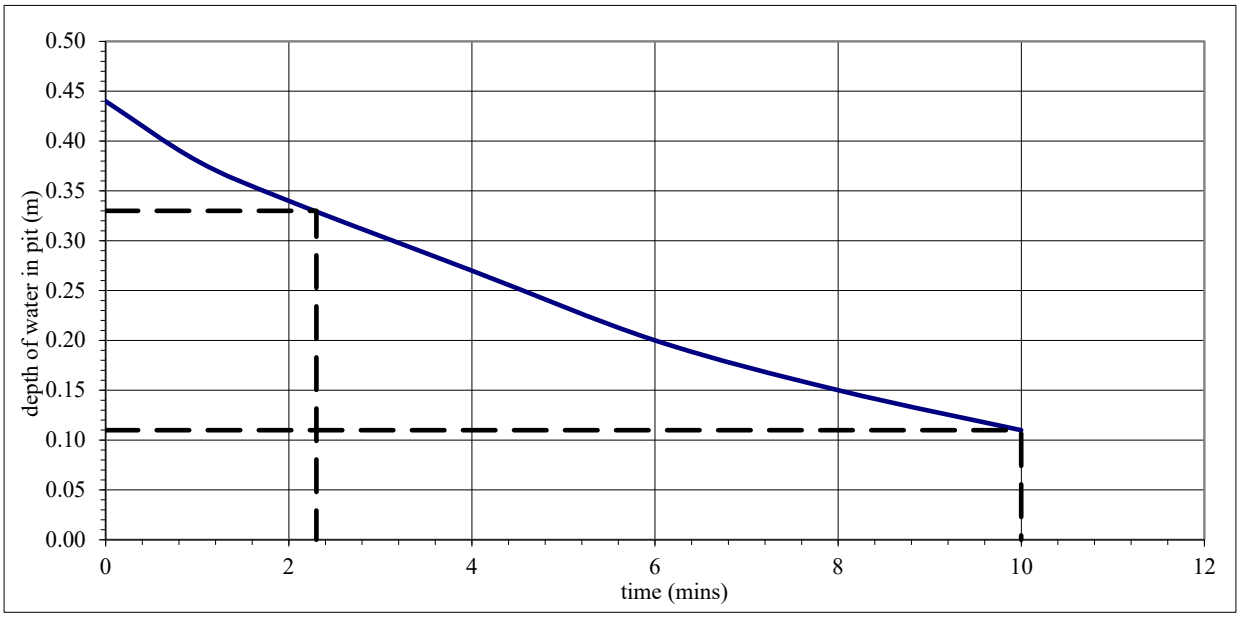
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.76	0.44
1	0.82	0.38
2	0.86	0.34
4	0.93	0.27
6	1.00	0.20
8	1.05	0.15
10	1.09	0.11

From graph below:
test start - 75% depth at
0.33 m water depth
time is 2.3 minutes

test end - 25% depth at
0.11 m water depth
time is 10.0 minutes

test infiltration rate (q) = 0.690 m/h

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
2.3	0.87	0.33	7.7	0.07	0.78	1.2E-02	0.690
10	1.09	0.11					



CAUSEWAY GEOTECH

APPENDIX G

GROUNDWATER AND GAS MONITORING RECORDS

Site:	St. Kevins's Cork
Project No.:	20-0105
Date:	08/06/2020
Weather:	Dry, warm

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	996	0	0.1	20.9	0	0
After:						

BH01	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	0.8	18.8	0	0
60	0	0.8	18.8	0	0
90	0	0.8	18.8	0	0
120	0	0.8	18.8	0	0
150	0	0.8	18.7	0	0
180	0	0.8	18.7	0	0
240	0	0.7	18.7	0	1
300	0	0.7	18.7	0	1

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.5
90	0.5
120	0.5
150	0.5
180	0.5
240	0.5
300	0.5

Groundwater monitoring	mbgl
Depth to top of water	5.3
Depth to bottom of BH	5.5
Sample collected (Y/N)	N
Sample depth	N/A

BH08	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	0.2	20.7	0	0
60	0	0.4	20.4	0	0
90	0	0.7	19.9	0	0
120	0	0.9	19.5	0	0
150	0	1	19.4	0	0
180	0	1	19.3	0	0
240	0	0.9	19.3	0	0
300	0	0.9	19.3	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.3
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.51
Sample collected (Y/N)	N
Sample depth	N/A

BH09	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	1.7	18	0	0
60	0	1.7	18	0	0
90	0	1.7	18	0	0
120	0	1.7	18	0	0
150	0	1.7	18	0	0
180	0	1.7	18	0	0
240	0	1.7	18.1	0	0
300	0	1.7	18.2	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.5
90	0.5
120	0.5
150	0.5
180	0.5
240	0.4
300	0.5

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.55
Sample collected (Y/N)	N
Sample depth	N/A

Site:	St. Kevins's Cork
Project No.:	20-0105
Date:	15/06/2020
Weather:	Wet, humid

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	998	0	0.1	20.9	0.1	0
After:						

BH01	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	0	20.7	0	0
60	0	0	20.7	0	0
90	0	0	20.7	0	0
120	0	0	20.7	0	0
150	0	0	20.7	0	0
180	0	0	20.6	0	0
240	0	0	20.6	0	0
300	0	0.1	20.5	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	5.5
Sample collected (Y/N)	N
Sample depth	N/A

BH08	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.1	0.4	19.9	0	0
60	0	0.5	19.8	0	0
90	0	0.6	19.6	0	0
120	0	0.6	19.6	0	0
150	0	0.7	19.6	0	0
180	0	0.7	19.6	0	0
240	0	0.7	19.6	0	0
300	0	0.7	19.6	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.3
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.51
Sample collected (Y/N)	N
Sample depth	N/A

BH09	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.1	2.1	17	0	0
60	0	2.1	17	0	0
90	0	2	17.1	0	0
120	0	2	17.1	0	0
150	0	2	17.2	0	0
180	0	2	17.1	0	0
240	0	1.9	17.1	0	0
300	0	2	17.1	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.3
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.55
Sample collected (Y/N)	N
Sample depth	N/A

Site:	St. Kevins's Cork
Project No.:	20-0105
Date:	22/06/2020
Weather:	Wet

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	1010	0	0.1	21.1	0	0
After:						

BH01	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	1	18.8	0	0
60	0	1.3	17.9	0	0
90	0	1.4	17.7	0	0
120	0	1.3	17.8	0	0
150	0	1.2	18	0	0
180	0	1.3	17.8	0	0
240	0	1.3	17.7	0	0
300	0	1.3	17.6	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	5.5
Sample collected (Y/N)	N
Sample depth	N/A

BH08	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.1	0.5	19.9	0	0
60	0	0.6	19.9	0	0
90	0	0.7	19.9	0	0
120	0	0.7	19.9	0	0
150	0	0.7	19.8	0	0
180	0	0.7	19.8	0	0
240	0	0.7	19.8	0	0
300	0	0.7	19.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.51
Sample collected (Y/N)	N
Sample depth	N/A

BH09	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	0.7	20	0	0
60	0	1.6	19.2	0	0
90	0	1.8	19	0	0
120	0	1.8	19	0	0
150	0	1.8	19	0	0
180	0	1.8	19	0	0
240	0	1.8	19	0	0
300	0	1.8	19	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.4
90	0.4
120	0.5
150	0.5
180	0.5
240	0.5
300	0.5

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.55
Sample collected (Y/N)	N
Sample depth	N/A

Site:	St. Kevins's Cork
Project No.:	20-0105
Date:	29/06/2020
Weather:	Dry, windy

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	1013	0	0.1	19.8	0	0
After:						

BH01	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	1.2	18.9	1	0
60	0	1.2	18.2	1	0
90	0	1.2	18.1	0	0
120	0	1.1	18.1	0	0
150	0	1.2	18.1	0	0
180	0	1.2	18.1	0	0
240	0	1.1.	18	0	0
300	0	1.1	18	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.3
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	5.5
Sample collected (Y/N)	N
Sample depth	N/A

BH08	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	0.4	19.8	1	0
60	0	0.4	19.8	0	0
90	0	0.5	19.8	0	0
120	0	0.5	19.7	0	0
150	0	0.5	19.7	0	0
180	0	0.5	19.8	0	0
240	0	0.5	19.8	0	0
300	0	0.5	19.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.5
60	0.4
90	0.5
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.51
Sample collected (Y/N)	N
Sample depth	N/A

BH09	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	1.9	17.8	0	0
60	0	1.9	17.7	0	0
90	0	1.9	17.6	0	0
120	0	1.8	17.5	0	0
150	0	1.8	17.5	0	0
180	0	1.8	17.5	0	0
240	0	1.8	17.5	0	0
300	0	1.8	17.5	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.4
90	0.4
120	0.4
150	0.4
180	0.5
240	0.5
300	0.5

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.55
Sample collected (Y/N)	N
Sample depth	N/A

CAUSEWAY GEOTECH

APPENDIX H

GEOTECHNICAL LABORATORY TEST RESULTS

CAUSEWAY GEOTECH

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www.causewaygeotech.com

SOIL AND ROCK SAMPLE ANALYSIS
LABORATORY TEST REPORT

3 June 2020

Project Name:	St. Kevin's Asylum, Cork
Project No.:	20-0105
Client:	Land Development Agency
Engineer:	Barrett Mahony Consulting Engineers

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).

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: St. Kevin's Asylum, Cork

Report Reference: Schedule 1

The table below details the tests carried out, the specifications used, and the number of tests included in this report.

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	16
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	14

Summary of Classification Test Results

Project No.	Project Name
20-0105	St. Kevin's Asylum, Cork

Hole No.	Sample				Soil Description	Density		*w*	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		bulk	dry							
						Mg/m3		%	%	%	%	%	Mg/m3	
BH06	2	1.20		B	Brown sandy gravelly SILT.			14.0	62	33 -1pt	26	7		ML
BH06	3	2.00		B	Brown sandy gravelly SILT.			23.0	64	37 -1pt	28	9		MI
BH08	2	1.20		B	Brown sandy gravelly silty CLAY.			9.6	41	32 -1pt	20	12		CL
BH08	3	2.00		B	Brown sandy gravelly silty CLAY.			14.0	58	35 -1pt	24	11		CL/CI/ML/MI
BH09	2	1.20		B	Brown sandy gravelly silty CLAY.			6.5	35	24 -1pt	18	6		ML/CL
BH10	3	2.00		B	Brown sandy gravelly silty CLAY.			15.0	58	39 -1pt	25	14		MI/CI
TP11	3	1.50		B	Brown sandy gravelly SILT.			17.0	43	41 -1pt	30	11		MI
TP18	3	1.00		B	Brown sandy gravelly silty CLAY.			12.0	53	23 -1pt	14	9		CL

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

LAB 01R Version 4

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

06/03/2020 00:00

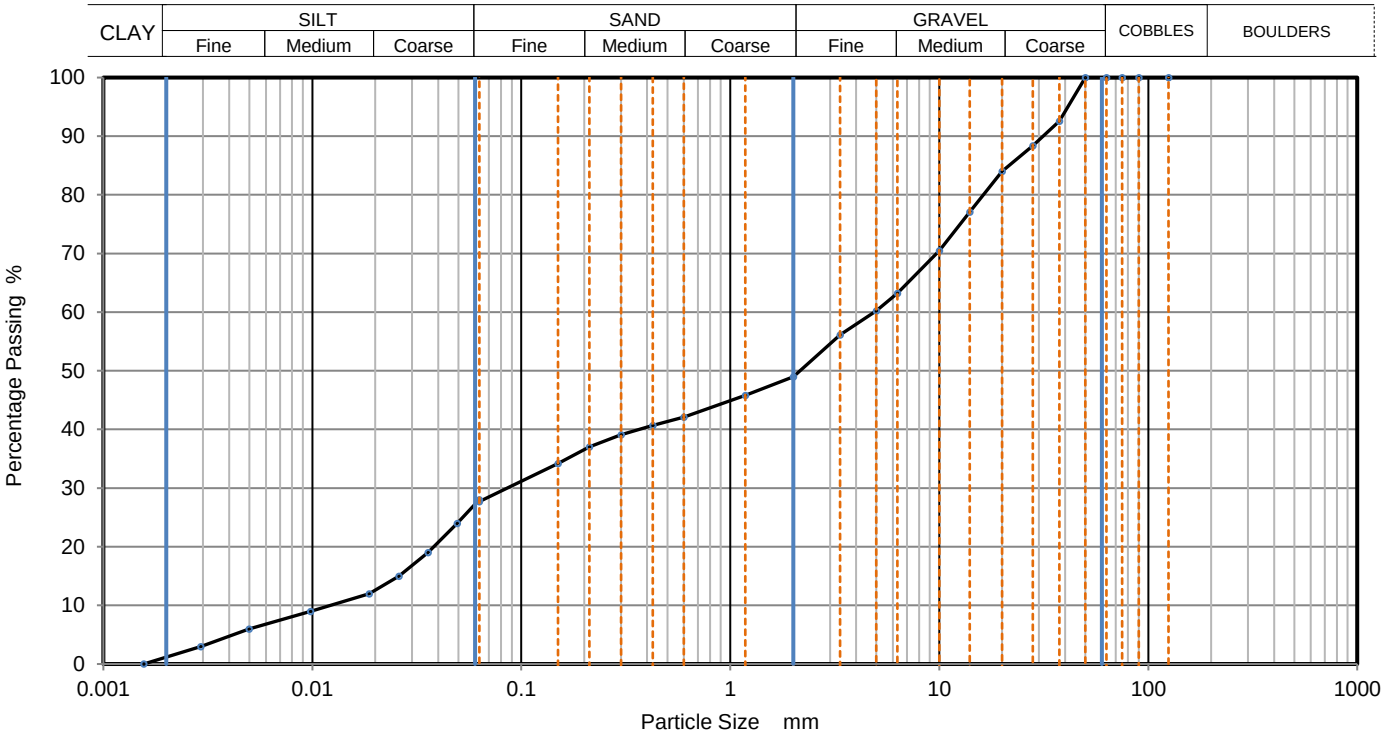
Approved By

Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref	20-0105
					Borehole/Pit No.	BH06
Site Name	St. Kevin's Asylum, Cork				Sample No.	2
Soil Description	Brown sandy gravelly SILT.				Depth, m	1.20
Specimen Reference	6	Specimen Depth	1.2	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID	Caus2020031124



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	28
90	100	0.04939	24
75	100	0.03581	19
63	100	0.02594	15
50	100	0.01866	12
37.5	93	0.00980	9
28	88	0.00498	6
20	84	0.00292	3
14	77	0.00156	0
10	71		
6.3	63		
5	60		
3.35	56		
2	49		
1.18	46		
0.6	42	Particle density	(assumed)
0.425	41	2.65	Mg/m3
0.3	39		
0.212	37		
0.15	34		
0.063	28		

Dry Mass of sample, g	7371

Sample Proportions	% dry mass
Cobbles	0
Gravel	51
Sand	21
Silt	27
Clay	1

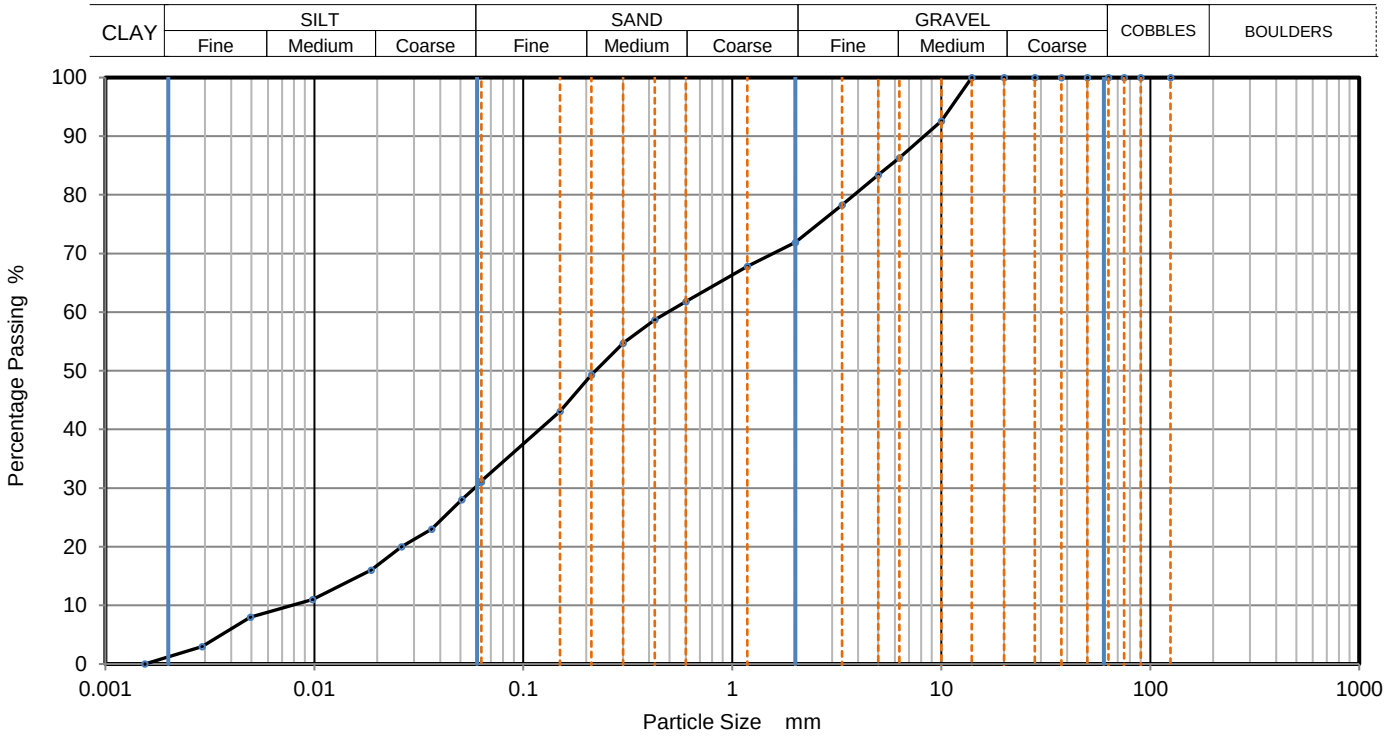
Grading Analysis		
D100	mm	
D60	mm	4.91
D30	mm	0.0857
D10	mm	0.0115
Uniformity Coefficient		430
Curvature Coefficient		0.13

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref	20-0105
				Borehole/Pit No.	BH06
Site Name	St. Kevin's Asylum, Cork			Sample No.	3
Soil Description	Brown sandy gravelly SILT.			Depth, m	2.00
Specimen Reference	6	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2020031125



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.05066	28
75	100	0.03647	23
63	100	0.02609	20
50	100	0.01866	16
37.5	100	0.00980	11
28	100	0.00495	8
20	100	0.00291	3
14	100	0.00154	0
10	93		
6.3	86		
5	83		
3.35	78		
2	72		
1.18	68		
0.6	62	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	55		
0.212	49		
0.15	43		
0.063	31		

Dry Mass of sample, g	356

Sample Proportions	% dry mass
Cobbles	0
Gravel	28
Sand	41
Silt	30
Clay	1

Grading Analysis		
D100	mm	
D60	mm	0.491
D30	mm	0.0583
D10	mm	0.00718
Uniformity Coefficient		68
Curvature Coefficient		0.96

Remarks

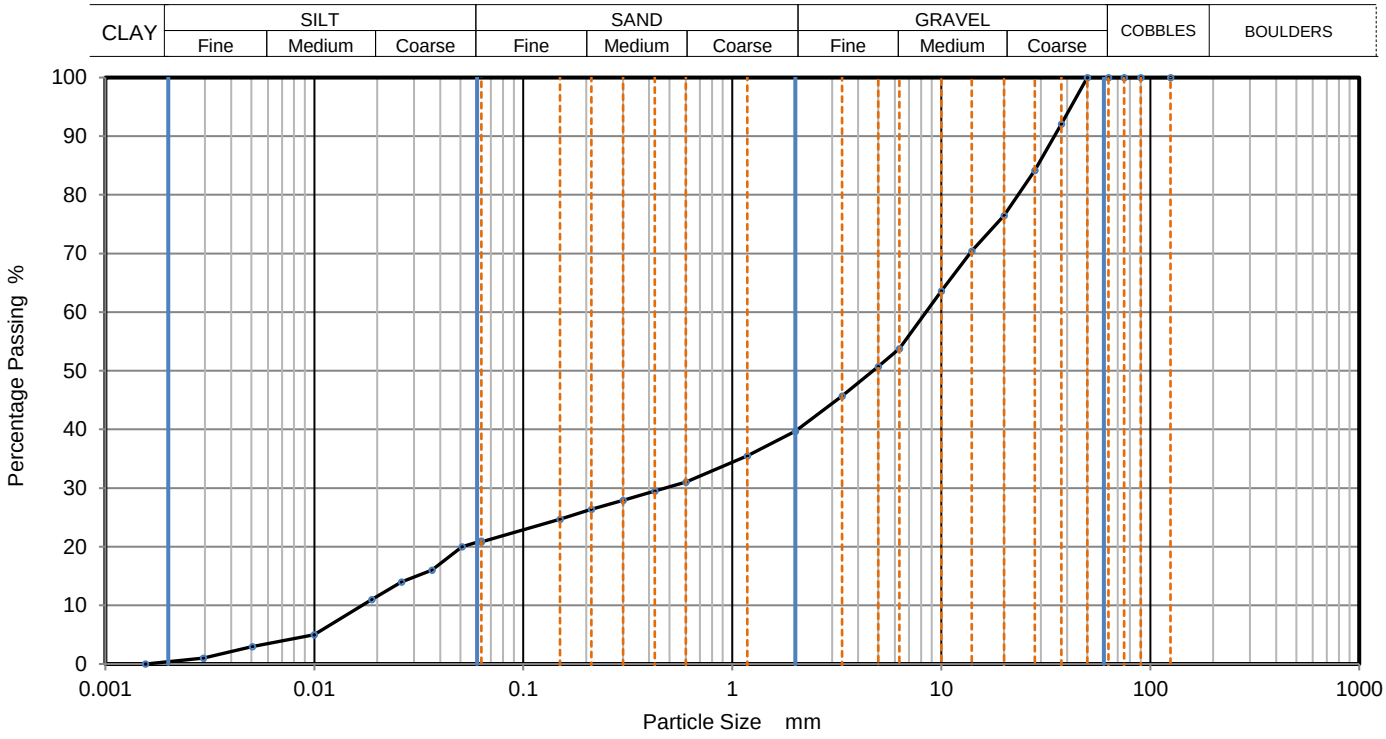
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref	20-0105
				Borehole/Pit No.	BH08
Site Name	St. Kevin's Asylum, Cork			Sample No.	2
Soil Description	Brown sandy gravelly silty CLAY.			Depth, m	1.20
Specimen Reference	6	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2020031126



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	21
90	100	0.05084	20
75	100	0.03660	16
63	100	0.02618	14
50	100	0.01883	11
37.5	92	0.00999	5
28	84	0.00505	3
20	77	0.00294	1
14	70	0.00156	0
10	64		
6.3	54		
5	51		
3.35	46		
2	40		
1.18	36		
0.6	31	Particle density	(assumed)
0.425	30	2.65	Mg/m3
0.3	28		
0.212	26		
0.15	25		
0.063	21		

Dry Mass of sample, g	6790

Sample Proportions	% dry mass
Cobbles	0
Gravel	60
Sand	19
Silt	20
Clay	0

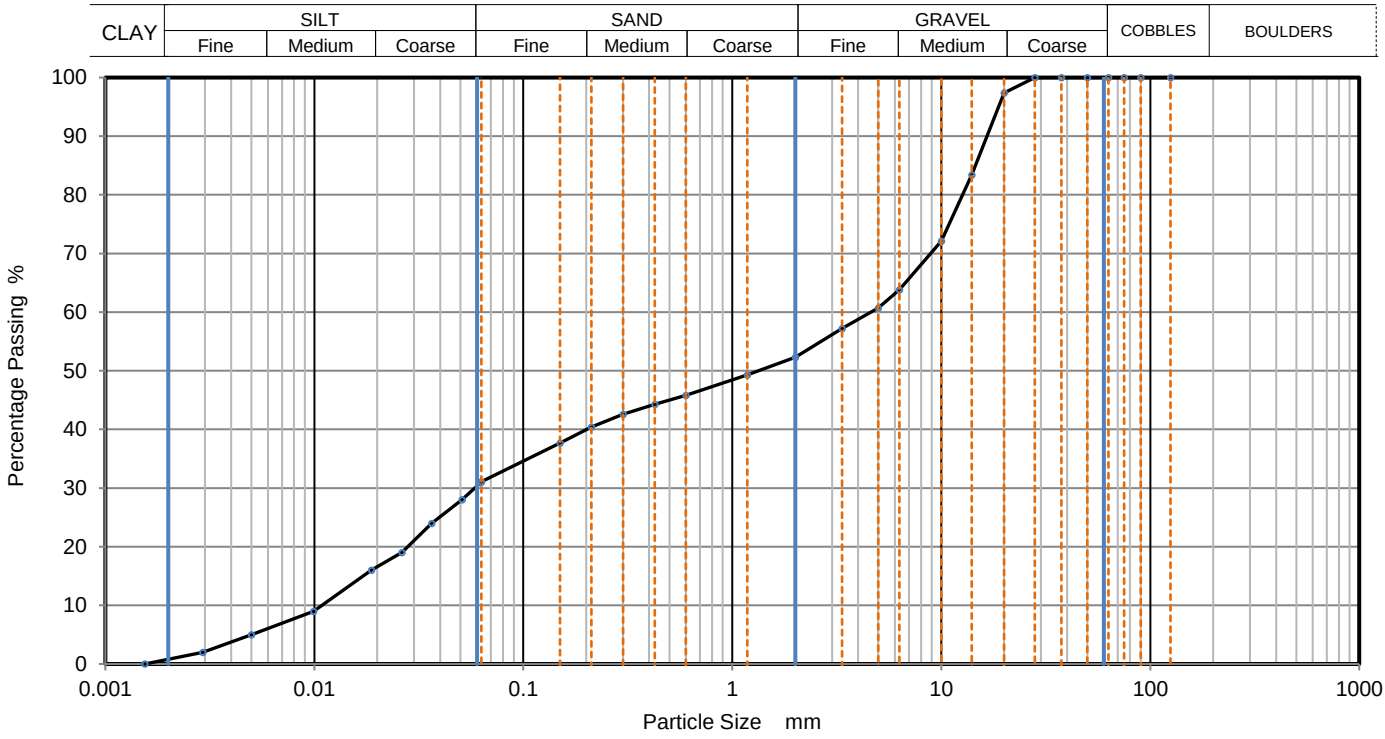
Grading Analysis		
D100	mm	
D60	mm	8.44
D30	mm	0.48
D10	mm	0.0169
Uniformity Coefficient		500
Curvature Coefficient		1.6

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref	20-0105
				Borehole/Pit No.	BH08
Site Name	St. Kevin's Asylum, Cork			Sample No.	3
Soil Description	Brown sandy gravelly silty CLAY.			Depth, m	2.00
Specimen Reference	6	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2020031127



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.05097	28
75	100	0.03647	24
63	100	0.02624	19
50	100	0.01877	16
37.5	100	0.00991	9
28	100	0.00501	5
20	97	0.00292	2
14	83	0.00154	0
10	72		
6.3	64		
5	61		
3.35	57		
2	52		
1.18	49		
0.6	46	Particle density	(assumed)
0.425	44	2.65	Mg/m3
0.3	43		
0.212	40		
0.15	38		
0.063	31		

Dry Mass of sample, g: 1063

Sample Proportions	% dry mass
Cobbles	0
Gravel	48
Sand	21
Silt	30
Clay	1

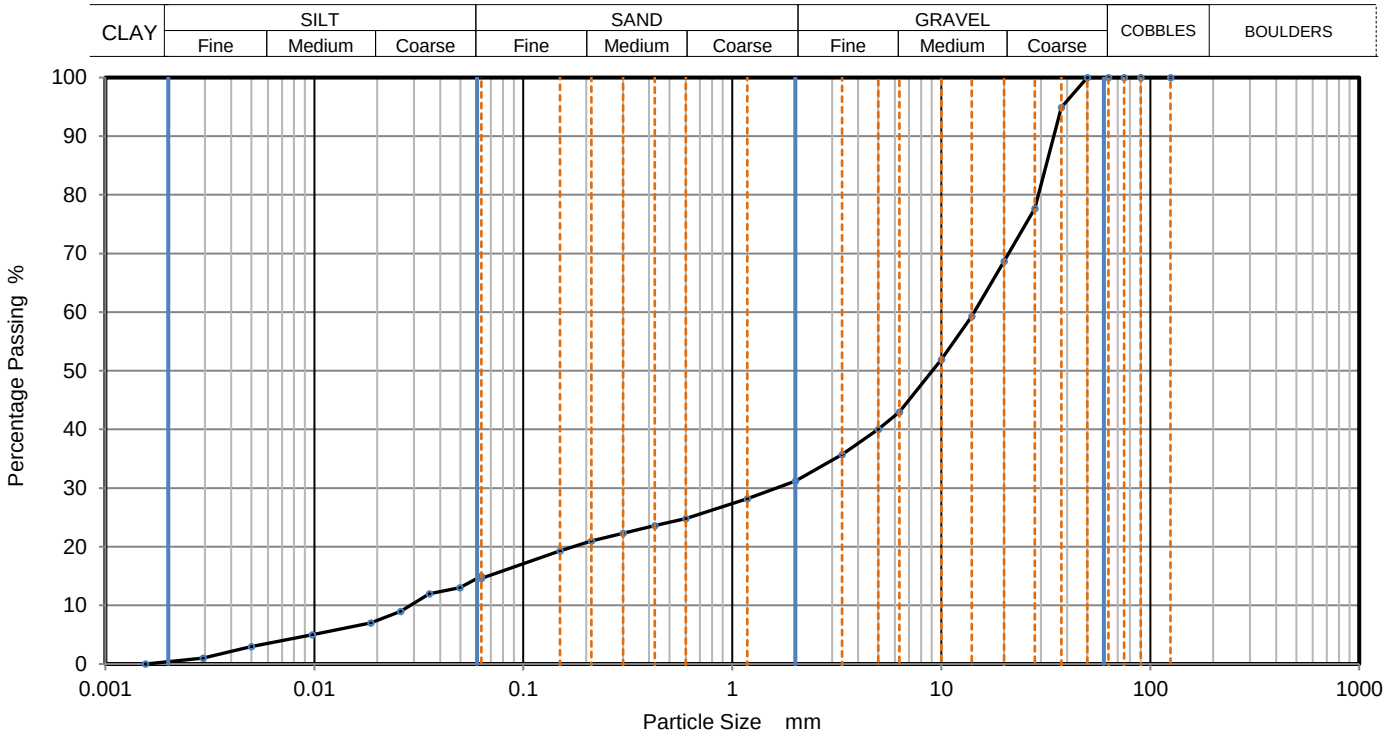
Grading Analysis		
D100	mm	
D60	mm	4.61
D30	mm	0.0588
D10	mm	0.0112
Uniformity Coefficient		410
Curvature Coefficient		0.067

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**20-0105**
				Borehole/Pit No.	BH09
Site Name	St. Kevin's Asylum, Cork			Sample No.	2
Soil Description	Brown sandy gravelly silty CLAY.			Depth, m	1.20
Specimen Reference	6	Specimen Depth	1.2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2020031128



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	15
90	100	0.04958	13
75	100	0.03551	12
63	100	0.02588	9
50	100	0.01862	7
37.5	95	0.00978	5
28	78	0.00499	3
20	69	0.00293	1
14	59	0.00156	0
10	52		
6.3	43		
5	40		
3.35	36		
2	31		
1.18	28		
0.6	25	Particle density	(assumed)
0.425	24	2.65	Mg/m3
0.3	22		
0.212	21		
0.15	19		
0.063	15		

Dry Mass of sample, g: 7016

Sample Proportions	% dry mass
Cobbles	0
Gravel	69
Sand	17
Silt	14
Clay	1

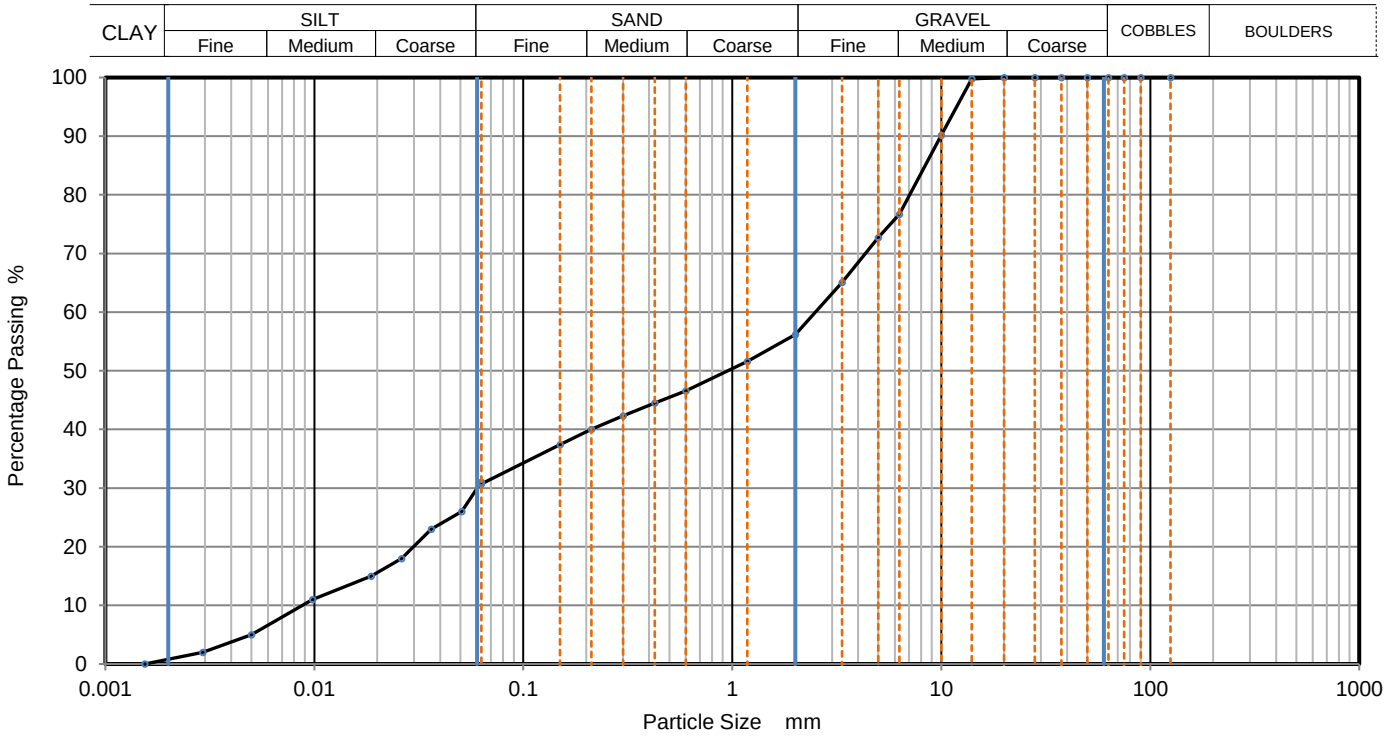
Grading Analysis		
D100	mm	
D60	mm	14.4
D30	mm	1.63
D10	mm	0.0296
Uniformity Coefficient		490
Curvature Coefficient		6.2

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref	20-0105
				Borehole/Pit No.	BH10
Site Name	St. Kevin's Asylum, Cork			Sample No.	3
Soil Description	Brown sandy gravelly silty CLAY.			Depth, m	2.00
Specimen Reference	6	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2020031129



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.05066	26
75	100	0.03626	23
63	100	0.02609	18
50	100	0.01866	15
37.5	100	0.00980	11
28	100	0.00501	5
20	100	0.00292	2
14	100	0.00154	0
10	90		
6.3	77		
5	73		
3.35	65		
2	56		
1.18	52		
0.6	47	Particle density	(assumed)
0.425	45	2.65	Mg/m3
0.3	42		
0.212	40		
0.15	37		
0.063	31		

Dry Mass of sample, g	623

Sample Proportions	% dry mass
Cobbles	0
Gravel	44
Sand	26
Silt	30
Clay	1

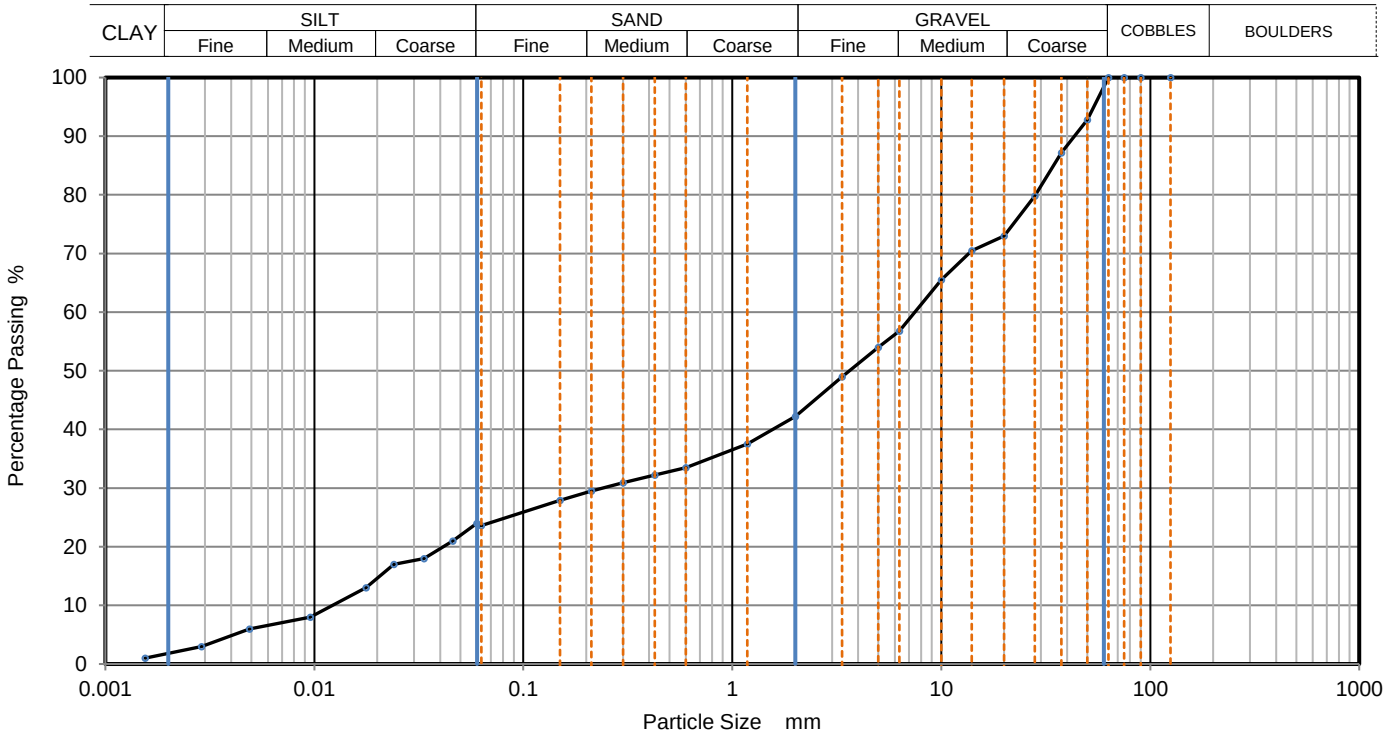
Grading Analysis		
D100	mm	
D60	mm	2.49
D30	mm	0.061
D10	mm	0.00903
Uniformity Coefficient		280
Curvature Coefficient		0.17

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**20-0105**
				Borehole/Pit No.	TP01
Site Name	St. Kevin's Asylum, Cork			Sample No.	3
Soil Description	Brown sandy gravelly silty CLAY.			Depth, m	0.40
Specimen Reference	2	Specimen Depth	0.4 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2020031130



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05994	24
90	100	0.04596	21
75	100	0.03345	18
63	100	0.02398	17
50	93	0.01764	13
37.5	87	0.00956	8
28	80	0.00489	6
20	73	0.00288	3
14	71	0.00155	1
10	66		
6.3	57		
5	54		
3.35	49		
2	42		
1.18	38		
0.6	34	Particle density	(assumed)
0.425	32	2.65	Mg/m3
0.3	31		
0.212	30		
0.15	28		
0.063	24		

Dry Mass of sample, g	16816

Sample Proportions	% dry mass
Cobbles	0
Gravel	58
Sand	19
Silt	22
Clay	2

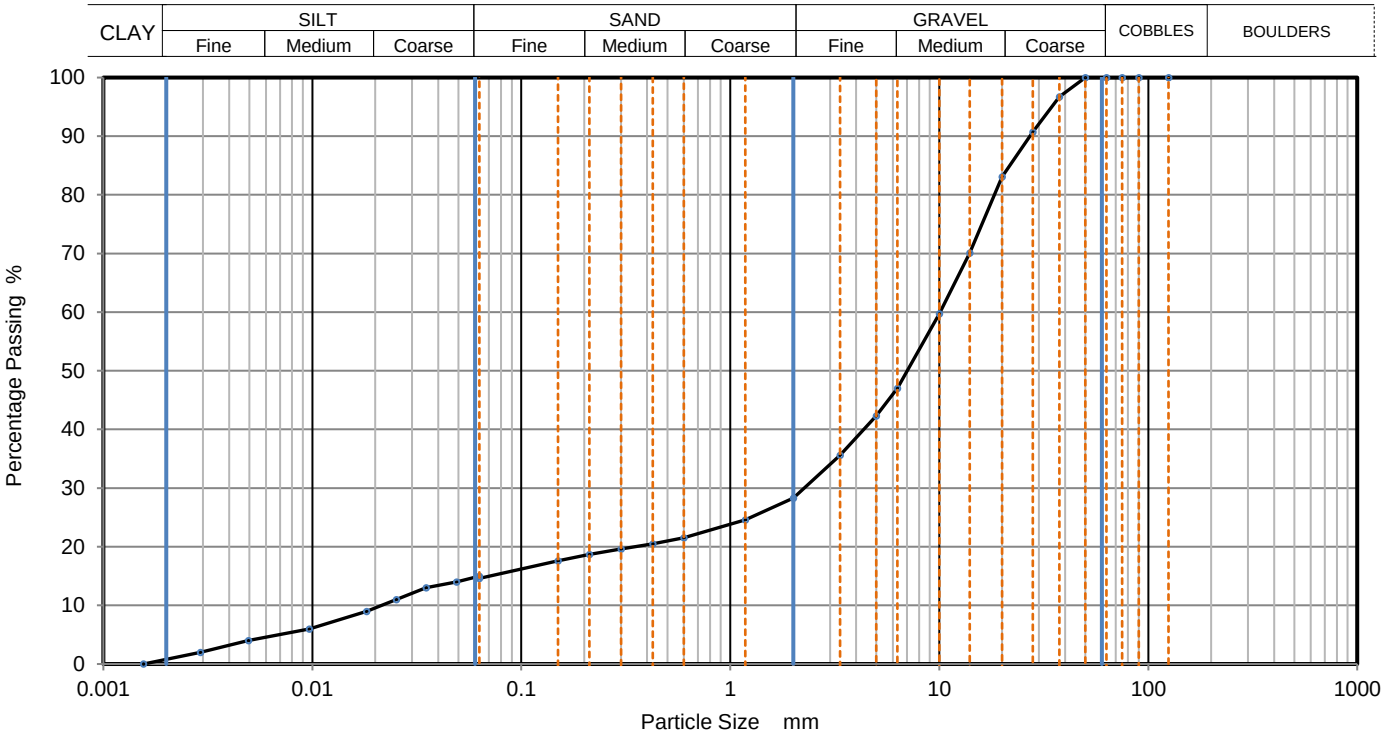
Grading Analysis		
D100	mm	
D60	mm	7.46
D30	mm	0.242
D10	mm	0.0117
Uniformity Coefficient		640
Curvature Coefficient		0.67

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**20-0105**
				Borehole/Pit No.	TP03
Site Name	St. Kevin's Asylum, Cork			Sample No.	3
Soil Description	Brown slightly sandy silty subangular fine to coarse GRAVEL.			Depth, m	0.50
Specimen Reference	2	Specimen Depth	0.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2020031131



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	15
90	100	0.04894	14
75	100	0.03506	13
63	100	0.02526	11
50	100	0.01819	9
37.5	97	0.00967	6
28	91	0.00494	4
20	83	0.00291	2
14	70	0.00156	0
10	60		
6.3	47		
5	42		
3.35	36		
2	28		
1.18	25		
0.6	22	Particle density	(assumed)
0.425	21	2.65	Mg/m3
0.3	20		
0.212	19		
0.15	18		
0.063	15		

Dry Mass of sample, g: 2561

Sample Proportions	% dry mass
Cobbles	0
Gravel	72
Sand	14
Silt	14
Clay	1

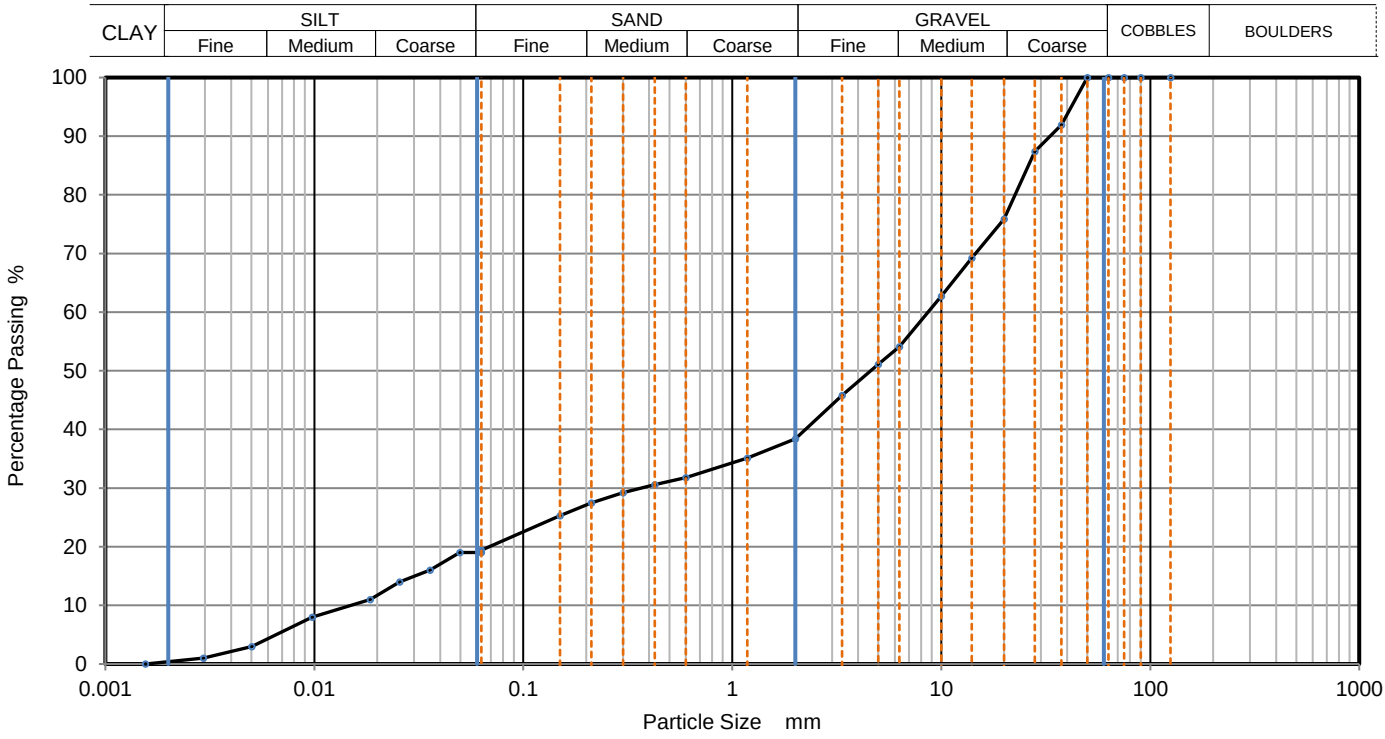
Grading Analysis		
D100	mm	
D60	mm	10.1
D30	mm	2.26
D10	mm	0.0206
Uniformity Coefficient		490
Curvature Coefficient		25

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref	20-0105
					Borehole/Pit No.	TP05
Site Name	St. Kevin's Asylum, Cork				Sample No.	3
Soil Description	Brown sandy silty subangular fine to coarse GRAVEL.				Depth, m	1.50
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	Caus2020031132



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	19
90	100	0.04958	19
75	100	0.03573	16
63	100	0.02557	14
50	100	0.01851	11
37.5	92	0.00978	8
28	87	0.00502	3
20	76	0.00294	1
14	69	0.00156	0
10	63		
6.3	54		
5	51		
3.35	46		
2	38		
1.18	35		
0.6	32	Particle density	(assumed)
0.425	31	2.65	Mg/m3
0.3	29		
0.212	28		
0.15	25		
0.063	19		

Dry Mass of sample, g	6507

Sample Proportions	% dry mass
Cobbles	0
Gravel	62
Sand	19
Silt	19
Clay	0

Grading Analysis		
D100	mm	
D60	mm	8.64
D30	mm	0.369
D10	mm	0.0154
Uniformity Coefficient		560
Curvature Coefficient		1

Remarks

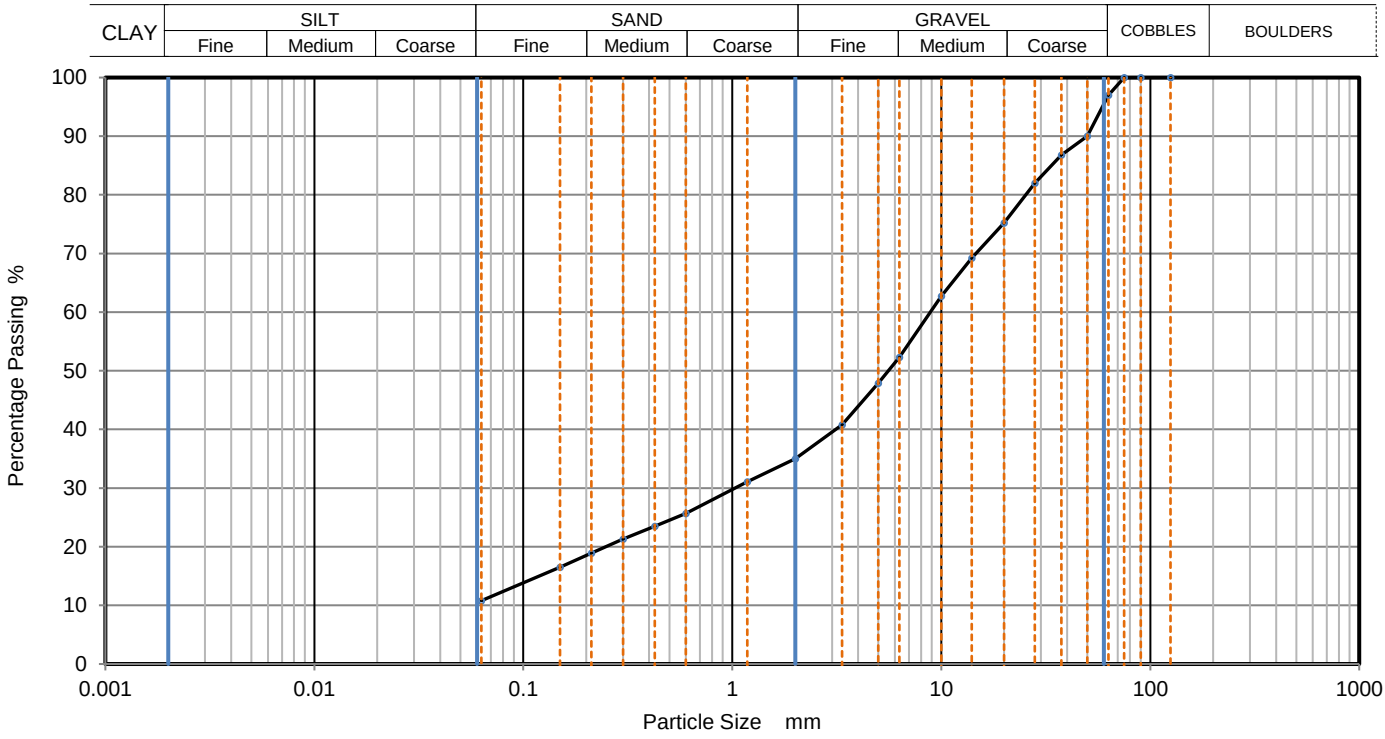
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen.Watson

UKAS TESTING

10122

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref	20-0105
					Borehole/Pit No.	TP06
Site Name	St. Kevin's Asylum, Cork				Sample No.	3
Soil Description	Brown sandy slightly silty subangular fine to coarse GRAVEL.				Depth, m	0.40
Specimen Reference	2	Specimen Depth	0.4	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID	Caus2020031133



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	97		
50	90		
37.5	87		
28	82		
20	75		
14	69		
10	63		
6.3	52		
5	48		
3.35	41		
2	35		
1.18	31		
0.6	26		
0.425	24		
0.3	21		
0.212	19		
0.15	17		
0.063	11		

Dry Mass of sample, g	16817

Sample Proportions	% dry mass
Cobbles	3
Gravel	62
Sand	24
Fines <0.063mm	11

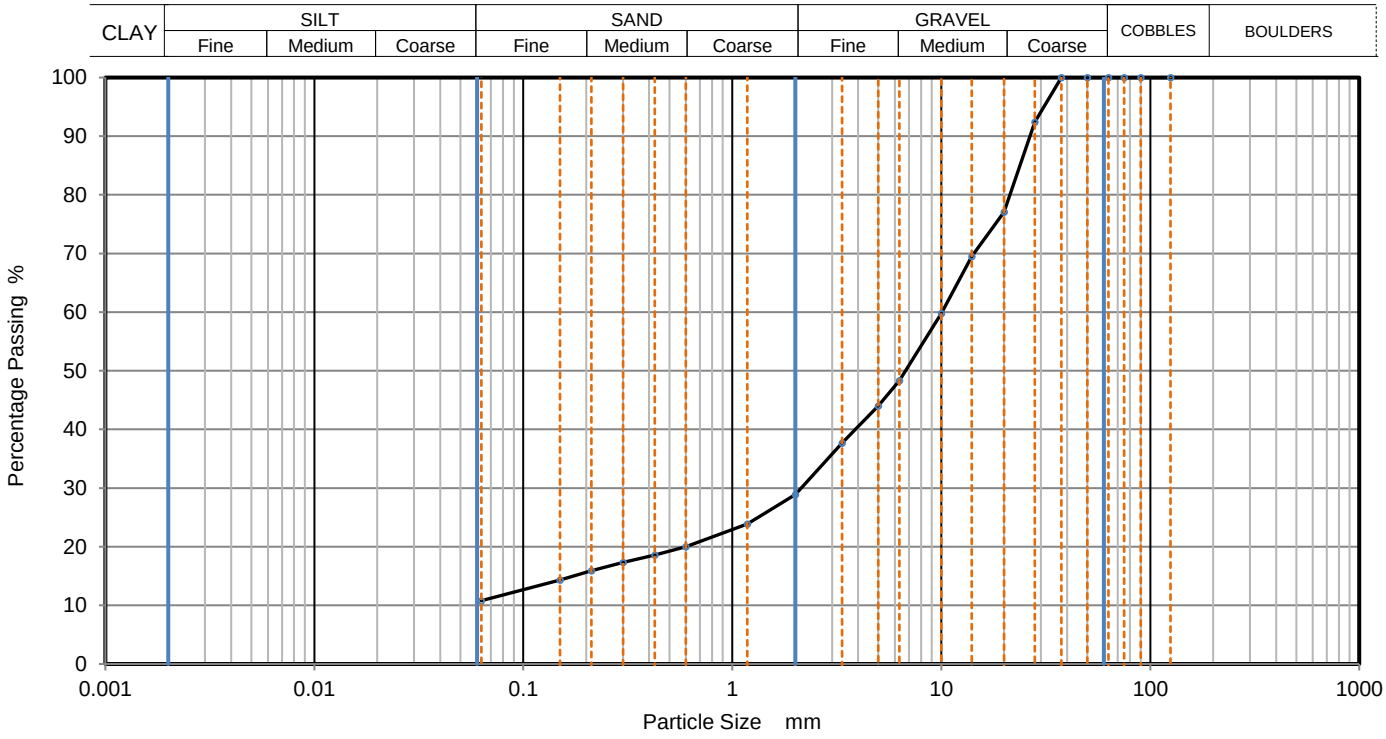
Grading Analysis		
D100	mm	
D60	mm	8.87
D30	mm	1.03
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref	20-0105
					Borehole/Pit No.	TP07
Site Name	St. Kevin's Asylum, Cork				Sample No.	3
Soil Description	Brown sandy slightly silty subangular fine to coarse GRAVEL.				Depth, m	0.65
Specimen Reference	2	Specimen Depth	0.65	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID	Caus2020031134



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	92		
20	77		
14	70		
10	60		
6.3	48		
5	44		
3.35	38		
2	29		
1.18	24		
0.6	20		
0.425	19		
0.3	17		
0.212	16		
0.15	14		
0.063	11		

Dry Mass of sample, g	2038

Sample Proportions	% dry mass
Cobbles	0
Gravel	71
Sand	18
Fines <0.063mm	11

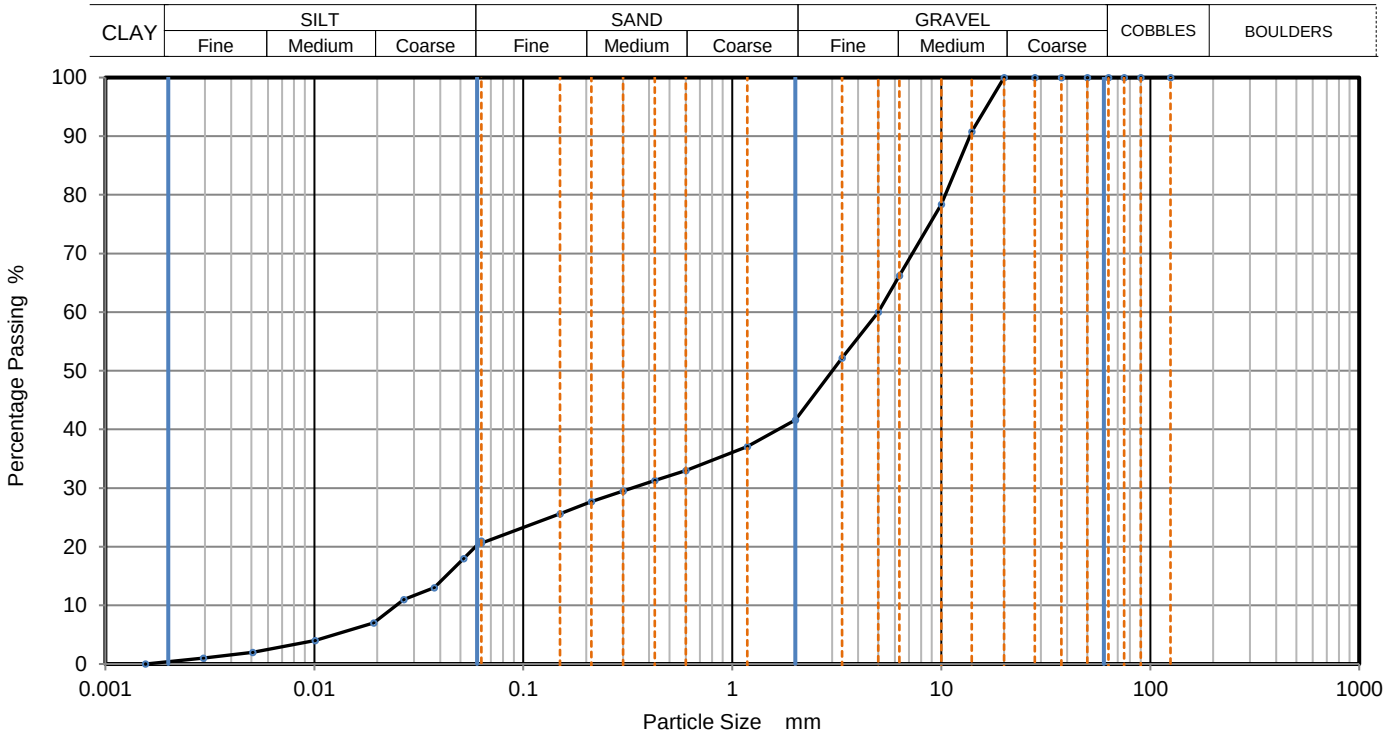
Grading Analysis		
D100	mm	
D60	mm	10.1
D30	mm	2.13
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref	20-0105
				Borehole/Pit No.	TP11
Site Name	St. Kevin's Asylum, Cork			Sample No.	3
Soil Description	Brown sandy gravelly SILT.			Depth, m	1.50
Specimen Reference	6	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2020031135



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	21
90	100	0.05176	18
75	100	0.03745	13
63	100	0.02677	11
50	100	0.01924	7
37.5	100	0.01009	4
28	100	0.00507	2
20	100	0.00294	1
14	91	0.00156	0
10	78		
6.3	66		
5	60		
3.35	52		
2	42		
1.18	37		
0.6	33	Particle density	(assumed)
0.425	31	2.65	Mg/m3
0.3	30		
0.212	28		
0.15	26		
0.063	21		

Dry Mass of sample, g	599

Sample Proportions	% dry mass
Cobbles	0
Gravel	58
Sand	21
Silt	20
Clay	1

Grading Analysis		
D100	mm	
D60	mm	5
D30	mm	0.328
D10	mm	0.0247
Uniformity Coefficient		200
Curvature Coefficient		0.87

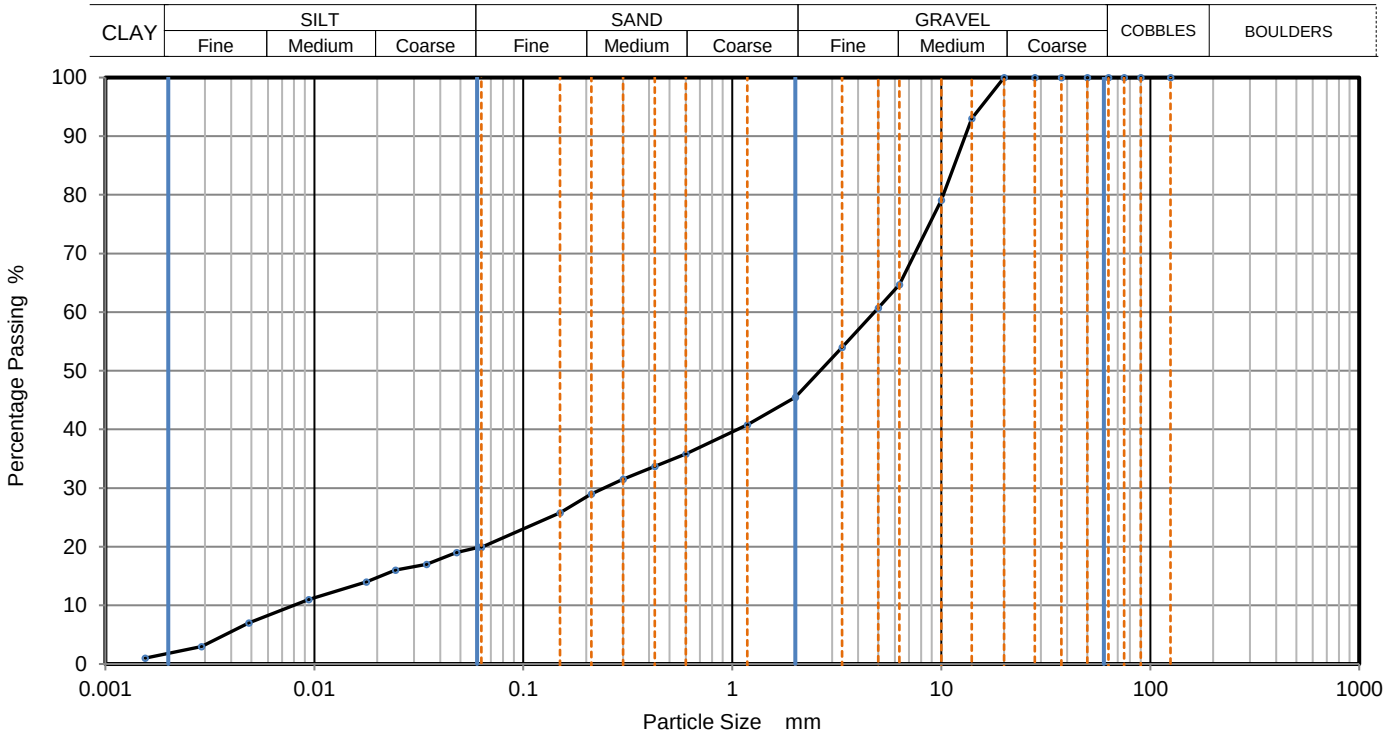
Remarks

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	20-0105
				Borehole/Pit No.	TP12
Site Name	St. Kevin's Asylum, Cork			Sample No.	3
Soil Description	Brown sandy gravelly silty CLAY.			Depth, m	1.00
Specimen Reference	2	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2020031136



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	20
90	100	0.04797	19
75	100	0.03438	17
63	100	0.02447	16
50	100	0.01775	14
37.5	100	0.00939	11
28	100	0.00486	7
20	100	0.00288	3
14	93	0.00155	1
10	79		
6.3	65		
5	61		
3.35	54		
2	46		
1.18	41		
0.6	36	Particle density	(assumed)
0.425	34	2.65	Mg/m3
0.3	32		
0.212	29		
0.15	26		
0.063	20		

Dry Mass of sample, g	1064

Sample Proportions	% dry mass
Cobbles	0
Gravel	55
Sand	26
Silt	18
Clay	2

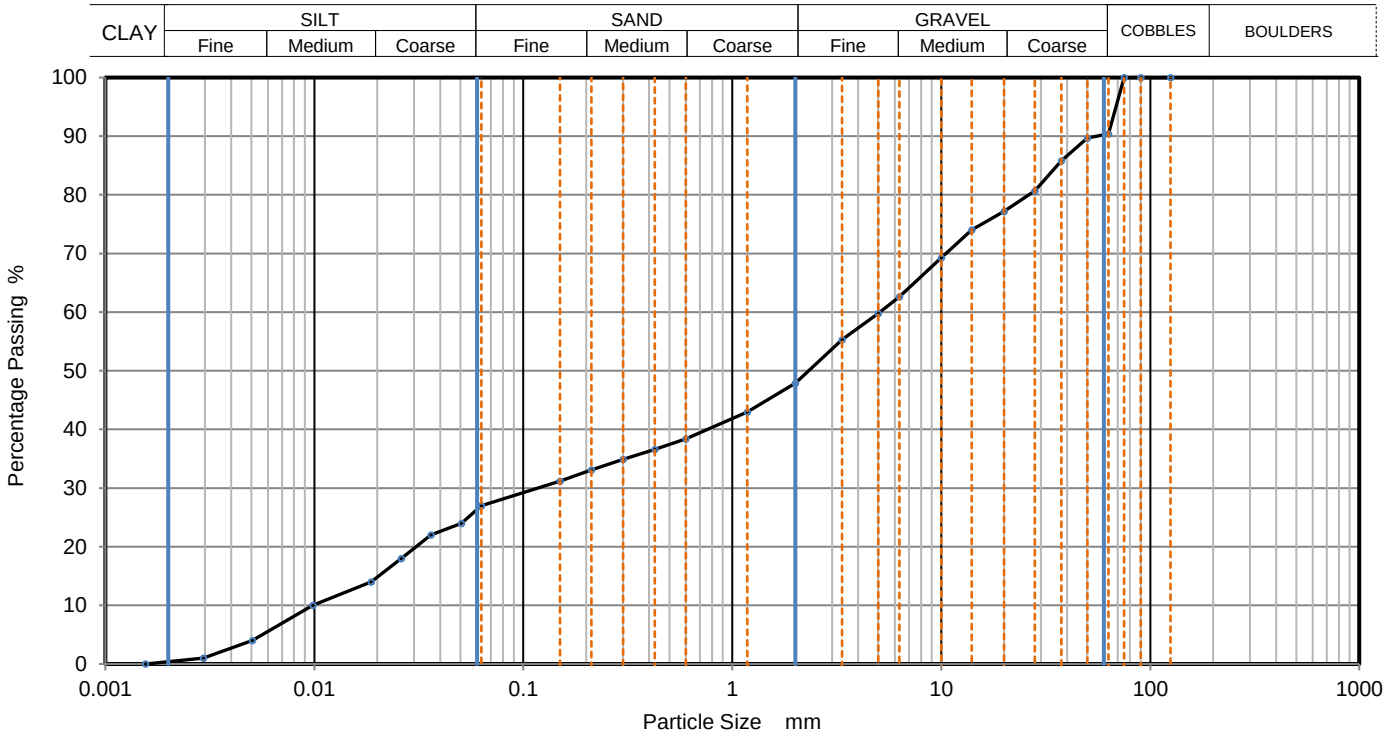
Grading Analysis		
D100	mm	
D60	mm	4.81
D30	mm	0.245
D10	mm	0.00803
Uniformity Coefficient		600
Curvature Coefficient		1.6

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION			Job Ref	20-0105
				Borehole/Pit No.	TP16
Site Name	St. Kevin's Asylum, Cork			Sample No.	3
Soil Description	Brown sandy gravelly silty CLAY.			Depth, m	1.00
Specimen Reference	2	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2020031137



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	27
90	100	0.05053	24
75	100	0.03616	22
63	90	0.02603	18
50	90	0.01872	14
37.5	86	0.00983	10
28	81	0.00505	4
20	77	0.00294	1
14	74	0.00156	0
10	69		
6.3	63		
5	60		
3.35	55		
2	48		
1.18	43		
0.6	38	Particle density	(assumed)
0.425	37	2.65	Mg/m3
0.3	35		
0.212	33		
0.15	31		
0.063	27		

Dry Mass of sample, g	16576

Sample Proportions	% dry mass
Cobbles	10
Gravel	43
Sand	21
Silt	27
Clay	1

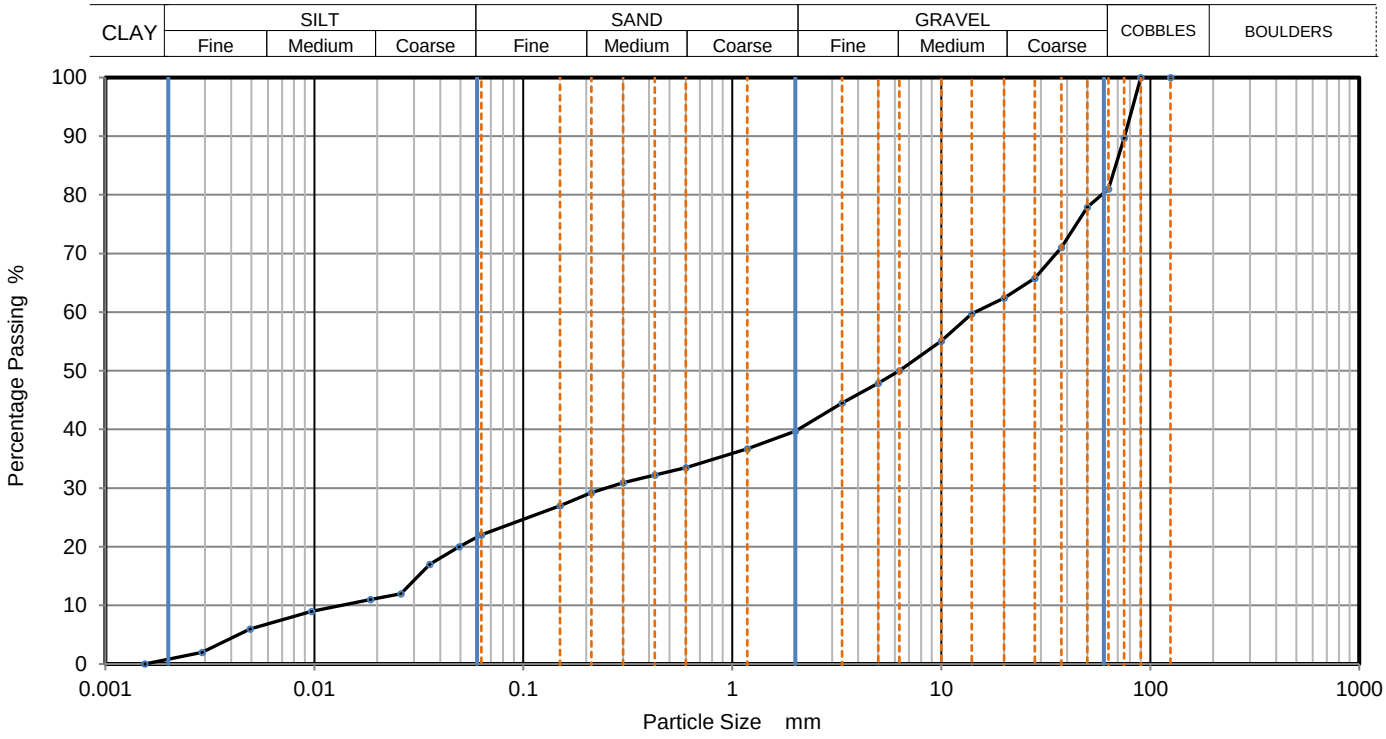
Grading Analysis		
D100	mm	
D60	mm	5.09
D30	mm	0.117
D10	mm	0.00954
Uniformity Coefficient		530
Curvature Coefficient		0.28

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref	20-0105
					Borehole/Pit No.	TP17
Site Name	St. Kevin's Asylum, Cork				Sample No.	3
Soil Description	Brown sandy gravelly silty CLAY.				Depth, m	1.00
Specimen Reference	2	Specimen Depth	1	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID	Caus2020031138



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	22
90	100	0.04940	20
75	90	0.03560	17
63	81	0.02594	12
50	78	0.01856	11
37.5	71	0.00969	9
28	66	0.00493	6
20	62	0.00291	2
14	60	0.00154	0
10	55		
6.3	50		
5	48		
3.35	45		
2	40		
1.18	37		
0.6	34	Particle density	(assumed)
0.425	32	2.65	Mg/m3
0.3	31		
0.212	29		
0.15	27		
0.063	22		

Dry Mass of sample, g	11675

Sample Proportions	% dry mass
Cobbles	19
Gravel	41
Sand	18
Silt	21
Clay	1

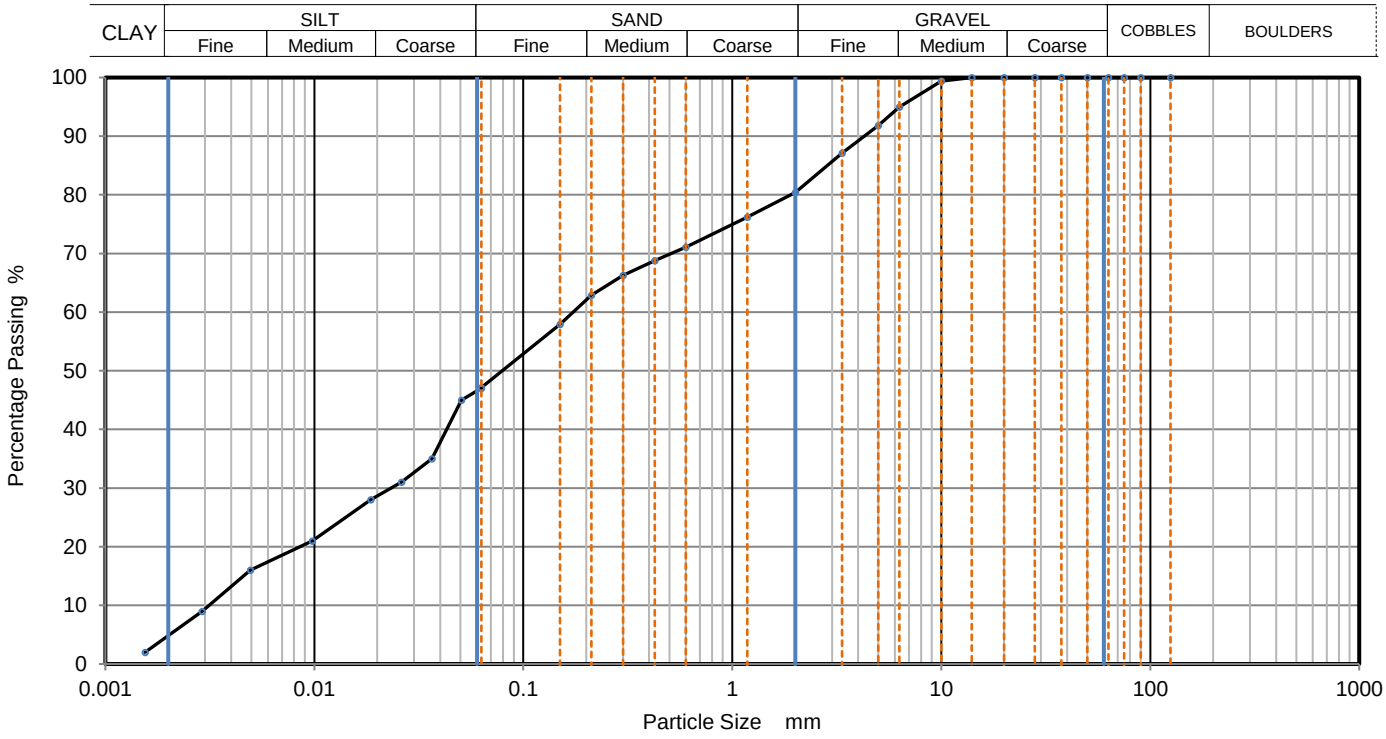
Grading Analysis		
D100	mm	
D60	mm	14.6
D30	mm	0.251
D10	mm	0.0155
Uniformity Coefficient		940
Curvature Coefficient		0.28

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref	20-0105
					Borehole/Pit No.	TP18
Site Name	St. Kevin's Asylum, Cork				Sample No.	3
Soil Description	Brown sandy gravelly silty CLAY.				Depth, m	1.00
Specimen Reference	6	Specimen Depth	1	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID	Caus2020031139



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	47
90	100	0.05053	45
75	100	0.03660	35
63	100	0.02618	31
50	100	0.01862	28
37.5	100	0.00978	21
28	100	0.00494	16
20	100	0.00290	9
14	100	0.00155	2
10	99		
6.3	95		
5	92		
3.35	87		
2	80		
1.18	76		
0.6	71	Particle density	(assumed)
0.425	69	2.65	Mg/m3
0.3	66		
0.212	63		
0.15	58		
0.063	47		

Dry Mass of sample, g	285

Sample Proportions	% dry mass
Cobbles	0
Gravel	20
Sand	33
Silt	42
Clay	5

Grading Analysis		
D100	mm	
D60	mm	0.173
D30	mm	0.024
D10	mm	0.00303
Uniformity Coefficient		57
Curvature Coefficient		1.1

Remarks

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

Approved
Stephen.Watson

CAUSEWAY GEOTECH

APPENDIX I

ENVIRONMENTAL LABORATORY TEST RESULTS

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

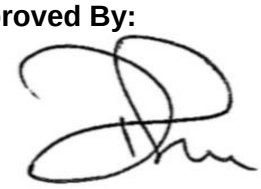
UKAS TESTING
2183

Final Report

Report No.:	20-07191-1
Initial Date of Issue:	16-Mar-2020
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Fernando Alfonso Gabriella Horan Joe Gervin John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraham
Project	20-0105 St. Kevin's Asylum, Cork

Quotation No.:		**Date Received:**	05-Mar-2020
Order No.:		**Date Instructed:**	09-Mar-2020
No. of Samples:	23		
Turnaround (Wkdays):	5	**Results Due:**	13-Mar-2020
Date Approved:	16-Mar-2020		

Approved By:



Details: Darrell Hall, Director

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

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Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd			Chemtest Job No.:		20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:			Chemtest Sample ID.:		981252	981253	981256	981257	981261	981262	981264	981266	981267
			Sample Location:		TP01	TP02	TP03	TP04	TP06	TP06	TP07	TP08	TP09
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.40	0.25	0.50	0.50	0.20	0.40	0.65	0.50	0.10
			Date Sampled:		02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020
			Asbestos Lab:		DURHAM				DURHAM				DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A	-				-				-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected				No Asbestos Detected				No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-				-				-
Moisture	N	2030	%	0.020	6.7	32	8.6	15		8.2	13	8.3	
pH	U	2010		4.0	8.1	5.8	7.1	6.0		8.9	6.5	7.4	
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	1.0	< 0.40	< 0.40		< 0.40	< 0.40	< 0.40	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010		0.020	< 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	1.6	9.5	0.50		< 0.50	< 0.50	< 0.50	
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0	
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.7	2.1	1.9	0.99		1.1	1.3	1.0	
Sulphate (Total)	U	2430	%	0.010	0.023	0.16	0.041	0.070		0.067	0.11	0.016	
Arsenic	U	2450	mg/kg	1.0	47	25	41	25		38	58	76	
Cadmium	U	2450	mg/kg	0.10	0.15	0.15	< 0.10	< 0.10		0.11	0.33	< 0.10	
Chromium	U	2450	mg/kg	1.0	16	16	19	14		18	14	18	
Copper	U	2450	mg/kg	0.50	27	40	38	32		17	30	29	
Mercury	U	2450	mg/kg	0.10	0.10	0.52	0.19	0.36		0.11	0.41	0.19	
Nickel	U	2450	mg/kg	0.50	30	24	36	18		30	16	37	
Lead	U	2450	mg/kg	0.50	80	140	59	130		49	140	57	
Selenium	U	2450	mg/kg	0.20	0.21	0.76	0.36	0.75		0.29	0.64	0.35	
Zinc	U	2450	mg/kg	0.50	73	89	62	42		66	81	73	
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	0.97	15	2.6	8.3		0.79	8.5	1.4	
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	
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	

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Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd		**Chemtest Job No.:**			20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:		**Chemtest Sample ID.:**			981252	981253	981256	981257	981261	981262	981264	981266	981267
		Sample Location:			TP01	TP02	TP03	TP04	TP06	TP06	TP07	TP08	TP09
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.40	0.25	0.50	0.50	0.20	0.40	0.65	0.50	0.10
		Date Sampled:			02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020
		Asbestos Lab:			DURHAM				DURHAM				DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0		240	< 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		240	< 5.0	< 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10		240	< 10	< 10	
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.21		< 0.10	< 0.10	< 0.10	
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.59		< 0.10	< 0.10	< 0.10	
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.17		< 0.10	< 0.10	< 0.10	
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.58		< 0.10	< 0.10	< 0.10	
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	1.0	< 0.10	6.6		< 0.10	1.3	< 0.10	
Anthracene	U	2700	mg/kg	0.10	< 0.10	0.12	< 0.10	1.7		< 0.10	0.47	< 0.10	
Fluoranthene	U	2700	mg/kg	0.10	< 0.10	3.1	< 0.10	11		< 0.10	1.9	< 0.10	
Pyrene	U	2700	mg/kg	0.10	< 0.10	2.6	< 0.10	11		< 0.10	1.9	< 0.10	
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	0.93	< 0.10	4.8		< 0.10	0.91	< 0.10	
Chrysene	U	2700	mg/kg	0.10	< 0.10	1.1	< 0.10	5.2		< 0.10	1.3	< 0.10	
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	1.4	< 0.10	5.2		< 0.10	0.78	< 0.10	
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	0.86	< 0.10	2.3		< 0.10	0.72	< 0.10	
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	1.3	< 0.10	4.8		< 0.10	0.86	< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	0.88	< 0.10	2.6		< 0.10	0.56	< 0.10	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.97		< 0.10	0.37	< 0.10	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	0.82	< 0.10	2.7		< 0.10	0.72	< 0.10	
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	14	< 2.0	60		< 2.0	12	< 2.0	
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	
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30		< 0.30	< 0.30	< 0.30	

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Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:				**Chemtest Sample ID.:**	981268	981270	981271	981272	981274	981276	981277	981279	981280
				Sample Location:	TP09	TP12	TP10	TP10	TP11	TP13	TP14	TP15	TP15
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.75	1.00	0.05	0.80	1.50	0.50	0.10	0.10	1.50
				Date Sampled:	02-Mar-2020	02-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020
				Asbestos Lab:			DURHAM					DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A			-					-	
Asbestos Identification	U	2192	%	0.001			No Asbestos Detected					No Asbestos Detected	
ACM Detection Stage	U	2192		N/A			-					-	
Moisture	N	2030	%	0.020	20	8.7		10	10	14	10	11	8.7
pH	U	2010		4.0	8.5	8.0		7.3	8.2	7.2	6.2	6.5	7.5
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	< 0.40		< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 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	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.5	1.1		0.88	0.91	2.6	1.1	1.1	0.84
Sulphate (Total)	U	2430	%	0.010	0.074	< 0.010		0.022	0.025	0.070	0.073	0.073	0.026
Arsenic	U	2450	mg/kg	1.0	36	51		130	71	43	53	47	50
Cadmium	U	2450	mg/kg	0.10	0.17	< 0.10		< 0.10	< 0.10	0.28	< 0.10	0.13	< 0.10
Chromium	U	2450	mg/kg	1.0	14	13		13	11	17	17	17	14
Copper	U	2450	mg/kg	0.50	24	25		12	12	39	32	36	23
Mercury	U	2450	mg/kg	0.10	0.24	0.17		0.20	< 0.10	0.44	0.33	0.37	0.12
Nickel	U	2450	mg/kg	0.50	25	33		25	19	23	28	25	22
Lead	U	2450	mg/kg	0.50	78	50		72	44	240	120	120	56
Selenium	U	2450	mg/kg	0.20	0.49	0.21		0.26	0.34	0.89	0.93	0.73	0.40
Zinc	U	2450	mg/kg	0.50	99	61		53	34	92	62	72	39
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	11	1.4		1.6	2.4	6.0	4.7	4.7	1.6
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 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	< 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	< 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	< 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	< 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	< 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	< 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	< 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	< 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	< 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	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 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	< 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	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	6.4	< 1.0	< 1.0	< 1.0

Chemtest
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Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd		**Chemtest Job No.:**			20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:		**Chemtest Sample ID.:**			981268	981270	981271	981272	981274	981276	981277	981279	981280
		Sample Location:			TP09	TP12	TP10	TP10	TP11	TP13	TP14	TP15	TP15
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.75	1.00	0.05	0.80	1.50	0.50	0.10	0.10	1.50
		Date Sampled:			02-Mar-2020	02-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020
		Asbestos Lab:					DURHAM					DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 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	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0		< 5.0	< 5.0	6.4	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	0.30	< 0.10		< 0.10	< 0.10	0.28	< 0.10	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	0.78	0.56		< 0.10	0.47	1.1	< 0.10	< 0.10	< 0.10
Pyrene	U	2700	mg/kg	0.10	0.80	0.78		< 0.10	0.64	1.2	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.50	< 0.10	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.46	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.65	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.38	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.75	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.49	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.55	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	< 2.0		< 2.0	< 2.0	6.4	< 2.0	< 2.0	< 2.0
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Chemtest
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Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:			**Chemtest Sample ID.:**		981281	981283	981285	981288	981289
			Sample Location:		TP16	TP17	TP18	TP19	TP20
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.20	0.50	0.50	0.20
			Date Sampled:		03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020
			Asbestos Lab:				DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
ACM Type	U	2192		N/A			-		-
Asbestos Identification	U	2192	%	0.001			No Asbestos Detected		No Asbestos Detected
ACM Detection Stage	U	2192		N/A			-		-
Moisture	N	2030	%	0.020	13	15	13	13	15
pH	U	2010		4.0	8.0	7.7	7.3	7.5	5.8
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.58	0.62	< 0.40	< 0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	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
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.60
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.7	2.2	2.0	0.90	1.2
Sulphate (Total)	U	2430	%	0.010	0.10	0.20	0.088	0.032	0.087
Arsenic	U	2450	mg/kg	1.0	46	76	38	62	28
Cadmium	U	2450	mg/kg	0.10	0.26	0.50	0.59	< 0.10	0.12
Chromium	U	2450	mg/kg	1.0	19	24	14	17	19
Copper	U	2450	mg/kg	0.50	48	83	110	19	25
Mercury	U	2450	mg/kg	0.10	0.66	1.5	0.51	0.19	0.24
Nickel	U	2450	mg/kg	0.50	31	38	24	22	25
Lead	U	2450	mg/kg	0.50	170	300	220	83	100
Selenium	U	2450	mg/kg	0.20	0.72	1.3	0.77	0.53	0.71
Zinc	U	2450	mg/kg	0.50	96	180	120	55	74
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	8.1	11	9.3	1.9	5.3
Aliphatic TPH >C5-C6	N	2680	mg/kg	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
Aliphatic TPH >C8-C10	U	2680	mg/kg	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
Aliphatic TPH >C12-C16	U	2680	mg/kg	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
Aliphatic TPH >C21-C35	U	2680	mg/kg	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
Total Aliphatic Hydrocarbons	N	2680	mg/kg	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
Aromatic TPH >C7-C8	N	2680	mg/kg	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
Aromatic TPH >C10-C12	U	2680	mg/kg	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
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:			**Chemtest Sample ID.:**		981281	981283	981285	981288	981289
			Sample Location:		TP16	TP17	TP18	TP19	TP20
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.20	0.50	0.50	0.20
			Date Sampled:		03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020
			Asbestos Lab:				DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Aromatic TPH >C21-C35	U	2680	mg/kg	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
Total Aromatic Hydrocarbons	N	2680	mg/kg	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
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	2.0	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.75	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	< 0.10	1.2	0.41	6.7	0.81
Pyrene	U	2700	mg/kg	0.10	< 0.10	1.1	0.50	7.1	0.81
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	3.2	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	3.5	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	4.5	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.9	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	3.7	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	2.5	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.80	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	2.6	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	2.3	< 2.0	39	< 2.0
Benzene	U	2760	µg/kg	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
Ethylbenzene	U	2760	µg/kg	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
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

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"

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 45 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

PRA/GQRA

McCloy Consulting

Contaminated Land Risk Assessment

St. Kevin's Asylum, Cork

M01831-07_DG01 | July 2020

WATER & ENVIRONMENTAL CONSULTANTS

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REVISION HISTORY

Rev. Ref.	Date	Prep	Chk	App	Amendments	Reason for Issue
1	26/03/2020	EHH	FM	FM	-	Interim Report for Review
2	07/07/2020	EHH	FM	FM	-	Final

DISTRIBUTION

Recipient	Revision					
	1	2	3	4	5	6
FILE	✓	✓				
Causeway Geotech Ltd	✓	✓				

DISCLAIMER

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CONTENTS

LIST OF TABLES

APPENDICES

1 INTRODUCTION

1.1 Terms of Reference

This Contaminated Land Risk Assessment report was commissioned by Causeway Geotech Ltd to support proposals for a residential development within the grounds of St. Kevin's Asylum, Cork.

1.2 Objectives

The Contaminated Land Risk Assessment is a combined Preliminary Risk Assessment (PRA) and Generic Quantitative Risk Assessment (GQRA) and provides a site-specific assessment of the contamination status of the site. The assessment identifies and quantifies potential complete pollutant linkages and is informed by an intrusive site investigation and environmental monitoring programme.

1.3 Statement of Authority

This assessment has been prepared and reviewed by qualified professions with appropriate experience. The key staff members involved in this project are as follows:

- Eppie Heaney-Henderson BSc MSc – Graduate Geo-environmental Consultant specialising in geo-environmental investigations and groundwater resource assessments.
- Francis McAuley BSc (Hons) MSc FGS – Senior Consultant (Hydrogeologist) experienced in undertaking geo-environmental assessments, site investigations, and hydrogeological risk assessments

1.4 Procedure

This assessment has been undertaken in accordance with the Model Procedures for the Management of Land Contamination (CLR11, Environment Agency, 2004)[1] which is the recommended technical guidance and procedure presented in the 'Outline of Risk Based Approach' section of the EPA (2013) document Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites. In additional overall risk assessment methodology has been informed by the EPA's Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites (2007)[2], referred in herein as "COP".

1 Environment Agency (2004). Model Procedures for the Management of Land Contamination (CLR11). DAERA(2016) Available from: https://www.daera-ni.gov.uk/articles/contaminated-land [Accessed: 06/03/2018].

[2] EPA (2007) Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites

2 SITE DETAILS

2.1 Site Location

The site (centroid IGR 164988, 71725) is accessed from Rose Hill Upper Road and located north of the River Lee c.2.6 km northwest of Cork city centre.

2.2 Site Description

A description of the site is presented in Table 2-1 below.

Table 2-1: Site description

Feature	Description
Site Description	
Site access and boundary description	The site is accessed from Rose Hill Upper Road at the east – north-east of the site. The Rose Hill Upper Road along with residential developments bounds the north and eastern boundary of the site. The western and southern boundaries are bound by neighbouring commercial units.
Ground levels / Topography	Ground levels at the north boundary of the site are c.65m OD and decrease with distance towards the river to the south of the site. Ground levels at the southern boundary are c.40m OD.
Ground cover	Ground cover is predominantly hardstanding with areas of vegetation cover and hedgerows and trees are evident throughout the site.
Built Development	Previous built development onsite.
Surrounding Land use	
North	Residential developments, The Carraig Mor Centre and St. Annes Pitch and Putt club.
East	Residential developments, commercial properties (i.e. Shanakiel Diagnostic Imaging) and historical Cork City Gaol.
South	Commercial property and River Lee
West	Commercial properties (Atkins Hall Apartments) and agricultural land with defined boundaries.

2.3 Development Proposal

The development proposal includes the development of a residential housing with associated car parking, garden areas, and minor areas of soft landscaping.

3 SITE SETTING

3.1 Ground Conditions

3.1.1 Published Geology

A review of the Geological Survey Ireland published (1:100,000 scale) bedrock mapping datasets indicates the majority of the site is underlain by the Cuskinny Member, described as flaser bedded sandstone and mudstone. Bedrock underlying the NE of the site is the Glyeen Formation, described as sandstone with mudstone and siltstone. The north of the site is underlain by the Old Head Sandstone Formation, described as flaser-bedded sandstone and minor mudstone.

A review of the Geological Survey Ireland published (1:100,000 scale) quaternary sediments map indicates most of the site is underlain by 'urban' deposits. It is recorded that north-west corner of the site is mapped as Till derived from Devonian sandstones. An outcrop of bedrock is noted from to north-west of the site (Old Head Sandstone Formation).

3.1.2 Radon

A review of the Radon Map on the EPA website[3] indicates the site is situated within an area where 1 - 5 % of the homes in the area estimated to be above the Radon reference level.

3.2 Hydrogeology

3.2.1 Aquifer Characteristics and Vulnerability

The groundwater body underlying the site is mapped as the Ballinhassig East groundwater body[4], it is described as a poorly productive bedrock. The site is categorized as category Ll, described as a locally important aquifer, moderately productive only in local zones) dominated by fracture flow. The site is located close to the margin / boundary of the South Cork groundwater body located to the south of the site, with a category Rg and is described as a regionally Important gravel aquifer.

GSI Groundwater Vulnerability mapping indicates the groundwater within the bedrock aquifer underlying the site has a 'Extreme' vulnerability to surface pollutants meaning it has a little to no thickness (<10m) of low permeability overburden affording the aquifer little / no protection for surface pollutants.

Groundwater flow is assumed to flow in a general south-western direction congruent with local surface water flow, discharging towards the River Lee.

3.2.2 Groundwater Abstractions

A review of the GSI Groundwater Wells and Springs data indicated the presence of 1 no. borehole records within a 1 km radius of the site. The key information is summarised in the table below/overleaf.

Table 3-1: Offsite Borehole Summary

Borehole No. /ID	Year	Depth (m)	Comments	Location (m)
1405NEW066	1961	24.4	-	Within 1km of the site to the south.

A review of group scheme abstractions on the GSI groundwater data viewer indicates there are no group scheme abstractions within 1km of the site.

[3] Environmental Protection Agency (2020), Radon Map. Available from http://www.epa.ie/radiation/radonmap/

[4] Geological Survey Ireland (2020), Groundwater Bodies, Dublin GWB: Summary of Initial Characterisation. Available from https://jetstream.gsi.ie/iwdds/delivery/GSI_Transfer/Groundwater/GWB/DublinGWB.pdf

3.3 Hydrology

3.3.1 Surface Watercourses

A desktop review of various mapping sources indicated that the nearest watercourse is the River Lee located c.0.25km south of the site and discharges into Lough Mahon which then discharges into the Celtic Sea c.14km southeast of the site.

3.3.2 Surface Water Catchments

The site is situated within the Lee, Cork Harbour and Youghal Bay catchment covering an area of c.2153km^2.

3.4 Designated Sites and Sites of Environmental Interest

Environmental receptors sensitive to change in the water environment such as Special Protected Areas (SPA), Special Areas of Conservation (SAC), Areas of Special Scientific Interest (ASSI), and RAMSAR sites have been considered within this assessment.

The Cork Harbour SPA / RAMSAR is located c.20km southeast of the site.

3.5 EPA Licensed IPPC / Waste Facilities

A review of the EPA 'waste' web maps identified several landfill / waste sites within 3 km of the site. A summary is shown in Table 3-2 below.

Table 3-2: EPA Licensed IPPC / Waste Facilities

Name	Type	Licensed	Distance from site	Direction from site
Cork University Hospital	Waste	Surrendered	1.47km	South
Ashgrove Recycling	Waste	Licensed	2.1km	Northeast

3.6 Historic Mapping Review

A review of historic potentially contaminative land uses at the site and surrounding area (250 m) was undertaken. The review incorporated:

- Records available through the Ordnance Survey Ireland's GeoHive viewer[5];
- Review of Google Earth Satellite imagery

[5] Ordnance Survey Ireland (2017) GeoHive Viewer. Available at http://map.geohive.ie/ Accessed 26/02/2020

Table 3-3: Summary of Historical Land use

Epoch	Map Source	Onsite	Surrounding Area (250m)
Historic Map 6-inch Colour (1837-1842)	GeoHive	Agricultural land with defined boundaries. Development present to the west of the site.	Defined land present to the north and west of the site. Residential and commercial developments present to the east and southeast and waterworks, a reservoir and River Lee present to the south.
Historic Map 25-inch (1888-1913)	GeoHive	Mental institution, hospital, chapel, mortuary, paths, garden areas and other patient outbuildings present.	Additional outbuildings. paths and forested areas Additional residential and commercial development to the southwest, southeast and east of site. Agricultural land present with defined boundaries to the north of site.
Aerial (1995)	GeoHive	No significant changes.	Additional outbuilding development. Increased residential development to the east of the site (Ashboro) and increased residential and commercial development (industrial estate and business park) to the north of the site. Reservoirs present to the northeast of site boundary.
Aerial (2000)	GeoHive	No significant changes.	Additional outbuilding development. Redevelopment of existing buildings to the northwest of the site.
Aerial (2005)	GeoHive	No significant changes.	Additional outbuilding development. Redevelopment of existing buildings / land use to west of the site.
Aerial (2005-2012)	GeoHive	No significant changes.	No significant changes.
Digital Globe 2011 -2013	GeoHive	Demolition of building located north within the site boundary.	Addition of residential developments to the north of the site.
Google Earth 2015	GoogleEarth	No significant changes.	No significant changes.
Google Earth 2015 -Present day	GoogleEarth	No significant changes.	No significant changes.

4 INITIAL CONCEPTUAL MODEL

For a risk of pollution or environmental harm to occur as a result of ground contamination, all of the following elements must be present:

- A source, i.e. a substance that is capable of causing pollution or harm;
- A receptor, i.e. something which could be adversely affected by the contaminant; and
- A pathway, i.e. a route by which the contaminant can reach the receptor.

Each of these elements can exist independently, but when they are all present and linked together, they create a risk. If one of the above elements is missing, there is no risk.

When a source-pathway-receptor linkage is present the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor, and the nature of the pathway.

This section presents a preliminary conceptual model by presenting the potential sources, pathways, and receptors and identifying plausible pollutant linkages.

4.1 Potential Contamination Sources

4.1.1 Onsite

A review of the historical mapping and recent aerial orthophotography indicates the local area has been significantly developed. The site was in operation until March 2002 as a mental asylum including hospital and mortuary results. Former development onsite has resulted in the potential for reduced quality made ground to be present at the site, which may contain contaminants such as heavy metals, sulphates, polycyclic aromatic hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH), asbestos, and bulk ground gases.

4.1.2 Offsite

A review of the historical and current land uses within the vicinity of the site indicates no potentially contaminative land use within 250 m of the site boundary.

4.2 Potential Pathways

Pathways are the means by which a contaminant can reach a receptor. Active pathways are primarily dependent on the physical characteristics of the site and the surrounding area between source and receptor. The nature of the site surface affects the potential for surface waters to infiltrate and penetrate the subsurface. The potential for infiltration will in turn affect the potential for leachate generation from potentially impacted vadose (unsaturated) zone soils.

The key pathways and exposure routes by which potentially contaminative substances can reach receptors are considered to be:

- Direct contact with soil and groundwater;
- Ingestion of soil and groundwater;
- Inhalation of fugitive dust; and
- Inhalation of ground gas / vapours to the proposed dwellings and buildings.
- Leaching of potential contaminants from soil to groundwater in the bedrock aquifer;
- Lateral and vertical migration of dissolved and free phase contaminants via groundwater

4.3 Receptors

Receptors are defined by their potential for being adversely affected by a contaminant. Receptors can be grouped into those that impact human health, and those that impact environmental receptors, such as controlled waters.

Human health receptors identified include:

- Future site end-users.

Environmental receptors identified include:

- Groundwater contained within the bedrock aquifer;
- Adjacent surface water environment including River Lee and Cork Harbour SPA / RAMSAR

Construction workers are not considered as a potential receptor in the conceptual model as personal protective equipment and procedures to ensure adherence to best practice guidelines during construction will limit exposure to potential contamination.

4.4 Conceptual Model

4.4.1 Methodology

The above information has been used to compile the initial conceptual site model (Table 4.1).

Where a complete pollutant linkage is identified, it is included in the conceptual site model table (CSM), and an estimated risk is assigned to each complete linkage. For a pollutant linkage to exist there has to be a viable pathway between a potential source and receptor (human health or environmental).

If there is no viable pathway linking a potential source to a receptor, it is not included in the below table as, by definition, the potential source poses no risk.

The classification methodology used to categorise the risk associated with complete pollutant linkages is provided at Appendix B. The risk categorisation is based on CLR 11 and considers the guidance laid out in CIRIA C552 and C665.

4.4.2 Pollutant Linkage Discussion

Risk to the environment (controlled waters) from onsite sources

Due to previous development at the site there is the potential for reduced quality made ground and shallow soils to be present and contain contaminants such as heavy metals, sulphates, polycyclic aromatic hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH), asbestos, and bulk ground gases.

The pathway for contaminants to migrate across the site is via leaching of potential contaminants from soil to groundwater in the bedrock aquifer and / or lateral and vertical migration of dissolved and free phase contaminants via surface runoff and / or groundwater, including River Lee to the south and Cork Harbour SPA / RAMSAR to the southeast.

Risk to human health from onsite sources

Due to previous development at the site there is the potential for reduced quality made ground and shallow soils to be present and contain contaminants such as heavy metals, sulphates, polycyclic aromatic hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH), asbestos, and bulk ground gases.

The pathway for contaminants to migrate across site is via direct contact with reduced quality soils, and / or inhalation and exposure to ground gases and VOC's.

Risk to human health from offsite sources (site end users)

No identified sources of contamination were identified off site. Therefore, no complete pollutant linkage exists from any potential offsite sources and site end users, to conclude no risk has been identified.

Table 4-1: Initial Conceptual Model

Potential contaminants	Potential receptor	Possible pathway	Likelihood	Severity	Risk
ON SITE SOURCES					
Reduced quality made ground: potentially including heavy metals, sulphates, polycyclic aromatic hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH), asbestos, and bulk ground gases.	Future site end users	Direct contact	Likely	Medium	**Moderate**
		Inhalation and exposure to ground gases / vapours	Likely	Medium	**Moderate**
	Controlled Waters (Bedrock Aquifer)	Leaching of potential contaminants from soil to groundwater in the bedrock aquifer	Likely	Medium	**Moderate**
	Controlled Waters (River Lee, Cork Harbour SPA / RAMSAR)	Lateral and vertical migration of dissolved and free phase contaminants via surface runoff and / or groundwater	Low	Medium	**Moderate/Low**

5 SITE INVESTIGATION

5.1 Scope of works

Based on the findings of the Preliminary Risk Assessment a site investigation was designed to characterise the identified potential pollutant linkages. The site investigation was designed and implemented in accordance with the following guidance:

- BS10175:2001 'Investigation of Potentially Contaminated Sites, Code of Practice'
- BS 5930:1999 'Code of Practice for Site Investigation'
- CLR4 'Sampling Strategies for Contaminated Land' (DoE, 1994)

The scope of works for the site investigation comprised the following:

- The drilling of 10 no. boreholes and installation 3 no. monitoring wells;
- Excavation of 20 no. trial pits;
- Collection of and laboratory analysis of c. 23 no. soil samples; and
- Monitoring of ground gas and groundwater levels at 3no. monitoring wells.

5.2 Site Investigation Rationale and Methodology

5.2.1 Overview of site investigation design and rationale

Boreholes and trial pits were cited to characterise the nature of the shallow soils and groundwater. The boreholes allowed for the following:

- Logging of the shallow soils (composition and thickness);
- Collection of soil samples for laboratory analysis; and
- Monitoring of ground gas and groundwater levels;

A site investigation plan is provided at Appendix C.

6 GROUND CONDITIONS ENCOUNTERED

6.1 Trial Pits

6.1.1 Made Ground

Made Ground was encountered at 13 no. trial pit locations within the site. The made ground generally comprised of brown sandy silty gravelly clay. Cobbles of sandstone were also recorded.

Made Ground was encountered at the surface and ranged to depths (thicknesses) of 0.1 – 2.15m across the site.

6.1.2 Superficial Deposits

Superficial deposits were encountered at 11 no. trial pit locations and generally comprised silty sandy fine to coarse gravel, overlying cobbles of sandstone deposits.

The gravel deposits were generally encountered to depths of 0 – 1.6m bgl. Trial pits were terminated within gravel deposits to a maximum depth of 1.6m bgl.

6.1.3 Bedrock

Bedrock was encountered at 13no. locations. Depth to bedrock ranged from 0.40 – 1.60m bgl.

6.1.4 Groundwater

During trial pit excavations no groundwater strikes were recorded.

6.2 Borehole(s)

6.2.1 Made Ground

Made ground was encountered at 7 no. borehole locations and generally comprised soft to firm, light to dark brown sandy gravelly clay. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium with mixed lithologies.

6.2.2 Superficial Deposits

Superficial deposits were encountered at 8 no. borehole locations and generally comprised of light brown slightly sandy gravelly clay. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Very dense greenish grey sandy silty subangular to coarse gravel of sandstone. Sand is fine to coarse. Very dense greenish grey sandy clayey gravel is also noted.

6.2.3 Bedrock

Bedrock was encountered at 8 no. borehole locations and generally comprised of greenish grey medium strong (locally weak) very thinly bedded and grained, well cemented sandstone interbedded with very thin beds of dark grey mudstone. Partially weathered: slightly reduced strength, closer fracture spacing with a faint to patchy dark orangish brown discolouration.

6.2.4 Groundwater

No groundwater / groundwater strikes were encountered during intrusive site investigation works.

6.3 Contamination

No visual or olfactory evidence of contamination was recorded during the site investigation or environmental monitoring.

7 GENERIC QUANTITATIVE RISK ASSESSMENT

7.1 Soil

A total of 23 no. soil samples were scheduled for a range of parameters, including:

- Metals suite
- Total Petroleum Hydrocarbons (CWG)
- Polyaromatic Hydrocarbons
- BTEX compounds including MTBE
- Asbestos screen, cyanide, sulphate, and pH

As part of the generic quantitative risk assessment, results were screened against generic assessment criteria; The LQM/CIEH Suitable 4 Use Levels (S4UL's).

The screening spreadsheets are provided at Appendix E in which the results were screened against the 'residential' end use with soil organic matter contents of 1%, 2.5% and/or 6% where applicable.

In the absence of S4UL criterion, Category 4 screening levels, or CL:AIRE Generic Assessment Criteria were utilised in the generic quantitative screening process.

The majority of parameters tested were recorded as below the laboratory limit of detection and/or below the generic assessment criteria. However, 2 no. metals, and 2no. PAH compounds, returned marginally exceedances above the generic assessment criterion. Information on exceedances of the generic assessment criteria are provided below.

7.1.1 Metals

Arsenic levels in soils were recorded as above the generic assessment criteria at 1no. sample location. A recorded arsenic concentration of 130mg/kg at TP10 (0.8m) exceeds the Sobra GAC (child) of 80mg/kg. However, the single exceedance is not regarded as posing significant risk due to the sample being collected at depth (0.8m bgl) and the remainder of the results falling below the GAC (child). The result also falls well below the adult GAC of 7,000 mg/kg.

Lead concentration is soil exceeded the generic assessment criteria at 3no. sample locations. The generic assessment criteria for lead based on residential end use with homegrown produce is 200 mg/kg. The exceedances were marginal:

TP13 (0.5m) – 240 mg/kg

TP17 (0.2m) – 300 mg/kg

TP18 (0.5m) – 220 mg/kg

The exceedances are marginal and do not exceed that GAC for residential end-use without homegrown produce (310 mg/kg), and as such, are not regarded as posing significant risk.

7.1.2 Polyaromatic Hydrocarbons

Exceedances of benzo(b)fluoranthene were noted at 2no. locations (TP04 and TP19). Exceedances of benzo(b)fluoranthene and dibenz(a,h)Anthracene were noted at 3no. locations (TP04, TP07, TP19).

All of the above noted exceedances were marginal (same order of magnitude) and are therefore not regarded as posing significant risk.

7.2 Groundwater

No groundwater / groundwater strikes were encountered during intrusive site investigation works. All boreholes monitored over the environmental monitoring period were noted as 'dry' and therefore no groundwater samples were collected or tested.

7.3 Ground Gas

Gas monitoring and analysis of results has been carried out in accordance with BS 8485:2015 Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.

Four return gas monitoring visits were undertaken in June 2020. Monitoring was undertaken at 3 no. boreholes. The monitoring results are included in Appendix H.

7.3.1 Meteorological Conditions

Atmospheric pressures ranged from 996 to 1013 mbar.

7.3.2 Site Gas Concentrations

Gas screening values have been calculated for methane on the basis of peak flows and concentrations to reflect the fact that the risk posed by this gas is the production of an explosive mixture with air. Gas screening values for carbon dioxide have been calculated using steady state flows and concentrations to reflect the fact that the risk posed is the long-term accumulation of this suffocating gas in confined spaces.

The maximum steady state carbon dioxide concentration recorded at the site was 2% at BH09. The maximum peak methane concentration recorded at the site was 0.1 % at BH08 and BH09. The measured flow rate across the site ranged from 0.4 – 0.5 l/hr. The maximum peak and steady state flow rates were recorded at BH01 and BH09 (0.5 l/hr).

Considering the worst-case measured carbon dioxide concentration (2%) and the worst-case measured flow (0.4 l/hr), the most onerous gas screening value from across the site is 0.01 l/hr, which falls within characteristic situation 1 (CS1), when assessed under the Wilson and Card methodology.

7.4 Pollutant Linkages for Assessment

7.4.1 Risks to Human Health

7.4.1.1 Inhalation of vapours / ground gases

Soil samples were tested for volatile organic carbons (VOC's) and recorded concentrations all fell below the relevant screening criteria and as such there is no risk to human health via exposure to vapours.

Gas monitoring was carried out at 3 no. borehole locations during June 2020.

The worst case 'peak' methane concentrations, worst case 'steady-state' carbon dioxide concentrations, and worst-case flow rate, recorded at all boreholes were used to calculate gas screening values (GSV). The most onerous GSV for the site (0.01) falls within characteristic situation 1 (CS1) when assessed under Wilson and Card.

There is no risk posed to human health at the site by generation of ground gases or VOC vapours.

7.4.1.2 Direct contact with reduced quality shallow soils and / or groundwater

No significant contamination was encountered within the shallow soils at the site, and no shallow groundwater was encountered at the site.

7.4.2 Risks to controlled waters

No significant contamination was identified in shallow soils that pose a risk to underlying groundwater and/or wider water environment.

7.5 Revised Conceptual Site Model

Following the site investigation, environmental monitoring, and generic quantitative risk assessment it can be concluded that no significant source of contamination was identified onsite and therefore there are no complete pollutant linkages and, hence, no risk to human health, or the water environment.

8

8 SUMMARY AND CONCLUSIONS

8.1 Development Proposals

The proposals includes the development of residential housing with associated car parking, garden areas and minor areas of soft landscaping.

8.2 Summary of Preliminary Risk Assessment (PRA)

The Preliminary Risk Assessment included the development of an initial conceptual site model (iCSM) which identified the following complete pollutant linkages.

Table 8-1: Summary of initial conceptual site model

Potential Source	Potential receptor	Possible pathway
Reduced quality made ground: potentially including heavy metals, sulphates, polycyclic aromatic hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH), asbestos, and bulk ground gases	Future site users	Inhalation and exposure to VOC's and ground gas
		Direct contact with reduced quality shallow soils and / or groundwater
	Controlled Waters (Bedrock Aquifer)	Leaching of potential contaminants from soil to groundwater in the bedrock aquifer
	Controlled Waters (River Lee, Cork Harbour SPA / RAMSAR)	Lateral and vertical migration of dissolved and free phase contaminants via surface runoff and / or groundwater

8.3 Summary of Generic Quantitative Risk Assessment (GQRA)

Following the site investigation, environmental monitoring, and generic quantitative risk assessment it can be concluded that no significant source of contamination was identified onsite and therefore there are no complete pollutant linkages and, hence, no risk to human health, or the water environment. Following the site investigation, environmental monitoring, and generic quantitative risk assessment it can be concluded that no significant source of contamination was identified onsite and therefore there are no complete pollutant linkages and, hence, no risk to human health, or the water environment.

8.4 Recommendations

8.4.1 Ground gas monitoring

The proposed development comprises of residential development. To comply with Guidance Document BS 8485 and NHBC[6] a minimum of 6 no. ground gas monitoring rounds are required to have taken place onsite prior to development.

It is recommended that a further 2 no. additional monitoring rounds are undertaken onsite before development proceeds.

[6] Guidance on evaluation and development of proposals on sites where methan and carbon dioxide are present (NHBC, 2007)

8.4.2 Consideration of clean soil capping layers

Although no significant contamination was identified across the site, some marginal exceedances of certain GAC values were recorded for lead, arsenic, and 2no. PAH compounds (as discussed in Section 7.2). As such, consideration may be given to installing certain levels of clean cover capping layers in residential garden areas, and areas of soft landscaping proximal to areas where marginal / single exceedances were recorded. Should this be incorporated into development proposals and were to be carried out in accordance to relevant industry guidance[7] [8], clean cover systems installed in areas of private residential garden areas would have minimum thickness of 600mm and include a basal capillary break layer of thickness 150-200mm and at least 150mm of clean topsoil. The topsoil should comply with BS 3882[9]. The capillary break layers should comprise clean quarry stone. Areas of soft landscaping areas in shared spaces would comprise a minimum thickness of 400mm clean cover.

8.5 Residual Risks

8.5.1.1 Unexpected Contamination

It is anticipated the Planning Authority may require an additional related (standard) planning condition, i.e. during development works should evidence of contamination be encountered, works should cease, and the Planning Authority shall be notified immediately. Any intrusive investigation, remediation and verification undertaken on the identified area would be required to be recorded and completed to the satisfaction of the Planning Authority.

[7] BRE 465: Cover systems for land regeneration - Thickness of cover systems for contaminated land

[8] Planning guidance in relation to ground contamination: guidance note for applicants, developers, land owners and consultants Version 6.00 (September 2016) Environmental Protection Group and Manchester City Council

[9] BS 3882:2015 Specification for Topsoil

Appendix A

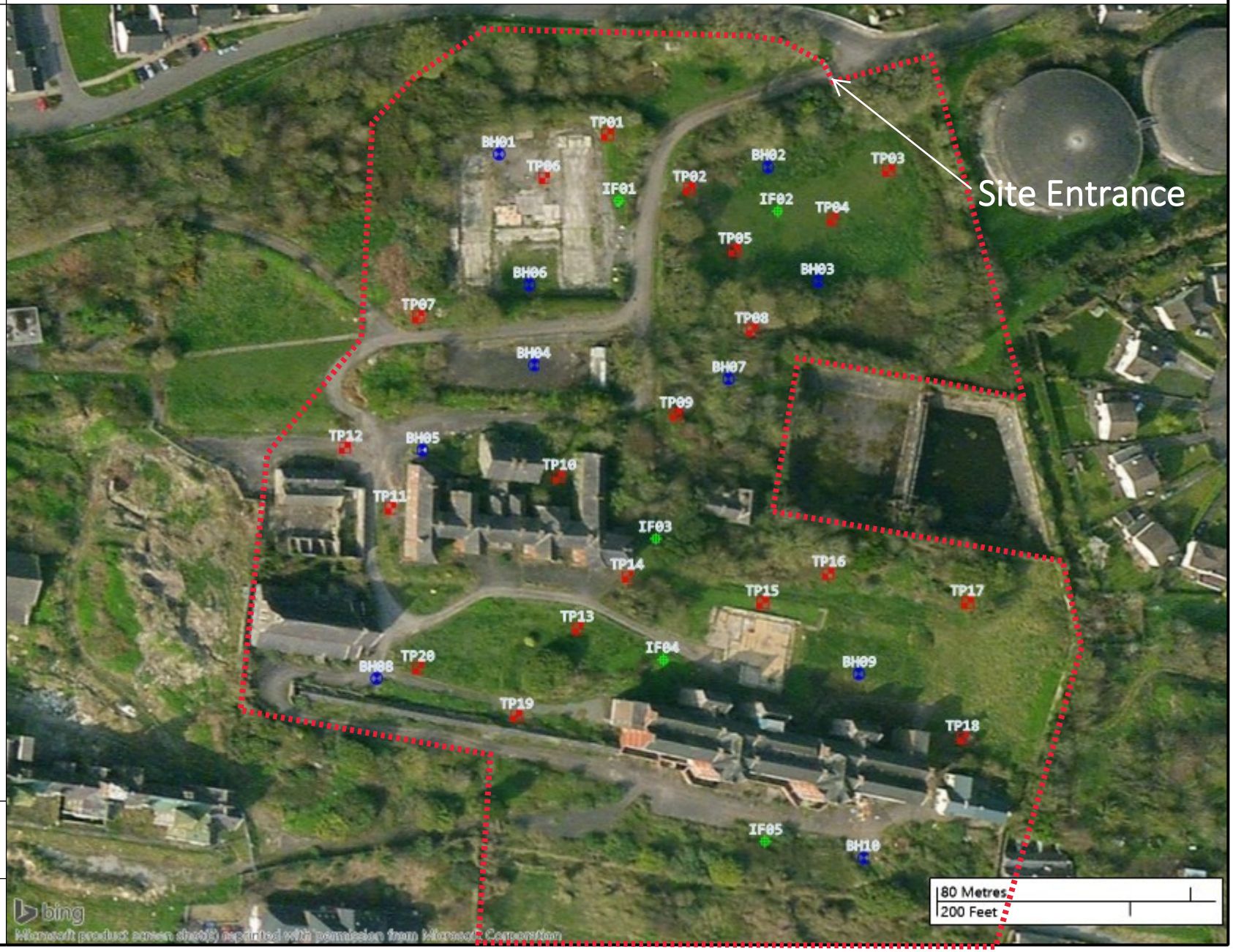
Location Plan

CAUSEWAY GEOTECH

Project No.:	20-0105	**Client:**	Land Development Agency
Project Name:	St. Kevin's Asylum, Cork	**Client's Representative:**	Barrett Mahoney

Legend Key

- Locations By Type - CP+RC
- Locations By Type - Soakaway
- Locations By Type - TP



Title:
Exploratory Hole Location Plan

Last Revised:	**Scale:**
25/02/2020	1:1750

Appendix B

Risk Classification

CLR11 outlines the framework to be followed for risk assessment in the UK. This report follows the first stage of the risk assessment process; preliminary risk assessment.

The initial conceptual model has been produced based on an assessment of risk, which is based a combination of the likelihood of an event occurring and its magnitude of its consequence. As such the guidance provided in CIRIA 552 has been used to produce the above conceptual model.

Table D1 Classification of Consequence (based on Table CIRIA552 6.3)

Classification	Definition
Severe	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part 2A. Catastrophic damage to buildings/property. Short term risk of pollution of sensitive water resource. Short term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definitions of ecological systems within the Defra Circular on Contaminated Land,01/2006)
Medium	Chronic damage to Human Health ("significant harm" as defined in the Defra Circular on Contaminated Land,01/2006) Pollution of sensitive water resources A significant change in a particular ecosystem, or organism forming part of such ecosystem. (note: the definitions of ecological systems within Defra Circular on Contaminated Land, 01/2006)
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ("significant harm" as defined in the Defra Circular on Contaminated Land, 01/2006). Damage to sensitive buildings/structures or the environment.
Minor	Harm, not necessarily significant harm but that could result in financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as Personal Protective Clothing, etc). Easily repairable effects of damage to buildings/structures.

Table D2 Classification of Probability (based on Table CIRA552 6.4

Classification	Definition
High Likelihood	An event which would either appear very likely in the short term and almost inevitable over the long term, or, there is evidence at the receptor of harm or pollution.
Likely	It is probable that an event, pollution linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	Circumstances are possible under which an event could occur, but it is not means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	Circumstances are such that it is improbable that an event would occur even in the very long term

Once the probability of an event occurring and its consequence have been classified as a consequences/risk category may then be assigned in accordance to Table D3. Definitions of consequence or risk category are as below in Table D4

Table D3 Comparison of consequence against probability

		Consequence of Risk			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/ Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/ Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/ Low Risk	Low Risk	Very Low Risk	Very Low Risk

Table D4 Definitions of these risk categories (based on Table CIRA 552 6.6)

Classification	Description
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, There is evidence that severe harm to a designated receptor is currently happening and as such urgent investigation and remediation are likely to be required, and could results in substantial liability.
High Risk	Harm is likely to occur. Remedial works may be required, with a realisation of the risk is likely to present a suitability liability, with investigation required and remedial in the short and likely long term.
Moderate Risk	It is possible that harm could arise to a designated receptor from an identified hazard.
Low Risk	It is possible that harm could arise to a receptor from an identified hazard, but it is likely that if the hard would occur, at worst, this harm if realised would normally be mild.
Very Low Risk	There is a low possibility that harm could occur. In the event of such harm being realised it is not likely to be severe.

Appendix C

Borehole and Trial Pit Logs

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH01
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	0.10	
Rotary Drilling	Comacchio 205	0.10	2.50	164927.73 E
Rotary Coring	Comacchio 205	2.50	5.50	71833.41 N

Final Depth: 5.50 m	Start Date: 04/03/2020	Driller: JC+RS	Sheet 1 of 1 Scale: 1:50
Elevation: 63.56 mOD	End Date: 25/03/2020	Logger: SR+NP	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					63.46	0.10		TOPSOIL Very dense greenish grey sandy clayey subangular GRAVEL (Driller's description)		
					61.26	2.30		Grey SANDSTONE (Driller's description)		
		TCR 100 SCR 100 RQD 50 FI 9			61.06	2.50		Medium strong (locally weak) very thinly bedded fine grained well cemented grey SANDSTONE interbedded with very thin beds of sark grey MUDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing with patchy dark orangish brown discolouration. Discontinuities: 1. 10 to 20 degree bedding fracture closely spaced (50/105/>250) planar and slightly undulating, smooth with dark orangish brown staining on fracture surfaces. 2. At 3.3m to 3.40m >85 degree joint, undulating, smooth with patchy dark orangish brown staining on fracture surfaces.		
3.60		TCR 100 SCR 100 RQD 44 FI 7			59.76	3.80		Medium strong (locally weak) very thinly bedded fine grained well cemented grey SANDSTONE interbedded with very thin beds of dark grey mudstone. Partially weathered: slightly reduced strength, slightly closer fracture spacing with faint and patchy orangish brown staining. Discontinuities: 1. 0 to 15 degree joints medium spaced (100/235/300) planar, smooth with faint and patchy orangish brown staining on fracture surfaces.		
5.10		TCR 100 SCR 85 RQD 30 FI 10			59.06	4.50				
5.50					58.06	5.50		Medium strong (locally weak) very thinly bedded fine grained well cemented grey SANDSTONE interbedded with very thin beds of dark grey MUDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing with patchy and faint orangish brown discolouration. Discontinuities: 1. 10 to 20 degree bedding fractures closely spaced (110/125/220) planar, smooth with patchy orangish brown staining on fracture surfaces. 2.>85 degree joints medium spaced (360/500/>500) undulating, rough with faint and patchy dark orangish brown staining on fracture surfaces. *5.40m to 5.50m: Discontinuous quartz vein.* End of Borehole at 5.50m		

(1.30) (0.70) (1.00)

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	No groundwater encountered.

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
2.50	130		

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated at scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH02
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 0.50 m	Start Date: 04/03/2020	Driller: JC	Sheet 1 of 1
Light Percussion	Dando Terrier	0.00	0.50	165022.93 E 71828.17 N	Elevation: 65.82 mOD	End Date: 04/03/2020	Logger: SR	Scale: 1:40 FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 0.30	B1				65.61	0.20		TOPSOIL		
0.30 - 0.50	B2				65.52	0.30		Soft light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of mixed lithologies.		
0.50 - 0.60	SPT (C)	N=50 (25 for 75mm/50 for 30mm) Hammer SN = 0490			65.32	0.50		Very dense greenish grey sandy silty subangular fine to coarse GRAVEL of sandstone. Sand is fine to coarse.		
0.50		04-03-2020		Dry				End of Borehole at 0.50m		

Water Strikes

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

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Termination Reason

Terminated on possible bedrock.

Last Updated

04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH03
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 1.60 m	Start Date: 04/03/2020	Driller: JC	Sheet 1 of 1
Light Percussion	Dando Terrier	0.00	1.60	165029.09 E				Scale: 1:40
				71802.20 N	Elevation: 65.21 mOD	End Date: 04/03/2020	Logger: SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				65.01	0.20		TOPSOIL		
								MADE GROUND: Soft to firm light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20 - 1.60	B2				64.01	1.20		Soft to firm light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of mixed lithologies.		
1.60	D3				63.61	1.60		End of Borehole at 1.60m		
1.60 - 1.98	SPT (S)	N=49 (20,10/49 for 225mm) Hammer SN = 0490		Dry						
1.60		04-03-2020		Dry						

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

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH04
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	1.20	
Rotary Drilling	Comacchio 205	1.20	5.00	164949.82 E
Rotarty Coring	Comacchio 205	5.00	8.00	71765.55 N

Final Depth: 8.00 m	Start Date: 05/03/2020	Driller: JC+RS	Sheet 1 of 2 Scale: 1:50
Elevation: 58.42 mOD	End Date: 26/03/2020	Logger: SR+NP	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 0.50	B1				58.32	0.10		MADE GROUND: Bitmac		
0.50 - 1.20	B2				57.92	0.50		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL of mixed lithologies with low cobble content. Sand is fine to coarse. Cobbles are angular of mixed lithologies.		
								Firm light brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to medium of mixed lithologies.		
1.20	D3				57.22	1.20		Very dense greenish grey sandy clayey subangular GRAVEL (Driller's description)		
1.20 - 1.65	SPT (S)	N=44 (20,10/9,11,12,12) Hammer SN = 0490		Dry						
1.20		05-03-2020		Dry						
					53.92	4.50		Greenish grey SANDSTONE (Driller's description)		
		TCR 100 SCR 69 RQD 13 FI 6			53.42	5.00		Medium strong thinly bedded grey fine to medium grained well cemented SANDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing, with dark grey and brown discolouration. Discontinuities: 1.>80 degree joint from 5.00m to 5.50m, undulating, rough with patchy orangish brown staining on fracture surface.		
						(0.50)				
					52.92	5.50				
		TCR 100 SCR 69 RQD 13 FI >20				(0.30)				
		TCR 100 SCR 69 RQD 13 FI 10			52.62	5.80				
5.80		TCR 100 SCR 51 RQD 0 FI 13				(0.47)		Medium strong (locally weak) very thinly bedded fine grained well cemented SANDSTONE interbedded with very thin beds of mudstone. Partially weathered: reduced strength, closer fracture spacing with faint patchy orangish brown discolouration. Discontinuities: 1. 55 to 70 degree bedding fractures, medium spaced (160/250/ >500) slightly undulating, smooth with pervasive orangish brown staining on fracture surfaces.		
					52.15	6.27				
		TCR 100 SCR 51 RQD 0 FI 18								
6.50		TCR 100 SCR 80 RQD 50 FI 8				(0.83)				
					51.32	7.10				
7.20		TCR 100 SCR 43 RQD 0 FI 11						Weak (locally medium strong) very thinly bedded dark grey MUDSTONE interbedded with very thin beds of sandstone. Partially weathered: slightly reduced strength. slightly closer fracture spacing with purplish brown discolouration. Discontinuities: 1. 75 to 90 degree bedding fractures closely spaced (30/115/145) slightly undulating, smooth with purplish brown staining on fracture surfaces.		
		TCR 100 SCR 43 RQD 0 FI 18				(0.90)				
8.00					50.42	8.00		Medium strong thinly bedded fine grained well cemented grey SANDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing with faint and patchy orangish brown discolouration. Discontinuities: 1. 35 to 45 degree bedding fractures closely spaced (90/115/290)		

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	No groundwater encountered.

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
5.00	130		

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated at scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
20-0105	St. Kevin's Asylum, Cork	BH04
	Client: Land Development Agency	
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)
Light Percussion	Dando Terrier	0.00	1.20
Rotary Drilling	Comacchio 205	1.20	5.00
Rotarty Coring	Comacchio 205	5.00	8.00

Coordinates
164949.82 E
71765.55 N

Final Depth: 8.00 m | **Start Date:** 05/03/2020 | **Driller:** JC+RS | Sheet 2 of 2 | Scale: 1:50

Elevation: 58.42 mOD | **End Date:** 26/03/2020 | **Logger:** SR+NP | FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
											Medium strong thinly bedded fine grained well cemented grey SANDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing with faint and patchy orangish brown discolouration. Discontinuities: 1. 35 to 45 degree bedding fractures closely spaced (90/115/290) slightly undulating, smooth with orangish brown staining on fracture surfaces. 2. 75 to 85 degree joint at 6045m to 6.65m: undulating, rough with orangish brown staining on fracture surface.		
											Medium strong (locally weak) very thinly bedded fine grained well cemented grey SANDSTONE interbedded with very thin beds of dark grey MUDSTONE. Partially weathered: slightly reduced strength, closer fracture spacing with faint and patchy orangish brown discolouration. Discontinuities: 1. 10 to 20 degree bedding fractures medium spaced (95/225/230) slightly undulating, smooth with patchy orangish brown staining on fracture surfaces. 2. At 7.25m to 8.00m: 85 to 90 degree joint, undulating, rough with patchy orangish brown staining. *7.25m to 7.57m: 90 quartz vein*		
											End of Borehole at 8.00m		
		TCR	SCR	RQD	FI								

9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5

Water Strikes

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

Chiselling Details

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

Remarks
No groundwater encountered.

Casing Details

To (m)	Diam (mm)
5.00	130

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated at scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH05
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	0.80	164920.21 E 71741.29 N

Final Depth:	0.80 m	Start Date:	05/03/2020	Driller:	JC	Sheet 1 of 1 Scale: 1:40
Elevation:	53.90 mOD	End Date:	05/03/2020	Logger:	SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.30 - 0.80	B1				53.60	0.30		TOPSOIL		
0.80 - 1.12	SPT (S)	N=50 (11,13/50 for 170mm) Hammer SN = 0490		Dry	53.10	0.80		Very dense light brown sandy clayey angular fine to medium GRAVEL of sandstone. Sand is fine to coarse.		
0.80		05-03-2020		Dry				End of Borehole at 0.80m		

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

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH06
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	4.00	
Rotary Drilling	Comacchio 205	4.00	6.50	164950.16 E
Rotary Coring	Comacchio 205	6.50	9.50	71792.20 N

Final Depth: 9.50 m	Start Date: 04/03/2020	Driller: JC+RS	Sheet 1 of 2
Elevation: 63.27 mOD	End Date: 25/03/2020	Logger: SR+NP	Scale: 1:50
			FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				63.07	0.20		TOPSOIL		
								MADE GROUND: Soft to firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20	D6				62.07	1.20				
1.20 - 2.00	B2							MADE GROUND: Firm light brown slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20 - 1.65	SPT (S)	N=14 (4,4/3,2,4,5) Hammer SN = 0490		Dry						
2.00	D7				61.27	2.00				
2.00 - 3.00	B3							MADE GROUND: Soft light brown slightly gravelly sandy SILT. Sand is fine to coarse. Gravel is subangular fine to medium of mixed lithologies.		
2.00 - 2.45	SPT (S)	N=6 (1,1/2,1,2,1) Hammer SN = 0490		Dry						
3.00	D8				60.27	3.00				
3.00 - 3.70	B4							Soft light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
3.00 - 3.45	SPT (S)	N=5 (1,1/1,1,2,1) Hammer SN = 0490		Dry						
3.70 - 4.00	B5				59.57	3.70		Very dense greenish grey sandy clayey GRAVEL (Driller's description)		
4.00 - 4.11	SPT (S)	N=50 (30 for 75mm/50 for 30mm) Hammer SN = 0490		Dry						
4.00		04-03-2020		Dry						
					57.27	6.00		Greenish grey SANDSTONE (Driller's description)		
					56.77	6.50		Medium strong (locally weak) very thinly bedded fine grained well cemented SANDSTONE interbedded with very thin beds of dark grey MUDSTONE. Partially weathered: reduced strength, closer fracture spacing with patchy orangish brown discolouration. Discontinuities: 1. 0 to 15 degree bedding fractures closely spaced (35/155/480) slightly undulating, smooth with orangish brown staining fracture surfaces. 2. 80 to 90 degree fractures widely spaced (650/1000/1600) undulating, rough with patchy orangish brown staining on fracture surfaces. *6.50m to 7.90m: 85 quartz vein*		
8.00						(3.00)				

	TCR	SCR	RQD	FI
	100	73	0	4
	100	76	10	>20
				11

Water Strikes

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

Chiselling Details

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

Remarks

No groundwater encountered.

Casing Details

To (m)	Diam (mm)
6.50	130

Water Added

From (m)	To (m)

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated at scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH06
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)
Light Percussion	Dando Terrier	0.00	4.00
Rotary Drilling	Comacchio 205	4.00	6.50
Rotary Coring	Comacchio 205	6.50	9.50

Coordinates: 164950.16 E, 71792.20 N

Final Depth: 9.50 m	Start Date: 04/03/2020	Driller: JC+RS	Sheet 2 of 2
Elevation: 63.27 mOD	End Date: 25/03/2020	Logger: SR+NP	Scale: 1:50
			FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
9.50								53.77	9.50		Medium strong (locally weak) very thinly bedded fine grained well cemented SANDSTONE interbedded with very thin beds of dark grey MUDSTONE. Partially weathered: reduced strength, closer fracture spacing with patchy orangish brown discolouration. Discontinuities: 1. 0 to 15 degree bedding fractures closely spaced (35/155/480) slightly undulating, smooth with orangish brown staining fracture surfaces. 2. 80 to 90 degree fractures widely spaced (650/1000/1600) undulating, rough with patchy orangish brown staining on fracture surfaces. End of Borehole at 9.50m		

TCR	SCR	RQD	FI

Water Strikes

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

Casing Details

To (m)	Diam (mm)
6.50	130

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated at scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH07
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 2.00 m	Start Date: 06/03/2020	Driller: JC	Sheet 1 of 1
Light Percussion	Dando Terrier	0.00	2.00	165005.24 E 71757.17 N	Elevation: 60.22 mOD	End Date: 06/03/2020	Logger: SR	Scale: 1:40 FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.30 - 1.20	B1				59.92	0.30		TOPSOIL		
								MADE GROUND: Soft light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20 - 2.00	B2				59.02	1.20				
1.20 - 1.65	SPT (S)	N=44 (4,5/8,8,14,14) Hammer SN = 0490		Dry				Dense light brown sandy clayey angular fine to medium GRAVEL of sandstone. Sand is fine to coarse.		
2.00	D3				58.22	2.00				
2.00 - 2.32	SPT (C)	N=50 (8,13/50 for 168mm) Hammer SN = 0490		Dry				End of Borehole at 2.00m		
2.00		06-03-2020		Dry						

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	No groundwater encountered.

Casing Details		Water Added	
To (m)	Diameter	From (m)	To (m)

Termination Reason	Last Updated
Terminated on refusal.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
20-0105	St. Kevin's Asylum, Cork	BH08
	Client: Land Development Agency	
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	3.80	
Rotary Drilling	Comacchio 405	3.80	5.00	164921.25 E
Rotary Coring	Comacchio 405	5.00	7.00	71663.55 N

Final Depth:	7.00 m	Start Date:	05/03/2020	Driller:	JC+SJ	Sheet 1 of 1
Elevation:	44.85 mOD	End Date:	21/05/2020	Logger:	SR	Scale: 1:50
						FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				44.65	0.20		TOPSOIL		
								MADE GROUND: Soft locally firm dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20	D5				43.65	1.20				
1.20 - 2.00	B2							MADE GROUND: Soft light brown slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is angular fine to coarse of mixed lithologies.		
1.20 - 1.65	SPT (S)	N=6 (2,2/1,1,2,2) Hammer SN = 0490		Dry						
2.00	D6				42.85	2.00		Firm light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of mixed lithologies.		
2.00 - 3.00	B3									
2.00 - 2.45	SPT (S)	N=13 (4,4/4,3,3,3) Hammer SN = 0490		Dry						
3.00	D7				41.85	3.00		Stiff light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of mixed lithologies.		
3.00 - 3.80	B4									
3.00 - 3.45	SPT (S)	N=22 (4,5/5,6,6,5) Hammer SN = 0490		Dry						
3.80 - 3.99	SPT (C)	N=50 (25 for 75mm/50 for 115mm) Hammer SN = 0490		Dry	41.05	3.80		Brown clayey GRAVEL with cobbles (Driller's description)		
3.80		05-03-2020		Dry						
					40.35	4.50		Grey weathered SANDSTONE (Driller's description)		
		100 0 0			39.85	5.00		Weak thinly bedded fine grained well cemented grey SANDSTONE. Heavily weathered: slightly reduced strength, closer fracture spacing with faint and patchy brown discolouration. Multiple drilling induced fractures.		
5.30		100 0 0								
5.60		100 0 0 NI						Discontinuities:		
6.00		100 0 0				(2.00)		1. 35 to 45 degree bedding fractures closely spaced (80/100/300) planar, smooth with brown staining on fracture surfaces.		
6.20		100 0 0								
6.50		100 85 70 3						2. Sub-vertical fractures probably medium spaced, planar, with blackish brown staining on fracture surface.		
7.00					37.85	7.00		End of Borehole at 7.00m		
		TCR SCR RQD FI								

Water Strikes

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

Casing Details

To (m)	Diam (mm)
5.00	200

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated on scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH09
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	2.00	
Rotary Drilling	Comacchio 405	2.00	5.00	165088.04 E
Rotary Coring	Comacchio 405	5.00	5.70	71667.60 N

Final Depth: 5.70 m	Start Date: 05/03/2020	Driller: JC+SJ	Sheet 1 of 1 Scale: 1:50
Elevation: 49.44 mOD	End Date: 21/05/2020	Logger: SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				49.24	0.20		TOPSOIL		
								MADE GROUND: Soft light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of mixed lithologies.		
1.20	D3				48.24	1.20				
1.20 - 2.00	B2							Dense light brown sandy silty subangular to subrounded fine to coarse GRAVEL of mixed lithologies. Sand is fine to coarse.		
1.20 - 1.65	SPT (S)	N=37 (9,8/8,9,10,10) Hammer SN = 0490		Dry						
2.00	D4				47.44	2.00				
2.00 - 2.38	SPT (S)	N=50 (9,16/50 for 225mm) Hammer SN = 0490		Dry				Brown sandy gravelly CLAY with cobbles (Driller's description)		
2.00		05-03-2020		Dry						
					45.24	4.20		Grey weathered SANDSTONE (Driller's description)		
		100 0 0			44.44	5.00		Weak thinly bedded fine grained well cemented grey SANDSTONE. Heavily weathered: closer fracture spacing with faint and patchy brown discolouration. Multiple drilling induced fractures.		
5.30		100 0 0 NI				(0.70)				
5.70					43.74	5.70		Discontinuities: 1. 10 to 30 degree bedding fractures closely spaced (70/90/120) planar, smooth with brown staining on fracture surfaces. 2. Sub-vertical fracture from 5.00-5.70 planar, with blackish brown staining on fracture surface.		
								End of Borehole at 5.70m		
		TCR SCR RQD FI								

Water Strikes				Chiselling Details			Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)	No groundwater encountered.

Casing Details		Water Added	
To (m)	Diam (mm)	From (m)	To (m)
5.00	200		

Core Barrel	Flush Type	Termination Reason	Last Updated
T2-101	Water	Terminated on scheduled depth.	04/06/2020

AGS

CAUSEWAY GEOTECH

Project No.	Project Name: St. Kevin's Asylum, Cork	Borehole ID
20-0105	Client: Land Development Agency	BH10
	Client's Rep: Barrett Mahony Consulting Engineers	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Light Percussion	Dando Terrier	0.00	5.00	165028.53 E 71612.34 N

Final Depth:	5.00 m	Start Date:	05/03/2020	Driller:	JC	Sheet 1 of 1 Scale: 1:40
Elevation:	40.79 mOD	End Date:	05/03/2020	Logger:	SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.20 - 1.20	B1				40.59	0.20		TOPSOIL		
								MADE GROUND: Soft to firm dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of mixed lithologies.		
1.20	D6				39.59	1.20				
1.20 - 2.00	B2							Stiff dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
1.20 - 1.65	SPT (S)	N=18 (2,1/6,4,4,4) Hammer SN = 0490		Dry						
2.00	D7				38.79	2.00				
2.00 - 3.00	B3							Firm dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
2.00 - 2.45	SPT (S)	N=10 (3,3/4,3,1,2) Hammer SN = 0490		Dry						
3.00	D8				37.79	3.00				
3.00 - 4.00	B4							Firm light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of mixed lithologies.		
3.00 - 3.45	SPT (S)	N=14 (2,1/3,3,4,4) Hammer SN = 0490		Dry						
4.00	D9				36.79	4.00				
4.00 - 5.00	B5							Very stiff light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of mixed lithologies of mixed lithologies.		
4.00 - 4.45	SPT (S)	N=31 (5,5/5,7,11,8) Hammer SN = 0490		Dry						
5.00	D10				35.79	5.00		End of Borehole at 5.00m		
5.00 - 5.42	SPT (S)	N=50 (19,19/50 for 275mm) Hammer SN = 0490		Dry						
5.00		05-03-2020		0.00						

Water Strikes

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

Casing Details

To (m)	Diameter

Water Added

From (m)	To (m)

Chiselling Details

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

Remarks

No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

04/06/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP01
Coordinates 564933.83 E 571901.20 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 02/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.05	ES1			0.10		TOPSOIL	
						Pinkish brown very silty sandy subangular fine to coarse GRAVEL of sandstone with high cobble content. Sand is fine to coarse.	
0.40	B3			0.40		End of trial pit at 0.40m	
0.40	ES2						

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: 0.40
Width: 0.60
Length: 1.20

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP02
Coordinates 564959.92 E 571883.89 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 02/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.25	ES1			0.30		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with coarse gravel sized pieces of broken glass, Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies.	
						Orangish brown very clayey sandy subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are of sandstone.	
0.75	B3			0.75		End of trial pit at 0.75m	
0.75	ES2						

Water Strikes	
Struck at (m)	Remarks

Depth: 0.75
Width: 0.60
Length: 1.70

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP03
Coordinates 565022.91 E 571889.16 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 02/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1			0.20		TOPSOIL	
0.50	B3					Light orangish brown clayey sandy subangular fine to coarse GRVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are of sandstone.	
0.50	ES2			0.75		End of trial pit at 0.75m	

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: 0.75
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP04
Coordinates 565005.08 E 571873.82 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 02/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
0.50	ES1			0.60			
				0.70		Orange very clayey sandy subangular fine to coarse GRAVEL of sandstone. Sand is fine to coarse.	
						Pink very silty sandy subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are of sandstone.	
1.50	B3						
1.50	ES2			1.60		End of trial pit at 1.60m	

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: 1.60
Width: 0.60
Length: 2.50

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP05
Coordinates 564974.18 E 571864.27 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 02/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1			0.30		TOPSOIL	
						Light brown very silty sandy subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are of sandstone.	
1.50	B3						
1.50	ES2			1.60		End of trial pit at 1.60m	

Water Strikes	
Struck at (m)	Remarks

Depth: 1.60
Width: 0.60
Length: 2.30

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP06
Coordinates 564913.61 E 571887.53 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 02/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.20	ES1					MADE GROUND: Greyish brown slightly silty very sandy subrounded to subangular fine to coarse GRAVEL of mixed lithologies with gravel sized pieces of waste pipe and concrete. Sand is fine to coarse.	
0.40	B3			0.40		End of trial pit at 0.40m	
0.40	ES2						

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: 0.40
Width: 0.60
Length: 1.80

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Unstable	Terminated on concrete	05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP07
Coordinates 564873.62 E 571843.99 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 02/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.05	ES1			0.10		TOPSOIL	
						Orange very silty sandy subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are of sandstone.	
0.65	B3			0.65		End of trial pit at 0.65m	
0.65	ES2						

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: 0.65
Width: 0.50
Length: 2.00

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP08
Coordinates 564979.36 E 571839.01 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 02/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1			0.20		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with medium coarse gravel sized pieces of glass. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
0.50	B3					Light brown very silty sandy subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are of sandstone.	
0.50	ES2			0.60		End of trial pit at 0.60m	

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: 0.60
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP09
Coordinates 564955.18 E 571812.48 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 02/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1					Brown very clayey sandy subangular fine to coarse GRAVEL of sandstone with high cobble content, sheets of plastic and steel, coarse gravel sized pieces of glass and boulder sized pieces of concrete and wood. Sand is fine to coarse. Cobbles are of sandstone.	
0.75	B3			0.75		End of trial pit at 0.75m	
0.75	ES2						

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: 0.75
Width: 0.80
Length: 2.00

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Unstable	Terminated on concrete	05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP10
Coordinates 564917.94 E 571793.04 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 03/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.05	ES1			0.10		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies.	
						MADE GROUND: Pink very clayey sandy subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are of sandstone.	
0.80	B3			0.80		End of trial pit at 0.80m	
0.80	ES2						

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: 0.80
Width: 0.60
Length: 1.60

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on refusal	05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP11
Coordinates 564864.15 E 571783.47 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 03/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.20	ES1			0.30		MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
1.50	B3					MADE GROUND: Stiff yellowish brown slightly sandy very gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of sandstone. cobbles are of sandstone.	
1.50	ES2			1.65		End of trial pit at 1.65m	

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: 1.65
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on refusal	05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP12
Coordinates 564850.25 E 571802.72 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 02/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.05	ES1			0.10		TOPSOIL	
						Grey very clayey sandy subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are of sandstone.	
1.00	B3						
1.00	ES2			1.10		End of trial pit at 1.10m	

Water Strikes	
Struck at (m)	Remarks

Depth: 1.10
Width: 0.60
Length: 2.10

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP13
Coordinates 564923.32 E 571745.13 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 03/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.20	ES1			0.30		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
0.50	ES2			0.60		Stiff yellowish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of sandstone. Cobbles are of sandstone.	
						End of trial pit at 0.60m	

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: 0.60
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on possible bedrock	05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP14
Coordinates 564939.26 E 571761.44 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 03/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1			0.20		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with cobble sized pieces of of red brick. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
0.50	B3					Brownish yellow very clayey sandy subangular fine to coarse GRAVEL of sandstone with low cobble content. Sand is fin to coarse. Cobbles are of sandstone.	
0.50	ES2			0.90		End of trial pit at 0.90m	

Water Strikes	
Struck at (m)	Remarks

Depth: 0.90
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP15
Coordinates 564982.08 E 571752.82 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 03/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1			0.25		MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
1.00	B3					MADE GROUND: Yellowish brown very clayey sandy subangular fine to coarse GRAVEL of sandstone with low cobble content and coarse gravel sized pieces of steel. Sand is fine to coarse. Cobbles are of sandstone.	
1.50	ES2			1.50		End of trial pit at 1.50m	

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: 1.50
Width: 0.60
Length: 2.20

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP16
Coordinates 565003.19 E 571761.88 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 03/02/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: Firm dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies.	
0.50	ES1			0.60			
						MADE GROUND: Brown very clayey sandy subangular fine to coarse GRAVEL of sandstone with high cobble content. Sand is fine to coarse. Cobbles are of sandstone.	
1.00	B3						
2.00	B4			2.05			
2.00	ES2					End of trial pit at 2.05m	

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: 2.05
Width: 0.60
Length: 2.00

Remarks: No groundwater encounetred

Stability: Stable

Termination Reason: Terminated due to pit walls collapsing

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP17
Coordinates 565047.06 E 571752.36 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 03/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.20	ES1			0.30		MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with medium gravel sized pieces of glass. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies.	
1.00	B3					MADE GROUND: Orangish brown very clayey sandy subangular fine to coarse GRAVEL of sandstone with high cobble content nd fine gravel sized rootlets. Sand is fine t coarse. Cobbles are of sandstone.	
1.00	ES2			1.65		End of trial pit at 1.65m	

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: 1.65
Width: 0.60
Length: 2.50

Remarks: No groundwater encountered

Stability: Unstable

Termination Reason: Terminated due to pit walls collapsing

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP18
Coordinates 565045.28 E 571709.66 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 03/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with cobble sized pieces of concrete and red brick, Sand is fine to coarse. Gravel is subrounded fin to coarse of mixed lithologies.	
0.50	ES1			0.70			
						MADE GROUND: Firm light yellowish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of sandstone. Cobbles are of sandstone.	
1.00	B3						
2.00	B4						
2.00	ES2			2.15		End of trial pit at 2.15m	

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: 2.15
Width: 0.60
Length: 2.20

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated due to pit walls collapsing

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP19
Coordinates 564903.93 E 571717.64 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 03/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10	ES1			0.15		MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Sand i fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
0.50	B3					MADE GROUND: Light brown very clayey sandy subangular fine to coarse GRAVELM of sandstone with low cobble content. Sand is fin to coarse. Cobbles are of sandstone.	
0.50	ES2			0.90		End of trial pit at 0.90m	

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: 0.90
Width: 0.60
Length: 2.00

Remarks: No groundwater encountered

Stability: Stable

Termination Reason: Terminated on possible bedrock

Last Updated 05/03/2020

AGS

CAUSEWAY GEOTECH

Project No. 20-0105	**Project Name:** St. Kevin's Asylum, Cork		**Trial Pit ID** TP20
Coordinates 564872.66 E 571732.96 N	**Client:** Land Development Agency		
Method: Trial Pitting	**Client's Representative:** Barrett Mahoney		Sheet 1 of 1 Scale: 1:25
Plant: 3T Tracked Excavator	**Elevation** mOD	**Date:** 03/03/2020	**Logger:** RS	DRAFT

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.20	ES1			0.35		MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
1.00	B3					MADE GROUND: Stiff brown slightly sandy very gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of sandstone. Cobbles are of sandstone.	
1.00	ES2			1.15		End of trial pit at 1.15m	

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: 1.15
Width: 0.60
Length: 1.80

Remarks: No groundwater encountered

Stability:	Termination Reason:	Last Updated
Stable	Terminated on possible bedrock	05/03/2020

AGS

Appendix D

Laboratory Certificates

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

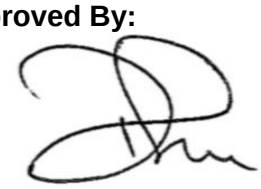
UKAS TESTING
2183

Final Report

Report No.:	20-07191-1
Initial Date of Issue:	16-Mar-2020
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Fernando Alfonso Gabriella Horan Joe Gervin John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen McCracken Stephen Watson Stuart Abraham
Project	20-0105 St. Kevin's Asylum, Cork

Quotation No.:		**Date Received:**	05-Mar-2020
Order No.:		**Date Instructed:**	09-Mar-2020
No. of Samples:	23		
Turnaround (Wkdays):	5	**Results Due:**	13-Mar-2020
Date Approved:	16-Mar-2020		

Approved By:



Details: Darrell Hall, Director

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Chemtest
The right chemistry to deliver results

Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd		Chemtest Job No.:			20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:		Chemtest Sample ID.:			981252	981253	981256	981257	981261	981262	981264	981266	981267
		Sample Location:			TP01	TP02	TP03	TP04	TP06	TP06	TP07	TP08	TP09
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.40	0.25	0.50	0.50	0.20	0.40	0.65	0.50	0.10
		Date Sampled:			02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020
		Asbestos Lab:			DURHAM				DURHAM				DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A	-				-				-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected				No Asbestos Detected				No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-				-				-
Moisture	N	2030	%	0.020	6.7	32	8.6	15		8.2	13	8.3	
pH	U	2010		4.0	8.1	5.8	7.1	6.0		8.9	6.5	7.4	
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	1.0	< 0.40	< 0.40		< 0.40	< 0.40	< 0.40	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010		0.020	< 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	1.6	9.5	0.50		< 0.50	< 0.50	< 0.50	
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0	
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.7	2.1	1.9	0.99		1.1	1.3	1.0	
Sulphate (Total)	U	2430	%	0.010	0.023	0.16	0.041	0.070		0.067	0.11	0.016	
Arsenic	U	2450	mg/kg	1.0	47	25	41	25		38	58	76	
Cadmium	U	2450	mg/kg	0.10	0.15	0.15	< 0.10	< 0.10		0.11	0.33	< 0.10	
Chromium	U	2450	mg/kg	1.0	16	16	19	14		18	14	18	
Copper	U	2450	mg/kg	0.50	27	40	38	32		17	30	29	
Mercury	U	2450	mg/kg	0.10	0.10	0.52	0.19	0.36		0.11	0.41	0.19	
Nickel	U	2450	mg/kg	0.50	30	24	36	18		30	16	37	
Lead	U	2450	mg/kg	0.50	80	140	59	130		49	140	57	
Selenium	U	2450	mg/kg	0.20	0.21	0.76	0.36	0.75		0.29	0.64	0.35	
Zinc	U	2450	mg/kg	0.50	73	89	62	42		66	81	73	
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	0.97	15	2.6	8.3		0.79	8.5	1.4	
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	
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	

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd		**Chemtest Job No.:**			20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:		**Chemtest Sample ID.:**			981252	981253	981256	981257	981261	981262	981264	981266	981267
		Sample Location:			TP01	TP02	TP03	TP04	TP06	TP06	TP07	TP08	TP09
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.40	0.25	0.50	0.50	0.20	0.40	0.65	0.50	0.10
		Date Sampled:			02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020	02-Mar-2020
		Asbestos Lab:			DURHAM				DURHAM				DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0		240	< 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		240	< 5.0	< 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10		240	< 10	< 10	
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.21		< 0.10	< 0.10	< 0.10	
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.59		< 0.10	< 0.10	< 0.10	
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.17		< 0.10	< 0.10	< 0.10	
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.58		< 0.10	< 0.10	< 0.10	
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	1.0	< 0.10	6.6		< 0.10	1.3	< 0.10	
Anthracene	U	2700	mg/kg	0.10	< 0.10	0.12	< 0.10	1.7		< 0.10	0.47	< 0.10	
Fluoranthene	U	2700	mg/kg	0.10	< 0.10	3.1	< 0.10	11		< 0.10	1.9	< 0.10	
Pyrene	U	2700	mg/kg	0.10	< 0.10	2.6	< 0.10	11		< 0.10	1.9	< 0.10	
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	0.93	< 0.10	4.8		< 0.10	0.91	< 0.10	
Chrysene	U	2700	mg/kg	0.10	< 0.10	1.1	< 0.10	5.2		< 0.10	1.3	< 0.10	
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	1.4	< 0.10	5.2		< 0.10	0.78	< 0.10	
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	0.86	< 0.10	2.3		< 0.10	0.72	< 0.10	
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	1.3	< 0.10	4.8		< 0.10	0.86	< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	0.88	< 0.10	2.6		< 0.10	0.56	< 0.10	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.97		< 0.10	0.37	< 0.10	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	0.82	< 0.10	2.7		< 0.10	0.72	< 0.10	
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	14	< 2.0	60		< 2.0	12	< 2.0	
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	
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30		< 0.30	< 0.30	< 0.30	

Chemtest
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Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:				**Chemtest Sample ID.:**	981268	981270	981271	981272	981274	981276	981277	981279	981280
				Sample Location:	TP09	TP12	TP10	TP10	TP11	TP13	TP14	TP15	TP15
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.75	1.00	0.05	0.80	1.50	0.50	0.10	0.10	1.50
				Date Sampled:	02-Mar-2020	02-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020
				Asbestos Lab:			DURHAM					DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A			-					-	
Asbestos Identification	U	2192	%	0.001			No Asbestos Detected					No Asbestos Detected	
ACM Detection Stage	U	2192		N/A			-					-	
Moisture	N	2030	%	0.020	20	8.7		10	10	14	10	11	8.7
pH	U	2010		4.0	8.5	8.0		7.3	8.2	7.2	6.2	6.5	7.5
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	< 0.40		< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 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	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.5	1.1		0.88	0.91	2.6	1.1	1.1	0.84
Sulphate (Total)	U	2430	%	0.010	0.074	< 0.010		0.022	0.025	0.070	0.073	0.073	0.026
Arsenic	U	2450	mg/kg	1.0	36	51		130	71	43	53	47	50
Cadmium	U	2450	mg/kg	0.10	0.17	< 0.10		< 0.10	< 0.10	0.28	< 0.10	0.13	< 0.10
Chromium	U	2450	mg/kg	1.0	14	13		13	11	17	17	17	14
Copper	U	2450	mg/kg	0.50	24	25		12	12	39	32	36	23
Mercury	U	2450	mg/kg	0.10	0.24	0.17		0.20	< 0.10	0.44	0.33	0.37	0.12
Nickel	U	2450	mg/kg	0.50	25	33		25	19	23	28	25	22
Lead	U	2450	mg/kg	0.50	78	50		72	44	240	120	120	56
Selenium	U	2450	mg/kg	0.20	0.49	0.21		0.26	0.34	0.89	0.93	0.73	0.40
Zinc	U	2450	mg/kg	0.50	99	61		53	34	92	62	72	39
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	11	1.4		1.6	2.4	6.0	4.7	4.7	1.6
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 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	< 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	< 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	< 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	< 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	< 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	< 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	< 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	< 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	< 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	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 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	< 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	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	6.4	< 1.0	< 1.0	< 1.0

Chemtest
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Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd		**Chemtest Job No.:**			20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:		**Chemtest Sample ID.:**			981268	981270	981271	981272	981274	981276	981277	981279	981280
		Sample Location:			TP09	TP12	TP10	TP10	TP11	TP13	TP14	TP15	TP15
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.75	1.00	0.05	0.80	1.50	0.50	0.10	0.10	1.50
		Date Sampled:			02-Mar-2020	02-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020
		Asbestos Lab:					DURHAM					DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 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	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0		< 5.0	< 5.0	6.4	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	0.30	< 0.10		< 0.10	< 0.10	0.28	< 0.10	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	0.78	0.56		< 0.10	0.47	1.1	< 0.10	< 0.10	< 0.10
Pyrene	U	2700	mg/kg	0.10	0.80	0.78		< 0.10	0.64	1.2	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.50	< 0.10	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.46	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.65	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.38	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.75	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.49	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.55	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	< 2.0		< 2.0	< 2.0	6.4	< 2.0	< 2.0	< 2.0
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:			**Chemtest Sample ID.:**		981281	981283	981285	981288	981289
			Sample Location:		TP16	TP17	TP18	TP19	TP20
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.20	0.50	0.50	0.20
			Date Sampled:		03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020
			Asbestos Lab:				DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
ACM Type	U	2192		N/A			-		-
Asbestos Identification	U	2192	%	0.001			No Asbestos Detected		No Asbestos Detected
ACM Detection Stage	U	2192		N/A			-		-
Moisture	N	2030	%	0.020	13	15	13	13	15
pH	U	2010		4.0	8.0	7.7	7.3	7.5	5.8
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.58	0.62	< 0.40	< 0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	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
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.60
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.7	2.2	2.0	0.90	1.2
Sulphate (Total)	U	2430	%	0.010	0.10	0.20	0.088	0.032	0.087
Arsenic	U	2450	mg/kg	1.0	46	76	38	62	28
Cadmium	U	2450	mg/kg	0.10	0.26	0.50	0.59	< 0.10	0.12
Chromium	U	2450	mg/kg	1.0	19	24	14	17	19
Copper	U	2450	mg/kg	0.50	48	83	110	19	25
Mercury	U	2450	mg/kg	0.10	0.66	1.5	0.51	0.19	0.24
Nickel	U	2450	mg/kg	0.50	31	38	24	22	25
Lead	U	2450	mg/kg	0.50	170	300	220	83	100
Selenium	U	2450	mg/kg	0.20	0.72	1.3	0.77	0.53	0.71
Zinc	U	2450	mg/kg	0.50	96	180	120	55	74
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	8.1	11	9.3	1.9	5.3
Aliphatic TPH >C5-C6	N	2680	mg/kg	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
Aliphatic TPH >C8-C10	U	2680	mg/kg	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
Aliphatic TPH >C12-C16	U	2680	mg/kg	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
Aliphatic TPH >C21-C35	U	2680	mg/kg	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
Total Aliphatic Hydrocarbons	N	2680	mg/kg	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
Aromatic TPH >C7-C8	N	2680	mg/kg	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
Aromatic TPH >C10-C12	U	2680	mg/kg	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
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 20-0105 St. Kevin's Asylum, Cork

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		20-07191	20-07191	20-07191	20-07191	20-07191
Quotation No.:			**Chemtest Sample ID.:**		981281	981283	981285	981288	981289
			Sample Location:		TP16	TP17	TP18	TP19	TP20
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.20	0.50	0.50	0.20
			Date Sampled:		03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020	03-Mar-2020
			Asbestos Lab:				DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Aromatic TPH >C21-C35	U	2680	mg/kg	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
Total Aromatic Hydrocarbons	N	2680	mg/kg	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
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	2.0	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.75	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	< 0.10	1.2	0.41	6.7	0.81
Pyrene	U	2700	mg/kg	0.10	< 0.10	1.1	0.50	7.1	0.81
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	3.2	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	3.5	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	4.5	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.9	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	3.7	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	2.5	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.80	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	2.6	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	2.3	< 2.0	39	< 2.0
Benzene	U	2760	µg/kg	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
Ethylbenzene	U	2760	µg/kg	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
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

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"

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 45 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

Site:	St. Kevins's Cork
Project No.:	20-0105
Date:	08/06/2020
Weather:	Dry, warm

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	996	0	0.1	20.9	0	0
After:						

BH01	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	0.8	18.8	0	0
60	0	0.8	18.8	0	0
90	0	0.8	18.8	0	0
120	0	0.8	18.8	0	0
150	0	0.8	18.7	0	0
180	0	0.8	18.7	0	0
240	0	0.7	18.7	0	1
300	0	0.7	18.7	0	1

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.5
90	0.5
120	0.5
150	0.5
180	0.5
240	0.5
300	0.5

Groundwater monitoring	mbgl
Depth to top of water	5.3
Depth to bottom of BH	5.5
Sample collected (Y/N)	N
Sample depth	N/A

BH08	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	0.2	20.7	0	0
60	0	0.4	20.4	0	0
90	0	0.7	19.9	0	0
120	0	0.9	19.5	0	0
150	0	1	19.4	0	0
180	0	1	19.3	0	0
240	0	0.9	19.3	0	0
300	0	0.9	19.3	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.3
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.51
Sample collected (Y/N)	N
Sample depth	N/A

BH09	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	1.7	18	0	0
60	0	1.7	18	0	0
90	0	1.7	18	0	0
120	0	1.7	18	0	0
150	0	1.7	18	0	0
180	0	1.7	18	0	0
240	0	1.7	18.1	0	0
300	0	1.7	18.2	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.5
90	0.5
120	0.5
150	0.5
180	0.5
240	0.4
300	0.5

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.55
Sample collected (Y/N)	N
Sample depth	N/A

Site:	St. Kevins's Cork
Project No.:	20-0105
Date:	15/06/2020
Weather:	Wet, humid

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	998	0	0.1	20.9	0.1	0
After:						

BH01	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	0	20.7	0	0
60	0	0	20.7	0	0
90	0	0	20.7	0	0
120	0	0	20.7	0	0
150	0	0	20.7	0	0
180	0	0	20.6	0	0
240	0	0	20.6	0	0
300	0	0.1	20.5	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	5.5
Sample collected (Y/N)	N
Sample depth	N/A

BH08	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.1	0.4	19.9	0	0
60	0	0.5	19.8	0	0
90	0	0.6	19.6	0	0
120	0	0.6	19.6	0	0
150	0	0.7	19.6	0	0
180	0	0.7	19.6	0	0
240	0	0.7	19.6	0	0
300	0	0.7	19.6	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.3
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.51
Sample collected (Y/N)	N
Sample depth	N/A

BH09	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.1	2.1	17	0	0
60	0	2.1	17	0	0
90	0	2	17.1	0	0
120	0	2	17.1	0	0
150	0	2	17.2	0	0
180	0	2	17.1	0	0
240	0	1.9	17.1	0	0
300	0	2	17.1	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.3
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.55
Sample collected (Y/N)	N
Sample depth	N/A

Site:	St. Kevins's Cork
Project No.:	20-0105
Date:	22/06/2020
Weather:	Wet

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	1010	0	0.1	21.1	0	0
After:						

BH01	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	1	18.8	0	0
60	0	1.3	17.9	0	0
90	0	1.4	17.7	0	0
120	0	1.3	17.8	0	0
150	0	1.2	18	0	0
180	0	1.3	17.8	0	0
240	0	1.3	17.7	0	0
300	0	1.3	17.6	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	5.5
Sample collected (Y/N)	N
Sample depth	N/A

BH08	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0.1	0.5	19.9	0	0
60	0	0.6	19.9	0	0
90	0	0.7	19.9	0	0
120	0	0.7	19.9	0	0
150	0	0.7	19.8	0	0
180	0	0.7	19.8	0	0
240	0	0.7	19.8	0	0
300	0	0.7	19.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.51
Sample collected (Y/N)	N
Sample depth	N/A

BH09	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	0.7	20	0	0
60	0	1.6	19.2	0	0
90	0	1.8	19	0	0
120	0	1.8	19	0	0
150	0	1.8	19	0	0
180	0	1.8	19	0	0
240	0	1.8	19	0	0
300	0	1.8	19	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.4
90	0.4
120	0.5
150	0.5
180	0.5
240	0.5
300	0.5

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.55
Sample collected (Y/N)	N
Sample depth	N/A

Site:	St. Kevins's Cork
Project No.:	20-0105
Date:	29/06/2020
Weather:	Dry, windy

Equipment:		Geotechnical Instruments GA5000				
Ambient Conditions	Barometric Pressure	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
Before:	1013	0	0.1	19.8	0	0
After:						

BH01	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	1.2	18.9	1	0
60	0	1.2	18.2	1	0
90	0	1.2	18.1	0	0
120	0	1.1	18.1	0	0
150	0	1.2	18.1	0	0
180	0	1.2	18.1	0	0
240	0	1.1.	18	0	0
300	0	1.1	18	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.3
60	0.4
90	0.4
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	5.5
Sample collected (Y/N)	N
Sample depth	N/A

BH08	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	0.4	19.8	1	0
60	0	0.4	19.8	0	0
90	0	0.5	19.8	0	0
120	0	0.5	19.7	0	0
150	0	0.5	19.7	0	0
180	0	0.5	19.8	0	0
240	0	0.5	19.8	0	0
300	0	0.5	19.8	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.5
60	0.4
90	0.5
120	0.4
150	0.4
180	0.4
240	0.4
300	0.4

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.51
Sample collected (Y/N)	N
Sample depth	N/A

BH09	Gas readings				
Time (sec)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)
30	0	1.9	17.8	0	0
60	0	1.9	17.7	0	0
90	0	1.9	17.6	0	0
120	0	1.8	17.5	0	0
150	0	1.8	17.5	0	0
180	0	1.8	17.5	0	0
240	0	1.8	17.5	0	0
300	0	1.8	17.5	0	0

Flow rates	
Time (sec)	Flow (l/h)
30	0.4
60	0.4
90	0.4
120	0.4
150	0.4
180	0.5
240	0.5
300	0.5

Groundwater monitoring	mbgl
Depth to top of water	Dry
Depth to bottom of BH	2.55
Sample collected (Y/N)	N
Sample depth	N/A

Appendix E

Generic Quantitative Analysis

M01831-07 St. Kevins Asylum, Cork
Generic Assessment Screening; soils

Determinand	Units	Generic Assessment Criteria							SI Location and Sample Depth (m bgl)											
		Residential WITH homegrown produce			Sobra		C4SL's		TP01	TP02	TP03	TP04	TP06	TP06	TP07	TP08	TP09	TP09	TP12	TP10
		SOM 1%	SOM 2.5%	SOM 6%	Child	Adult	With	Without	0.40	0.25	0.50	0.50	0.20	0.40	0.65	0.50	0.10	0.75	1.00	0.05
Asbestos Identification	%								No Asbestos Detected				No Asbestos Detected				No Asbestos Detected			No Asbestos Detected
Moisture	%								6.7	32	8.6	15		8.2	13	8.3		20	8.7	
pH									8.1	5.8	7.1	6.0		8.9	6.5	7.4		8.5	8.0	
Boron (Hot Water Soluble)	mg/kg	-	-	290					< 0.40	1.0	< 0.40	< 0.40		< 0.40	< 0.40	< 0.40		< 0.40	< 0.40	
Sulphate (2:1 Water Soluble) as SO4	g/l								< 0.010	< 0.010	< 0.010	< 0.010		0.020	< 0.010	< 0.010		< 0.010	< 0.010	
Cyanide (Free)	mg/kg	24			24	2100			< 0.50	0.50	< 0.50	< 0.50		< 0.50	< 0.50	< 0.50		< 0.50	< 0.50	
Cyanide (Total)	mg/kg	34							< 0.50	1.6	9.5	0.50		< 0.50	< 0.50	< 0.50		< 0.50	< 0.50	
Thiocyanate	mg/kg	34							< 5.0	< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	
Sulphide (Easily Liberatable)	mg/kg								1.7	2.1	1.9	0.99		1.1	1.3	1.0		1.5	1.1	
Sulphate (Total)	%								0.023	0.16	0.041	0.070		0.067	0.11	0.016		0.074	< 0.010	
Arsenic	mg/kg	-	-	37	80	7000	37	40	47	25	41	25		38	58	76		36	51	
Cadmium	mg/kg	-	-	11	140*	12000	22	150	0.15	0.15	< 0.10	< 0.10		0.11	0.33	< 0.10		0.17	< 0.10	
Chromium	mg/kg	-	-	910					16	16	19	14		18	14	18		14	13	
Copper	mg/kg	-	-	2400					27	40	38	32		17	30	29		24	25	
Mercury	mg/kg	-	-	40					0.10	0.52	0.19	0.36		0.11	0.41	0.19		0.24	0.17	
Nickel	mg/kg	-	-	180					30	24	36	18		30	16	37		25	33	
Lead	mg/kg	-	-	-			200	310	80	140	59	130		49	140	57		78	50	
Selenium	mg/kg	-	-	250					0.21	0.76	0.36	0.75		0.29	0.64	0.35		0.49	0.21	
Zinc	mg/kg	-	-	3700					73	89	62	42		66	81	73		99	61	
Chromium (Hexavalent)	mg/kg	-	-	6			21	21	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	< 0.50	< 0.50		< 0.50	< 0.50	
Organic Matter	%	-	-	-					0.97	15	2.6	8.3		0.79	8.5	1.4		11	1.4	
Aliphatic TPH >C5-C6	mg/kg	42	78	160					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aliphatic TPH >C6-C8	mg/kg	100	230	530					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aliphatic TPH >C8-C10	mg/kg	27	65	150					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aliphatic TPH >C10-C12	mg/kg	130 (48)vap	330(118)vap	760(283)vap					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aliphatic TPH >C12-C16	mg/kg	1100(24)vap	2400(59)sol	4300(142)					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aliphatic TPH >C16-C21	mg/kg	65000(8.48)f,sol	92000(21)f,sol	110000f					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aliphatic TPH >C21-C35	mg/kg	65000(8.48)f,sol	92000(21)f,sol	110000f					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aliphatic TPH >C35-C44	mg/kg	65000(8.48)f,sol	92000(21)f,sol	110000f					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Total Aliphatic Hydrocarbons	mg/kg	-	-	-					< 5.0	< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	
Aromatic TPH >C5-C7	mg/kg	70	140	300					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aromatic TPH >C7-C8	mg/kg	130	290	660					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aromatic TPH >C8-C10	mg/kg	34	83	190					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aromatic TPH >C10-C12	mg/kg	74	180	380					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aromatic TPH >C12-C16	mg/kg	140	330	660					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aromatic TPH >C16-C21	mg/kg	260f	540f	930f					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Aromatic TPH >C21-C35	mg/kg	1100f	1500f	1700f					< 1.0	< 1.0	< 1.0	< 1.0		240	< 1.0	< 1.0		< 1.0	< 1.0	
Aromatic TPH >C35-C44	mg/kg	1100f	1500f	1700f					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Total Aromatic Hydrocarbons	mg/kg	-	-	-					< 5.0	< 5.0	< 5.0	< 5.0		240	< 5.0	< 5.0		< 5.0	< 5.0	
Total Petroleum Hydrocarbons	mg/kg	-	-	-					< 10	< 10	< 10	< 10		240	< 10	< 10		< 10	< 10	
Naphthalene	mg/kg	2.3f	5.6f	13f					< 0.10	< 0.10	< 0.10	0.21		< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	
Acenaphthylene	mg/kg	170	420	920					< 0.10	< 0.10	< 0.10	0.59		< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	
Acenaphthene	mg/kg	210	510	1100					< 0.10	< 0.10	< 0.10	0.17		< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	
Fluorene	mg/kg	170	400	860					< 0.10	< 0.10	< 0.10	0.58		< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	

Determinand	Units	Generic Assessment Criteria							TP01	TP02	TP03	TP04	TP06	TP06	TP07	TP08	TP09	TP09	TP12	TP10
		Residential WITH homegrown produce						C4SL's	0.40	0.25	0.50	0.50	0.20	0.40	0.65	0.50	0.10	0.75	1.00	0.05
		SOM 1%	SOM 2.5%	SOM 6%																
Phenanthrene	mg/kg	95	220	440					< 0.10	1.0	< 0.10	6.6		< 0.10	1.3	< 0.10		0.30	< 0.10	
Anthracene	mg/kg	2400	5400	11000					< 0.10	0.12	< 0.10	1.7		< 0.10	0.47	< 0.10		< 0.10	< 0.10	
Fluoranthene	mg/kg	280	560	890					< 0.10	3.1	< 0.10	11		< 0.10	1.9	< 0.10		0.78	0.56	
Pyrene	mg/kg	620	1200	2000					< 0.10	2.6	< 0.10	11		< 0.10	1.9	< 0.10		0.80	0.78	
Benzo[a]anthracene	mg/kg	7.2	11	13					< 0.10	0.93	< 0.10	4.8		< 0.10	0.91	< 0.10		< 0.10	< 0.10	
Chrysene	mg/kg	15	22	27					< 0.10	1.1	< 0.10	5.2		< 0.10	1.3	< 0.10		< 0.10	< 0.10	
Benzo[b]fluoranthene	mg/kg	2.6	3.3	3.7					< 0.10	1.4	< 0.10	5.2		< 0.10	0.78	< 0.10		< 0.10	< 0.10	
Benzo[k]fluoranthene	mg/kg	77	93	100					< 0.10	0.86	< 0.10	2.3		< 0.10	0.72	< 0.10		< 0.10	< 0.10	
Benzo[a]pyrene	mg/kg	2.2	2.7	3			5	5.3	< 0.10	1.3	< 0.10	4.8		< 0.10	0.86	< 0.10		< 0.10	< 0.10	
Indeno(1,2,3-c,d)Pyrene	mg/kg	27	36	41					< 0.10	0.88	< 0.10	2.6		< 0.10	0.56	< 0.10		< 0.10	< 0.10	
Dibenz(a,h)Anthracene	mg/kg	0.24	0.28	0.3					< 0.10	< 0.10	< 0.10	0.97		< 0.10	0.37	< 0.10		< 0.10	< 0.10	
Benzo[g,h,i]perylene	mg/kg	320	340	350					< 0.10	0.82	< 0.10	2.7		< 0.10	0.72	< 0.10		< 0.10	< 0.10	
Total Of 16 PAH's	mg/kg	-	-	-					< 2.0	14	< 2.0	60		< 2.0	12	< 2.0		< 2.0	< 2.0	
Benzene	µg/kg	87	170	370	47	4100			< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Toluene	µg/kg	130000	290000	660000					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Ethylbenzene	µg/kg	*47000*	*110000*	*260000*					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
m & p-Xylene	µg/kg	*59000*	*140000*	*320000*					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
o-Xylene	µg/kg	*60000*	*140000*	*330000*					< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	
Total Phenols	mg/kg	280	550	1100	2000	175000			< 0.30	< 0.30	< 0.30	< 0.30		< 0.30	< 0.30	< 0.30		< 0.30	< 0.30	

M01831-07 St. Kevins Asylum, Cork
Generic Assessment Screening; soils

Determinand	Units	Generic Assessment Criteria							TP10	TP11	TP13	TP14	TP15	TP15	TP16	TP17	TP18	TP19	TP20
		Residential WITH homegrown produce			Sobra		C4SL's												
		SOM 1%	SOM 2.5%	SOM 6%	Child	Adult	With	Without	0.80	1.50	0.50	0.10	0.10	1.50	0.50	0.20	0.50	0.50	0.20
Asbestos Identification	%												No Asbestos Detected				No Asbestos Detected		No Asbestos Detected
Moisture	%								10	10	14	10	11	8.7	13	15	13	13	15
pH									7.3	8.2	7.2	6.2	6.5	7.5	8.0	7.7	7.3	7.5	5.8
Boron (Hot Water Soluble)	mg/kg	-	-	290					< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	0.58	0.62	< 0.40	< 0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	g/l								< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Cyanide (Free)	mg/kg	24			24	2100			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	mg/kg	34							< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.60
Thiocyanate	mg/kg	34							< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	mg/kg								0.88	0.91	2.6	1.1	1.1	0.84	1.7	2.2	2.0	0.90	1.2
Sulphate (Total)	%								0.022	0.025	0.070	0.073	0.073	0.026	0.10	0.20	0.088	0.032	0.087
Arsenic	mg/kg	-	-	37	80	7000	37	40	130	71	43	53	47	50	46	76	38	62	28
Cadmium	mg/kg	-	-	11	140*	12000	22	150	< 0.10	< 0.10	0.28	< 0.10	0.13	< 0.10	0.26	0.50	0.59	< 0.10	0.12
Chromium	mg/kg	-	-	910					13	11	17	17	17	14	19	24	14	17	19
Copper	mg/kg	-	-	2400					12	12	39	32	36	23	48	83	110	19	25
Mercury	mg/kg	-	-	40					0.20	< 0.10	0.44	0.33	0.37	0.12	0.66	1.5	0.51	0.19	0.24
Nickel	mg/kg	-	-	180					25	19	23	28	25	22	31	38	24	22	25
Lead	mg/kg	-	-	-			200	310	72	44	240	120	120	56	170	300	220	83	100
Selenium	mg/kg	-	-	250					0.26	0.34	0.89	0.93	0.73	0.40	0.72	1.3	0.77	0.53	0.71
Zinc	mg/kg	-	-	3700					53	34	92	62	72	39	96	180	120	55	74
Chromium (Hexavalent)	mg/kg	-	-	6			21	21	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	%	-	-	-					1.6	2.4	6.0	4.7	4.7	1.6	8.1	11	9.3	1.9	5.3
Aliphatic TPH >C5-C6	mg/kg	42	78	160					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	mg/kg	100	230	530					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	mg/kg	27	65	150					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	mg/kg	130 (48)vap	330(118)vap	760(283)vap					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	mg/kg	1100(24)vap	2400(59)sol	4300(142)					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	mg/kg	65000(8.48)f,sol	92000(21)f,sol	110000f					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	mg/kg	65000(8.48)f,sol	92000(21)f,sol	110000f					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	mg/kg	65000(8.48)f,sol	92000(21)f,sol	110000f					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	mg/kg	-	-	-					< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	mg/kg	70	140	300					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	mg/kg	130	290	660					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	mg/kg	34	83	190					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	mg/kg	74	180	380					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	mg/kg	140	330	660					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	mg/kg	260f	540f	930f					< 1.0	< 1.0	6.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	mg/kg	1100f	1500f	1700f					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	mg/kg	1100f	1500f	1700f					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	mg/kg	-	-	-					< 5.0	< 5.0	6.4	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	mg/kg	-	-	-					< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	mg/kg	2.3f	5.6f	13f					< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	mg/kg	170	420	920					< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	210	510	1100					< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	170	400	860					< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

SI Location and Sample Depth (m bgl)																					
		Residential WITH homegrown produce						C4SL's	TP10	TP11	TP13	TP14	TP15	TP15	TP16	TP17	TP18	TP19	TP20
		SOM 1%	SOM 2.5%	SOM 6%					0.80	1.50	0.50	0.10	0.10	1.50	0.50	0.20	0.50	0.50	0.20
Phenanthrene	mg/kg	95	220	440					< 0.10	< 0.10	0.28	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.0	< 0.10
Anthracene	mg/kg	2400	5400	11000					< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.75	< 0.10
Fluoranthene	mg/kg	280	560	890					< 0.10	0.47	1.1	< 0.10	< 0.10	< 0.10	< 0.10	1.2	0.41	6.7	0.81
Pyrene	mg/kg	620	1200	2000					< 0.10	0.64	1.2	< 0.10	< 0.10	< 0.10	< 0.10	1.1	0.50	7.1	0.81
Benzo[a]anthracene	mg/kg	7.2	11	13					< 0.10	< 0.10	0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.2	< 0.10
Chrysene	mg/kg	15	22	27					< 0.10	< 0.10	0.46	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.5	< 0.10
Benzo[b]fluoranthene	mg/kg	2.6	3.3	3.7					< 0.10	< 0.10	0.65	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	4.5	< 0.10
Benzo[k]fluoranthene	mg/kg	77	93	100					< 0.10	< 0.10	0.38	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.9	< 0.10
Benzo[a]pyrene	mg/kg	2.2	2.7	3			5	5.3	< 0.10	< 0.10	0.75	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.7	< 0.10
Indeno(1,2,3-c,d)Pyrene	mg/kg	27	36	41					< 0.10	< 0.10	0.49	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.5	< 0.10
Dibenz(a,h)Anthracene	mg/kg	0.24	0.28	0.3					< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.80	< 0.10
Benzo[g,h,i]perylene	mg/kg	320	340	350					< 0.10	< 0.10	0.55	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.6	< 0.10
Total Of 16 PAH's	mg/kg	-	-	-					< 2.0	< 2.0	6.4	< 2.0	< 2.0	< 2.0	< 2.0	2.3	< 2.0	39	< 2.0
Benzene	µg/kg	87	170	370	47	4100			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	130000	290000	660000					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	*47000*	*110000*	*260000*					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	µg/kg	*59000*	*140000*	*320000*					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	*60000*	*140000*	*330000*					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	mg/kg	280	550	1100	2000	175000			< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Summary of Gas Monitoring Data and Gas Screening Values
M01831-07 St Kevins Asylum, Cork

ID	Date	Pressure before monitoring (mbar)	Pressure after monitoring (mbar)	Peak Flow (l/hr)	Steady State Flow (l/hr)	CH4 Peak Conc (%)	C02 Steady State Conc (%)	Depth to Water (m)	Borehole Depth (m)	GSV CH4 (l/hr)	GSV CO2 (l/hr)	Modified Wilson & Card Classification	Risk Classification
BH01	08/06/2020	996		0.5	0.5	0	0.7	5.30	5.50	-	-	-	-
	15/06/2020	998		0.4	0.4	0	0.1	DRY	5.50				
	22/06/2020	1010		0.4	0.4	0	1.3	DRY	5.50				
	29/06/2020	1013		0.4	0.4	0	1.1	DRY	5.50				
Maximum flow rate and concentrations:				**0.5**	**0.5**	**0**	**1.3**	-		**0**	**0.0065**	**CS1**	**VERY LOW**

ID	Date	Pressure before monitoring (mbar)	Pressure after monitoring (mbar)	Peak Flow (l/hr)	Steady State Flow (l/hr)	CH4 Peak Conc (%)	C02 Steady State Conc (%)	Depth to Water (m)	Borehole Depth (m)	GSV CH4 (l/hr)	GSV CO2 (l/hr)	Modified Wilson & Card Classification	Risk Classification
BH08	08/06/2020	996		0.4	0.4	0	0.9	DRY	2.51	-	-	-	-
	15/06/2020	998		0.4	0.4	0.1	0.7	DRY	2.51				
	22/06/2020	1010		0.4	0.4	0.1	0.7	DRY	2.51				
	29/06/2020	1013		0.4	0.4	0	0.5	DRY	2.51				
Maximum flow rate and concentrations:				**0.4**	**0.4**	**0.1**	**0.9**	-		**0.0004**	**0.0036**	**CS1**	**VERY LOW**

ID	Date	Pressure before monitoring (mbar)	Pressure after monitoring (mbar)	Peak Flow (l/hr)	Steady State Flow (l/hr)	CH4 Peak Conc (%)	C02 Steady State Conc (%)	Depth to Water (m)	Borehole Depth (m)	GSV CH4 (l/hr)	GSV CO2 (l/hr)	Modified Wilson & Card Classification	Risk Classification
BH09	08/06/2020	996		0.5	0.5	0	1.7	DRY	2.55	-	-	-	-
	15/06/2020	998		0.4	0.4	0.1	2	DRY	2.55				
	22/06/2020	1010		0.5	0.5	0	1.8	DRY	2.55				
	29/06/2020	1013		0.5	0.5	0	1.8	DRY	2.55				
Maximum flow rate and concentrations:				**0.5**	**0.5**	**0.1**	**2**	-		**0.0005**	**0.01**	**CS1**	**VERY LOW**

CAUSEWAY GEOTECH

APPENDIX K

SPT HAMMER ENERGY MEASUREMENT REPORT

LOLER REPORT THOROUGH EXAMINATION OF LIFTING EQUIPMENT

This report complies with the requirements of the Lifting Operations and Lifting Equipment Regulations 1998

Date of Examination: 03/01/2020	**Date of Report:** 03/01/2020	**Report No:** 387602

Name & address of employer for whom the thorough examination was made:	Address of premises at which the examination was made:
CAUSEWAY GEOTECH LTD 8 DRUMAHISKEY ROAD BALLYMONEY CO ANTRIM	**CAUSEWAY GEOTECH LTD** 8 DRUMAHISKEY ROAD BALLYMONEY CO ANTRIM

Description and identification of the equipment:	Safe working load(s)	Date of manufacture	Date of last thorough examination
SPT HAMMER LIFTING POINT ID.No - 200	**100 KGS**	Unknown	19/06/19

Is this the first examination after installation		Was the examination carried out:	
or after assembly at a new site or location?	No	within an interval of 6 months?	No
If the answer to the above question is YES.		within an interval of 12 months?	Yes
has the equipment been installed correctly?		In accordance with an examination scheme?	No
		after the occurence of exceptional circumstances?	No

Identification of any part found to have a defect which is or could become a danger to persons and a description of the defect: (If none state NONE)

None

Is the above a defect which is immediate danger to persons? **Note** this is a reportable defect	NO	
Is the above a defect which is immediate danger to persons? (If YES state the by when)	NO	

Particulars of any repair, renewal or alteration required to remedy the defect identified above:

None

Particulars of any tests carried out as part of the examination: (If none state NONE)

None

IS THIS EQUIPMENT SAFE TO OPERATE? YES

Company Approved Qualified Examiner	Name of person authenticating this report:	Latest date when examination must be carried out:
Daryl Haire	Signed: Brian Lowry	**03/07/2020**

Name and address of employer of persons making and authenticating this report:

MIM-NI Ltd
6 Carrakeel Industrial Park
Maydown, Derry, BT47 6SZ

Form 17 Issue 1
Authorised by: CMcL

Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Keeble House
Stuart Way
East Grinstead
West Sussex
RH19 4QA

SPT Hammer Ref: .T5
Test Date: 22/02/2020
Report Date: 03/03/2020
File Name: .T5.spt
Test Operator: NPB

Instrumented Rod Data

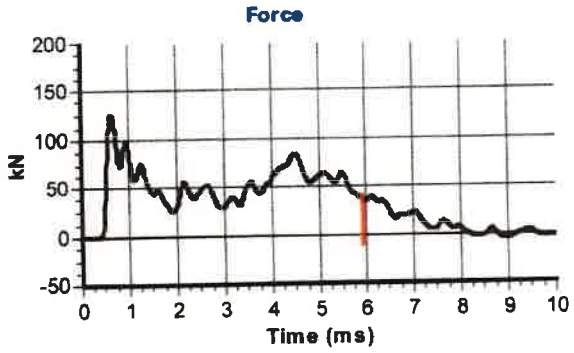
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.0
Assumed Modulus E_a (GPa): 200
Accelerometer No.1: 6458
Accelerometer No.2: 9607

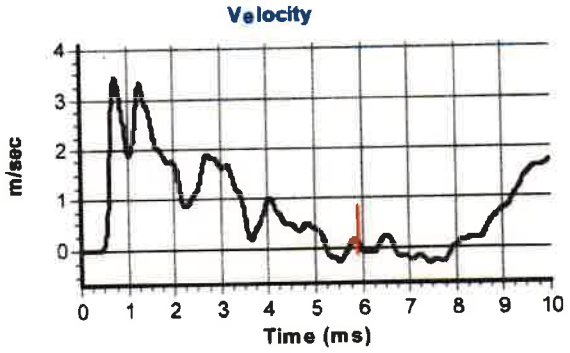
SPT Hammer Information

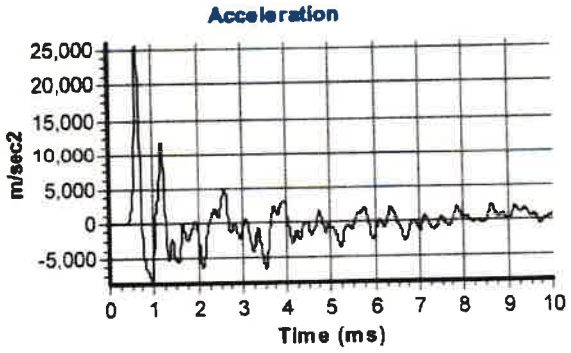
Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 10.0

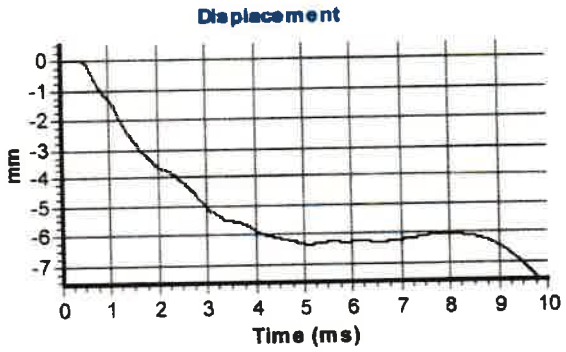
Comments / Location

BALLEYMONEY









Calculations

Area of Rod A (mm2): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 360

Energy Ratio E_r (%): 76

Signed: Neil Burrows
Title: Field Operations Manager

The recommended calibration interval is 12 months