Appendix 7.2 – Site Investigation Report, 2019

S.I. Ltd Contract No: 5662

Client: Castlethorn
Engineer: Waterman Moylan
Contractor: Site Investigations Ltd

Kellystown,
Porterstown, Dublin 15
Site Investigation Report

Prepared by:

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Stephen Letch

Issue Date:	10/01/2020
Status	Final
Revision	1

Contents:

Appendices:

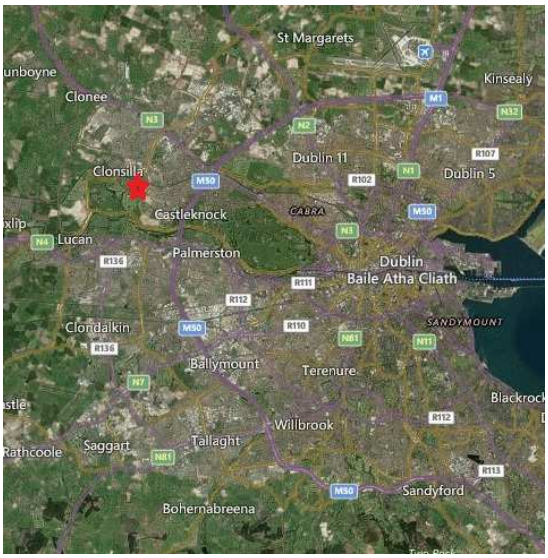
1. Introduction

On the instructions of Waterman Moylan, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Kellystown, Porterstown, Dublin 15. The investigation was for a residential development of the site and completed on behalf of the Client, Castlethorn. The investigation was started in November and completed in December 2019.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Site Location

The site is located in Porterstown, Dublin 15. The first map below shows the location of Porterstown in Dublin, and the second map shows the location of the site in the Porterstown.



3. Fieldwork

The fieldworks comprised a programme of cable percussive boreholes and rotary coreholes, trial pits with dynamic probes, soakaway tests and California Bearing Ratio tests. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. Laboratory testing has been performed on representative soil samples recovered from the trial pits and these were completed in accordance of BS1377: 1990. The fieldworks comprised of the following:

- 4 No. cable percussive boreholes with rotary corehole follow on
- 39 No. trial pits with dynamic probes
- 5 No. soakaway tests
- 25 No. California Bearing Ratio tests

3.1. Cable Percussive Boreholes with Rotary Coreholes

Cable percussion boring was undertaken at 4 No. locations using a Dando 150 rig and constructed 200mm diameter boreholes. The boreholes terminated at depths ranging from 1.60mbgl to 2.70mbgl. It was not possible to collect undisturbed samples due to the granular soils encountered so bulk disturbed samples were recovered at regular intervals.

To test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g. BH01 at 1.00mbgl where N=21-(3,4/4,5,6,6)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g. BH01 at 2.70mbgl where N=50-(25 for 5mm/50 for 0mm)).

Following chiselling for one hour, the cable percussion boreholes were removed from the location and the rotary coring rig moved onto the position. The rotary drilling was carried out using a Sondeq SS71 top drive rig. Open hole drilling techniques were used to advance through the overburden and the bedrock was then cored with the corehole terminated when 3m of core was recovered.

Once the coreholes were completed, the rock cores were returned to SIL, where they were logged and photographed by a SIL geotechnical engineer. Provided on the logs are engineering geological descriptions of the rock cores with details of the bedding/discontinuities and mechanical indices for each core run, i.e. TCR, SCR, RQD and Fracture Index.

The borehole and corehole logs are combined and along with the photographs are presented in Appendix 1.

3.2. Trial Pits with Dynamic Probes

39 No. trial pits were excavated using a wheeled excavator. The pits were logged and photographed by SIL geotechnical engineer and representative disturbed bulk samples were recovered as the pits were excavated, which were returned to the laboratory for geotechnical testing.

Adjacent to the trial pits, dynamic probes were completed using a track mounted Competitor 130 machine. The testing complies with the requirements of BS1377: Part 9 (1990) and Eurocode 7: Part 3. The configuration utilised standard DPH (Heavy) probing method

comprising a 50kg weight, 500mm drop height and a 50mm diameter (90°) cone. The number of blows required to drive the cone each 100mm increment into the sub soil is recorded in accordance with the standards. The dynamic probe provides no information regarding soil type or groundwater conditions.

The dynamic probe results can be used to analyse the strength of the soil strata encountered by the probe. 'Proceedings of the Trinity College Dublin Symposium of Field and Laboratory Testing of Soils for Foundations and Embankments' presents a paper by Foirbart that is most relevant to Irish soil conditions and within this paper the following equations were included:

Granular Soils: DPH N_{100} x 2.5 = SPT N value

Cohesive Soils: C_u = 15 x DPH N_{100} + 30 kN/m^2

These equations present a relationship between the probe N_{100} value and the SPT N value for granular soils and the undrained shear strength of cohesive soils.

The trial pit logs with the dynamic probe results are presented in Appendix 2 along with the photographs.

3.3. Soakaway Tests

At 5 No. locations, soakaway tests were completed and logged by SIL geotechnical engineer. The soakaway test is used to identify possible areas for storm water drainage. The pit was filled with water and the level of the groundwater was recorded over time. As stipulated by BRE Special Digest 365, the pit should be filled three times and that the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall at a steady rate then the test is deemed to have failed and the area is unsuitable for storm water drainage.

The test results and photographs are provided in Appendix 3.

3.4. California Bearing Ratio tests

At 25 No. individual locations, undisturbed cylindrical mould samples were taken to complete California Bearing Ratio tests in the laboratory. The results facilitate the designing of the access roads and associated areas. These tests were completed to BS1377: 1990: Part 4, Clause 7 ‘Determination of California Bearing Ratio’. The results are presented as part of Appendix 4 with the geotechnical laboratory test data.

3.5. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and along with a site plan in Appendix 6.

4. Laboratory Testing

Geotechnical laboratory testing was completed on representative soil samples in accordance with BS 1377 (1990). Testing included:

- 3 No. Moisture contents
- 3 No. Atterberg limits
- 3 No. Particle size gradings
- 3 No. pH, sulphate and chloride content

Environmental testing was completed by ALS Environmental Ltd. and consists of the following:

- 3 No. Rilta Suite analysis
- 3 No. loss on ignition tests

The geotechnical laboratory test results are presented in Appendix 4 with the environmental tests reported in Appendix 5.

5. Ground Conditions

5.1. Overburden

MADE GROUND was encountered in four trial pits to the South East of the site. This extended to 2.10mbgl at TP02, although this terminated on pea gravel at 2.10mbgl and this may be due to a deep underground service in the soils so may be limited to a narrow area. TP03 and TP04 also recorded fill material to 0.95mbgl and 0.60mbgl respectively and to 0.20mgbl at TP05 across the small country road running through the site. The fill material consists of gravelly cobble and boulders overlying cohesive clay soils.

The natural ground conditions are consistent with cohesive soils dominating the site with brown grey overlying black slightly sandy slightly gravelly silty CLAY. The boundary between the CLAYs in the boreholes range from 0.70mbgl to 1.30mbgl but this ranges slightly deeper in the trial pits. The boundary is slightly deeper in the trial pits with it logged from 0.70mbgl (TP19) to 2.70mbgl (TP06) with ten pits not recording the black CLAY.

The SPT N-values are consistent with values ranging from 19 to 21 recorded at 1.00mbgl, increasing to 22 at 2.00mbgl where full tests were completed in BH01 and BH04. The trial pits

also encountered similar cohesive soils and the dynamic probes show a slow increase in blow counts as the probe was advanced into the soils.

The laboratory tests of the cohesive soils confirm that CLAY soils dominate the site with low plasticity indexes of 14 to 16% recorded. The particle size distribution curves were poorly sorted straight-line curves with 28% to 56% fines content.

5.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendix 1 and 2. Groundwater ingresses were recorded in two of the boreholes, BH01 and BH02, at 1.80mbgl and 1.40mbgl respectively. Both holes recorded that the ingresses were sealed off by the casings at 1.90mbgl and 1.60mbgl and suggests that these are small granular lenses with groundwater in the voids. Groundwater was also recorded in eleven of the thirty-nine trial pits during the fieldworks period and ranged in depth from 1.30mbgl to 2.40mbgl, with ingress rates of seepages to rapid ingresses recorded.

6. Recommendations and Conclusions

Please note the following caveats:

The recommendations given, and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

6.1. Shallow Foundations

Due to the unknown depth of foundation and no longer-term groundwater information, this analysis assumes the groundwater will not influence the construction or performance of these foundations.

SIL do not recommend that shallow foundations are placed on fill material due to the unknown compaction methods used during laying of man-made material. This unknown could result in softer spots and differential settlement of a building once construction is completed. If shallow foundations are to be used and man-made soils are encountered below foundation level, then this soil should be removed and replaced with engineered fill.

The boreholes encountered both brown CLAY and black CLAY at 1.00mbgl. The SPT N-values at this depth are good with values ranging from 19 to 22 and the dynamic probe counts would support these higher SPT N-values.

Using a correlation proposed by Stroud and Butler between SPT N-values and plasticity indices, the SPT N-value can be used to calculate the undrained shear strength. With the low to intermediate plasticity indexes recorded in the laboratory for the soils encountered on site, this correlation is C_u=6N. Therefore, using the lower value of 19, this indicates that the undrained shear strength of the CLAY is 114kN/m2. This can be used to calculate the ultimate bearing capacity, and this has been calculated to be 600kN/m^2. Finally, a factor of safety is applied and with a factor of 3, an allowable bearing capacity of 200kN/m^2 would be anticipated using the lower SPT values.

A suitably qualified Engineer should inspect the ground at each foundation and confirm that the soils are suitable for the final foundation design.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- Foundations are to be constructed on a level formation of uniform material type (described above).
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m^3.
- All bearing capacity calculations allow for a settlement of 25mm.

The trial pits indicate that excavations in the cohesive soils should be stable for a short while at least. However, regular inspection of temporary excavations should be completed during construction to ensure that all slopes are stable. Temporary support should be used on any excavation that will be left open for an extended period.

6.2. Groundwater

The caveats below relating to interpretation of groundwater levels should be noted:
There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously, groundwater was encountered in two of the boreholes and eleven of the trial pits during the fieldworks period. There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. However, based on this information at the exploratory hole locations to date, it is considered likely that any shallow ingress into excavations of the CLAY will be slow. If granular soils are encountered in shallow excavations, then the possibility of water ingressing into an excavation increase.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

6.3. Soakaway Tests

The soakaway tests failed the specification as the water level did not fall sufficiently enough to complete the tests. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The tests were terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation. The unsuitability of the soils for soakaways is further

suggested by the soil descriptions of the materials in this area of the site where the soakaway was completed, i.e. well compacted clay soils.

6.4. Pavement Design

The CBR test results in Appendix 4 indicate CBR values ranging from 5.8% to 11.6%.

The CBR samples were recovered from 0.50mbgl and inspection of the formation strata should be completed prior to construction of the pavement. Once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design.

6.5. Contamination

Environmental testing was carried out on three samples from the investigation and the results are shown in Appendix 5. For material to be removed from site, Rilta Suite testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill.

The Waste Classification report created using HazWasteOnline™ software shows that the material tested can be classified as non-hazardous material. The Total Petroleum Hydrocarbon (TPH) result from the TP03 sample did record a level above the limit of detection, but the level was low and not in liquid form so therefore, the sample can be recorded as non-hazardous.

Following this analysis of the solid test results, the leachate disposal suite results indicate that the soils tested would generally be able to be treated as Inert Waste.

Three samples were tested for analysis but it cannot be discounted that any localised contamination may have been missed. Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual landfill before acceptance and a testing regime designed by an environmental engineer would be recommended to satisfy the landfill.

6.6. Aggressive Ground Conditions

The chemical test results in Appendix 4 indicate a general pH value between 7.38 and 7.96, which is close to neutral and below the level of 9, therefore no special precautions are required.

The maximum value obtained for water soluble sulphate was 123mg/l as SO_3. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground'* guidelines require SO_4 values and after

conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 147mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1

Cable Percussive Borehole and

Rotary Corehole Logs and Photographs

Contract No: 5662	**Cable Percussion and Rotary Corehole Log**		Corehole No: **BH01**

Contract:	Kellystown	Easting:	706066.529	Date Started:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737456.859	Date Completed:	06/12/2019
Client:	Castlethorn	Elevation:	61.17	Drilled By:	J. O'Toole / MEDL
Engineer:	Waterman Moylan	Rig Type:	Dando 150 / Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
	0.10	TOPSOIL.		61.0	61.07						
		Brown slightly sandy gravelly silty CLAY.		60.5							
0.5											
1.0	1.10			60.0	60.07	N=21 (3,4/4,5,6,6) B / 1.00					
		Stiff black slightly sandy gravelly silty CLAY with low cobble content.		59.5							
1.5											
2.0				59.0		N=22 (3,3/3,6,7,6) B / 2.00					
2.5	2.50	Obstruction - weathered bedrock.			58.67						
	2.70	Open hole drilling: Driller reports weathered bedrock.		58.5	58.47	50 (25 for 5mm/50 for 0mm)					
	2.80	Very strong grey fine grained LIMESTONE. Fresh to slightly weathered.			58.37					9	
3.0		*Discontinuities - rough, planar, tight to open, sub-horizontal to 45° dip, clean with occasional staining.*		58.0							
3.5				57.5						Ni	
4.0											
4.5				57.0		2.80 - 5.80	92	67	48		
5.0				56.5						6	
5.5				56.0							
	5.80	End of Corehole at 5.80m		55.5	55.37						
6.0				55.0							
6.5				54.5							
7.0				54.0							
7.5				53.5							
8.0				53.0							
8.5				52.5							
9.0				52.0							
9.5				51.5							

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Sealed:	Water Details: Date:	Hole Depth:	Water Depth:	Installations: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
2.50	2.70	01:00	1.80	1.75	1.9	28/11	2.70	Dry				0.00	5.80	Arisings	-

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water

Contract No: 5662	**Cable Percussion and Rotary Corehole Log**		Corehole No: **BH02**

Contract:	Kellystown	Easting:	706041.742	Date Started:	27/11/2019
Location:	Porterstown, Dublin 15	Northing:	737508.553	Date Completed:	06/12/2019
Client:	Castlethorn	Elevation:	61.27	Drilled By:	J. O'Toole / MEDL
Engineer:	Waterman Moylan	Rig Type:	Dando 150 / Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
	0.10	TOPSOIL.			61.17						
		Brown slightly sandy gravelly silty CLAY.		61.0							
0.5											
	0.70	Stiff black slightly sandy gravelly silty CLAY with low cobble content.			60.57						
1.0				60.5		N=19 (3,4/4,5,5,5) B / 1.00					
1.5	1.50	Obstruction - boulder.		60.0	59.77						
	1.70	Open hole drilling: Driller reports sandy gravelly clay.			59.57	50 (25 for 5mm/50 for 0mm)					
2.0				59.5							
	2.20	Core run attempted - poor recovery - returns of dark grey MUDSTONE.			59.07						
2.5				59.0							
3.0				58.5		2.20 - 3.80	63	3	0		
3.5				58.0							
	3.80	Strong to very strong dark grey calcareous MUDSTONE. Fresh weathering state.		57.5	57.47					Ni	
4.0		*Discontinuities - rough, planar, tight to open, sub-horizontal dip, clean with occasional staining.*								15	
4.5				57.0						Ni	
				56.5							
5.0				56.0		3.80 - 6.80	91	85	65		
5.5										5	
6.0				55.5							
6.5				55.0							
	6.80	End of Corehole at 6.80m		54.5	54.47						
7.0				54.0							
7.5				53.5							
8.0				53.0							
8.5				52.5							
9.0				52.0							
9.5				51.5							

Chiselling:			Water Strikes:			Water Details:			Installations:			Backfill:			Remarks:
From:	To:	Time:	Strike:	Rose:	Sealed:	Date:	Hole Depth:	Water Depth:	From:	To:	Pipe:	From:	To:	Type:	-
1.50	1.70	01:00	1.40	1.30	1.6	27/11	1.70	Dry				0.00	6.80	Arisings	

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water

Contract No: 5662	**Cable Percussion and Rotary Corehole Log**				Corehole No: **BH03**
Contract:	Kellystown	Easting:	705739.563	Date Started:	25/11/2019
Location:	Porterstown, Dublin 15	Northing:	737540.229	Date Completed:	09/12/2019
Client:	Castlethorn	Elevation:	60.73	Drilled By:	J. O'Toole / MEDL
Engineer:	Waterman Moylan	Rig Type:	Dando 150 / Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
	0.20	TOPSOIL.			60.53						
		Brown slightly sandy gravelly silty CLAY.		60.5							
0.5											
	0.80	Stiff black slightly sandy gravelly silty CLAY with low cobble content.		60.0	59.93	N=17 (3,3/4,4,4,5) B / 1.00					
1.0				59.5							
1.5	1.50	Obstruction - boulder.			59.23						
	1.60	Open hole drilling: Driller reports sandy gravelly clay.		59.0	59.13	50 (25 for 5mm/50 for 0mm)					
2.0				58.5							
2.5											
3.0				58.0							
3.5				57.5							
				57.0							
4.0	4.00	Strong to very strong dark grey calcareous MUDSTONE. Fresh weathering state.			56.73					Ni	
		Discontinuities - rough, planar, tight to open, sub-horizontal dip, clean with occasional staining.		56.5						13	
4.5										7	
				56.0							
5.0										10	
				55.5							
5.5						4.00 - 7.00	100	85	60		
				55.0							
6.0										6	
				54.5							
6.5											
				54.0							
7.0	7.00	End of Corehole at 7.00m			53.73						
				53.5							
7.5											
				53.0							
8.0											
				52.5							
8.5											
				52.0							
9.0											
				51.5							
9.5											
				51.0							

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Sealed:	Water Details: Date:	Hole Depth:	Water Depth:	Installations: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.50	1.60	01:00				25/11	1.60	Dry				0.00	7.00	Arisings	-

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water

Contract No: 5662	**Cable Percussion and Rotary Corehole Log**		Corehole No: **BH04**

Contract:	Kellystown	Easting:	705975.213	Date Started:	25/11/2019
Location:	Porterstown, Dublin 15	Northing:	737597.506	Date Completed:	09/12/2019
Client:	Castlethorn	Elevation:	60.78	Drilled By:	J. O'Toole / MEDL
Engineer:	Waterman Moylan	Rig Type:	Dando 150 / Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5	0.20	TOPSOIL.		60.5	60.58						
		Firm brown slightly sandy gravelly silty CLAY.									
1.0				60.0		N=14 (3,3/3,4,3,4) B / 1.00					
1.5	1.30	Stiff black slightly sandy gravelly silty CLAY with low cobble content.		59.5	59.48						
2.0				59.0		N=16 (3,3/3,4,4,5) B / 2.00					
2.5	2.60	Obstruction - weathered bedrock.		58.5	58.18	50 (25 for 5mm/50 for 0mm)					
	2.70				58.08						
	2.80	Open hole drilling: Driller reports weathered bedrock.		58.0	57.98					Ni	
		Discontinuities - rough, planar, tight to open, sub-horizontal dip, clean with occasional staining.									
3.5		Very strong grey fine grained LIMESTONE. Fresh to slightly weathered.		57.5						11	
				57.0						20	
4.0						2.70 - 5.70	100	83	24		
4.5				56.5							
5.0				56.0						11	
5.5				55.5							
	5.80	End of Corehole at 5.70m		55.0	54.98						
6.0				54.5							
6.5											
7.0				54.0							
7.5				53.5							
8.0				53.0							
8.5				52.5							
9.0				52.0							
9.5				51.5							
				51.0							

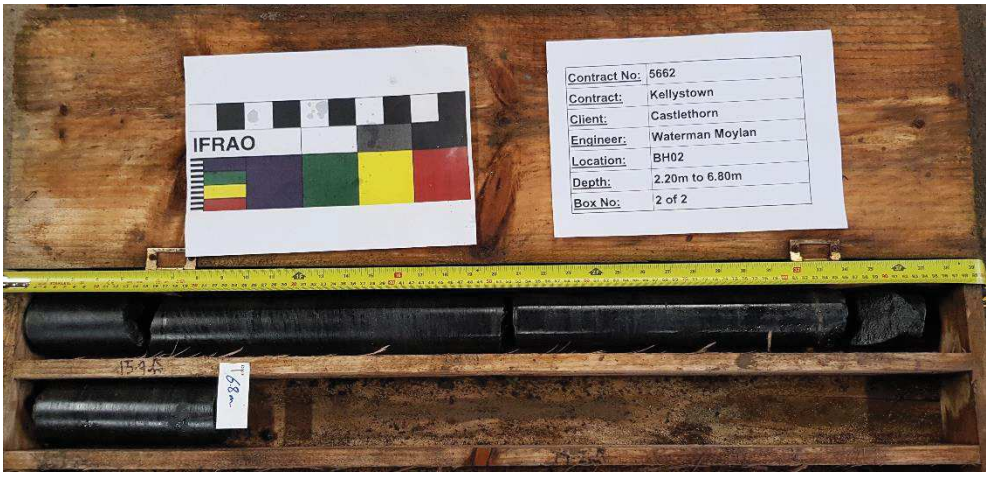
Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Sealed:	Water Details: Date:	Hole Depth:	Water Depth:	Installations: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
2.60	2.60	01:00				25/11	2.60	Dry				0.00	5.70	Arisings	-

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water

RC01 Box 1 of 1

RC02 Box 1 of 2

RC02 Box 2 of 2



RC03 Box 1 of 1

RC04 Box 1 of 1

Appendix 2

Trial Pit and Dynamic Probe Logs and Photographs

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP01**
Contract:	Kellystown	Easting:	706061.699	Date:	27/11/2019
Location:	Porterstown, Dublin 15	Northing:	737437.955	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.21	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 2.40	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.10	TOPSOIL.			61.11			1	
		Stiff brown grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.0		0.50	B	4, 7, 10, 12, 18	
0.5								24	
				60.5				17, 21	
1.0						1.00	B	15, 14	
	1.20				60.01			9	
		Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		60.0				18, 24, 27, 35	
1.5									
				59.5					
2.0									
				59.0					
	2.40				58.81				
2.5		Obstruction - possible boulders or bedrock. **Pit terminated at 2.40m**							
				58.5					
3.0									
				58.0					
3.5									
				57.5					
4.0									
				57.0					
4.5									
				56.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP02**
Contract:	Kellystown	Easting:	706091.521	Date:	27/11/2019
Location:	Porterstown, Dublin 15	Northing:	737509.203	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.26	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.80 x 0.40 x 2.10	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0	0.30	MADE GROUND: grey gravelly cobbles and boulders.		61.0	60.96	1.00	B	1, 4, 11, 14, 8, 6, 7, 13	
0.5	0.80	MADE GROUND: black slightly sandy gravelly silty clay with high cobble and low boulder content with some rags.		60.5	60.46			4, 5, 4, 13, 7, 5, 8, 5, 7, 14, 26, 35	
1.0		MADE GROUND: black slightly sandy gravelly silty clay with high cobble and low boulder content.		60.0		2.00	B		
1.5				59.5					
2.0	2.10	MADE GROUND: grey fine to medium gravel. **Pit terminated at 2.10m**		59.0	59.16				
2.5				58.5					
3.0				58.0					
3.5				57.5					
4.0				57.0					
4.5				56.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible service	Minor collapse of pit walls.	Dry	Pea gravel at 2.10mbgl - possibly overlying service.	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP03**
Contract:	Kellystown	Easting:	705998.201	Date:	27/11/2019
Location:	Porterstown, Dublin 15	Northing:	737457.656	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	62.19	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.80 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5		MADE GROUND: brown slightly sandy gravelly silty clay with high cobble and low boulder content with some red brick and tarmacadam fragments.		62.0		0.50	ES	1, 3, 5, 12, 15, 19	
1.0	0.95	Stiff brown grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.5	61.24	1.00	B	10, 7, 8, 12, 14, 11	
1.5				61.0				15, 19, 24, 27, 35	
2.0				60.5					
2.5	2.20	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		60.0	59.99	2.50	B		
3.0	3.00	**Pit terminated at 3.00m**		59.5	59.19				
3.5				59.0					
4.0				58.5					
4.5				58.0					
				57.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP04**
Contract:	Kellystown	Easting:	706028.269	Date:	27/11/2019
Location:	Porterstown, Dublin 15	Northing:	737511.536	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.25	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.20 x 0.40 x 2.10	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.05	TOPSOIL.			61.20			1	
	0.15	MADE GROUND: grey gravelly cobbles and boulders.			61.10			19	
		MADE GROUND: grey slightly sandy gravelly silty clay with high cobble and medium boulder content.		61.0				18	
0.5								15	
						0.50	B	12	
	0.60	Stiff brown grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.65			25	
								14	
				60.5				8	
1.0								7	
								10	
								17	
								14	
				60.0				9	
								6	
1.5								16	
						1.50	B	18	
								11	
				59.5				25	
								35	
2.0									
	2.10	Obstruction - possible boulders or bedrock. **Pit terminated at 2.10m**			59.15				
				59.0					
2.5									
				58.5					
3.0									
				58.0					
3.5									
				57.5					
4.0									
				57.0					
4.5									
				56.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP05**
Contract:	Kellystown	Easting:	705949.850	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737466.642	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.89	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 2.60	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.10	TOPSOIL.			61.79			2	
	0.20	MADE GROUND: grey gravelly cobbles and boulders.			61.69			12	
	0.30	TOPSOIL.			61.59			10	
0.5		Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.5				7 4 3 4 3 3 4	
1.0				61.0		1.00	B		
	1.10	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.79			7 10 8 9	
1.5				60.5		1.50	B	12 12 8 9	▼
	1.90	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		60.0	59.99			19	
2.0						2.10	B	27 35	
2.5				59.5					
	2.60	Obstruction - possible boulders or bedrock. **Pit terminated at 2.60m**			59.29				
3.0				59.0					
3.5				58.5					
4.0				58.0					
4.5				57.5					
				57.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	1.70 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP06**
Contract:	Kellystown	Easting:	705968.854	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737523.898	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.89	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.90 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.00	TOPSOIL.			61.69			1	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.5		0.50 0.50	B ES	2 2 3 3 9	
0.5								8 7	
	0.80	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.0	61.09			12 13 11	
1.0								16 14	
				60.5				16 17	
1.5						1.50	B	13 14	
2.0				60.0				10 10 9 9	
								18 35	
2.5				59.5					
	2.70	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).			59.19	2.80	B		
3.0	3.00	**Pit terminated at 3.00m**		59.0	58.89				
3.5				58.5					
4.0				58.0					
				57.5					
4.5									
				57.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP07**
Contract:	Kellystown	Easting:	705980.829	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737566.711	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.11	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.90 x 0.40 x 2.50	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.		61.0				1	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.91			2 3 7 9	
0.5				60.5				5	
	0.70	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.41			4 4 5 5	
1.0				60.0		1.00	B	4 5 6 5	
1.5				59.5				6 5 8 9	
2.0				59.0				14 18 26 35	
	2.40				58.71				
2.5	2.50	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		58.5	58.61	2.50	B		
		Obstruction - possible boulders or bedrock.							
3.0		**Pit terminated at 2.50m**		58.0					
3.5				57.5					
4.0				57.0					
4.5				56.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP08**
Contract:	Kellystown	Easting:	705961.176	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737541.093	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.65	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 2.60	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0	0.20	TOPSOIL.		61.5	61.45			1	
	0.40	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			61.25			2 2 3 5	
0.5								4	
	0.90	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.0	60.75			7 21 19	
1.0		Stiff brown grey slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).				1.00	B	14 12 12 10 7	
1.5				60.5				10 11	
	1.80	Very stiff brown grey slightly sandy gravelly silty CLAY with high cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		60.0	59.85			10 9 11 17	
2.0						2.00	B	35	
2.5	2.60	Obstruction - possible boulders or bedrock. **Pit terminated at 2.60m**		59.5 59.0	59.05				
3.0				58.5					
3.5				58.0					
4.0				57.5					
4.5				57.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP09**
Contract:	Kellystown	Easting:	705958.291	Date:	26/11/2019
Location:	Porterstown, Dublin 15	Northing:	737510.084	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.74	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.20 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.						1	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.5	61.54	0.50	B	2 3 2 2 2 3	
0.5	0.60	Stiff brown grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.0	61.14			13 11 10 11 15 19 24 28 32 35	
1.0									
1.5				60.5		1.50	B		
	1.70	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		60.0	60.04				
2.0									
2.5				59.5					
				59.0					
3.0	3.00	**Pit terminated at 3.00m**			58.74	3.00	B		
3.5				58.5					
4.0				58.0					
4.5				57.5					
				57.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP10**
Contract:	Kellystown	Easting:	705952.670	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737577.442	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.65	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.90 x 0.40 x 2.70	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.20	TOPSOIL.		60.5	60.45			0 1 2 3 2 3 2 3 3 3	
1.0	1.10	Firm brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		60.0	59.55	1.00	B	5 8 8 9 16 20 23 19 16	
1.5		Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		59.5					
2.0	2.70	Obstruction - possible boulders or bedrock. **Pit terminated at 2.70m**		59.0	57.95	2.00	B	35	
2.5				58.5					
3.0				58.0					
3.5				57.5					
4.0				57.0					
4.5				56.5					
				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP11**
Contract:	Kellystown	Easting:	705931.128	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737482.664	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.88	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.20 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.00	TOPSOIL.			61.68			1	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.5				3 3 3 2 3 2 3 3	
	0.90	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.0	60.98	1.00	B	5 9 9 7 8 11 10 7 12 23 31 35	
	2.00	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		60.5 60.0 59.5	59.88	2.50	B		
	3.00	**Pit terminated at 3.00m**		59.0	58.88				
				58.5 58.0 57.5 57.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP12**
Contract:	Kellystown	Easting:	705839.339	Date:	29/11/2019
Location:	Porterstown, Dublin 15	Northing:	737497.150	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.58	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.20	TOPSOIL.		61.5	61.38			1	
		Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.						2	
								2	
								3	
								2	
								3	
				61.0				1	
	0.70	Stiff becoming very stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.88			3	
1.0								4	
						1.00	B	2	
				60.5				4	
								5	
								4	
1.5								8	
								8	
				60.0				6	
								5	
2.0								4	
								4	
								6	
				59.5				8	
								8	
								12	
								17	
2.5								25	
						2.50	B	35	
				59.0					
3.0	3.00	**Pit terminated at 3.00m**			58.58				
				58.5					
3.5									
				58.0					
4.0									
				57.5					
4.5									
				57.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	2.30 Medium	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP13**
Contract:	Kellystown	Easting:	705899.897	Date:	29/11/2019
Location:	Porterstown, Dublin 15	Northing:	737517.227	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	62.50	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.80 x 0.40 x 2.50	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0	0.20	TOPSOIL.		62.0	62.30			1, 2, 2	
0.5		Stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.						7, 6, 6, 8, 10, 10, 10	
1.0				61.5		1.00	B	28, 26	
	1.30	Very stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			61.20			17, 15, 19, 24, 29, 35	
1.5				61.0					
2.0				60.5		2.00	B		
	2.10	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).			60.40				
2.5	2.50	Obstruction - possible boulders or bedrock.		60.0	60.00	2.40	B		
		Pit terminated at 2.50m							
3.0				59.5					
3.5				59.0					
4.0				58.5					
4.5				58.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP14**
Contract:	Kellystown	Easting:	705910.723	Date:	29/11/2019
Location:	Porterstown, Dublin 15	Northing:	737547.182	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.69	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 2.40	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.20	TOPSOIL.		61.5	61.49			0 2 2 3 3 3 3 3 3	
1.0		Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.0		1.00	B	8 8	
	1.10	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		60.5	60.59			6 5 3	
1.5						1.50	B	4 3 3 3 3	
2.0				60.0				4 5 7	
2.5	2.40	Obstruction - boulders. **Pit terminated at 2.40m**		59.5	59.29			12 12 18 29 35	
3.0				59.0					
3.5				58.5					
4.0				58.0					
4.5				57.5					
				57.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP15**
Contract:	Kellystown	Easting:	705887.712	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737549.128	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.82	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.						0	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			61.62	0.50 0.50	B ES	1 2 2 2 1 2 1 1 2 2 2	
	1.20	Firm becoming stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.62	1.50	B	3 5 6 3 3 3 3 4 6 8 12 14 16 16 29 35	
	3.00	**Pit terminated at 3.00m**			58.82				

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP16**
Contract:	Kellystown	Easting:	705820.103	Date:	29/11/2019
Location:	Porterstown, Dublin 15	Northing:	737528.588	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.96	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.20 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.						0	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.76			3	
0.5				60.5				2	
	0.80	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.16			2	
								2	
								3	
								3	
								3	
								3	
1.0				60.0		1.00	B	5	
								5	
								6	
								6	
								9	
1.5				59.5				8	
								9	
	1.70	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).			59.26			8	
								11	
								16	
2.0				59.0		2.00	B	24	
								35	
2.5				58.5					
3.0	3.00	**Pit terminated at 3.00m**		58.0	57.96				
3.5				57.5					
4.0				57.0					
4.5				56.5					
				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP17**
Contract:	Kellystown	Easting:	705784.809	Date:	29/11/2019
Location:	Porterstown, Dublin 15	Northing:	737511.471	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.74	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.90 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0	0.20	TOPSOIL.		60.5	60.54	1.00	B	1 2 2 3 2 4 9 9 11 14 19 21 8 7 6 7 12 19 21 24 29 35	▼
0.5		Firm becoming stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		60.0					
1.0									
1.5				59.5					
2.0				59.0					
2.5				58.5		2.50	B		
3.0	3.00	**Pit terminated at 3.00m**		58.0	57.74				
3.5				57.5					
4.0				57.0					
4.5				56.5					
				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Minor collapse of pit walls.	2.10 Slow	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP18**
Contract:	Kellystown	Easting:	705790.803	Date:	29/11/2019
Location:	Porterstown, Dublin 15	Northing:	737540.254	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.67	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.		60.5	60.47			0	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.						1	
0.5								2	
								2	
								2	
								2	
				60.0				3	
								4	
	0.90				59.77			2	
1.0		Firm brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse.				1.00	B	3	
	1.10	Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			59.57			3	
				59.5				5	
								7	
								10	
1.5		Stiff becoming very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).				1.50	B	8	
				59.0				9	
								8	
								15	
2.0								14	
								19	
								24	
				58.5				27	
								32	
2.5								35	
						2.50	B		
				58.0					
3.0	3.00	**Pit terminated at 3.00m**			57.67				
				57.5					
3.5									
				57.0					
4.0									
				56.5					
4.5									
				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP19**
Contract:	Kellystown	Easting:	705762.342	Date:	26/11/2019
Location:	Porterstown, Dublin 15	Northing:	737532.911	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.95	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.			60.75			1 1 2 3 2 3 3 3 4 3 2 3 4 5 5 5 6 8 8 7 8 9 12 11 10 14 25 35	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		60.5	60.45				
0.5	0.50	Firm brown grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.25				
	0.70	Stiff becoming very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		60.0		1.00	B		
1.0									
1.5				59.5					
				59.0		2.00	B		
2.0									
2.5				58.5					
						2.80	B		
3.0	3.00	**Pit terminated at 3.00m**		58.0	57.95				
3.5				57.5					
4.0				57.0					
4.5				56.5					
				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	2.40 Medium	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP20**
Contract:	Kellystown	Easting:	705715.182	Date:	26/11/2019
Location:	Porterstown, Dublin 15	Northing:	737540.018	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.24	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.10 x 0.40 x 1.50	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.		60.0	59.94			2	
	0.30	Firm light brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.						2 3 2 3 4 3 3	
0.5				59.5					
	0.90	Stiff brown grey slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).			59.34	1.00	B	5 6 4 9	
1.0				59.0				17	
1.5	1.50	Obstruction - possible boulders or bedrock. **Pit terminated at 1.50m**			58.74			35	
2.0				58.5					
				58.0					
2.5									
				57.5					
3.0									
				57.0					
3.5									
				56.5					
4.0									
				56.0					
4.5									
				55.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP21**
Contract:	Kellystown	Easting:	705801.936	Date:	29/11/2019
Location:	Porterstown, Dublin 15	Northing:	737607.409	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.20	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.20	TOPSOIL.		60.0	60.00			0 1 2 2 3 3 3 2 3 3 5 4 6 8 7 12 17 23 35	
		Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		59.5					
1.0	0.90	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		59.0	59.30	1.00	B		
1.5	1.50	Very black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		58.5	58.70				▼
2.0				58.0		2.00	B		
2.5				57.5					
3.0	3.00	**Pit terminated at 3.00m**			57.20				
3.5				57.0					
4.0				56.5					
4.5				56.0					
				55.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	1.60 Medium	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP22**
Contract:	Kellystown	Easting:	705824.790	Date:	29/11/2019
Location:	Porterstown, Dublin 15	Northing:	737570.436	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.22	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.90 x 0.40 x 2.50	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.		60.0	60.02			0	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.						1	
0.5								1	
	0.80	Firm brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		59.5	59.42			1	
1.0						1.00	B	2	
				59.0				3	
1.5								4	
	1.60	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		58.5	58.62			4	
2.0						2.00	B	4	
				58.0				3	
2.5	2.50	Obstruction - possible boulders or bedrock. **Pit terminated at 2.50m**			57.72			2	
				57.5				2	
3.0								2	
				57.0				2	
3.5								3	
				56.5				7	
4.0								18	
				56.0				23	
4.5								35	
				55.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP23**
Contract:	Kellystown	Easting:	705840.489	Date:	29/11/2019
Location:	Porterstown, Dublin 15	Northing:	737601.985	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.18	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.80 x 0.40 x 2.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.30	TOPSOIL.		60.0	59.88			0 1 1 2 1 2 1 2 3 3 2 3 1 2 4 8 12 11 16 20 28 31 35	
1.0		Firm brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		59.5		1.00	B		
1.5	1.70	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		59.0					
2.0	2.00	Obstruction - boulders.		58.5	58.48				▼
2.5		**Pit terminated at 2.00m**		58.0	58.18	2.00	B		
3.0				57.5					
3.5				57.0					
4.0				56.5					
4.5				56.0					
				55.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	1.90 Medium	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP24**
Contract:	Kellystown	Easting:	705867.394	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737570.820	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.72	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 2.20	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.		60.5	60.52			1	
	0.20	Firm becoming stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.						2 2 3 5 6 12	
0.5				60.0				8 10	
1.0						1.00	B	8 6 17	
				59.5				24 8 11	
1.5	1.50	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).			59.22			6 13	
				59.0				9 14	
2.0						2.00	B	15 19	
	2.20	Obstruction - possible boulders or bedrock. **Pit terminated at 2.20m**		58.5	58.52			26 35	
2.5									
				58.0					
3.0									
				57.5					
3.5									
				57.0					
4.0									
				56.5					
4.5									
				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP25**
Contract:	Kellystown	Easting:	705883.358	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737579.562	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.54	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 2.60	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0	0.20	TOPSOIL.		60.5	60.34	1.00	B	2, 2, 2, 5, 5, 7, 8, 11, 6, 6, 8, 6, 4, 6, 8, 10, 10, 10, 12, 11, 13, 12, 14, 14, 16, 24, 35	▼
0.5		Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		60.0					
1.0				59.5					
1.5	1.40	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		59.0	59.14				
2.0				58.5		2.00	B		
2.5	2.60	Obstruction - possible boulders or bedrock. **Pit terminated at 2.60m**		58.0	57.94				
3.0				57.5					
3.5				57.0					
4.0				56.5					
4.5				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	2.40 Medium	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP26**
Contract:	Kellystown	Easting:	705914.200	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737588.331	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.39	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.90 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.						0	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.19			1	
0.5	0.60	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		60.0	59.79			2 4 6 8 7 5 6 7	
1.0				59.5		1.00	B		
	1.20	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).			59.19			12 16 14 19 21 24 24 31 35	
1.5				59.0					
2.0				58.5		2.00	B		
	2.10	Grey silty sandy fine to coarse, subangular to subrounded GRAVEL of limestone with high cobble content. Sand is fine to coarse. Cobbles are angular to subangular of limestone.			58.29				
2.5				58.0		2.50	B		
3.0	3.00	**Pit terminated at 3.00m**		57.5	57.39				
3.5				57.0					
4.0				56.5					
4.5				56.0					
				55.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP27**
Contract:	Kellystown	Easting:	705882.318	Date:	27/11/2019
Location:	Porterstown, Dublin 15	Northing:	737602.217	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.25	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 1.50	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0	0.20	TOPSOIL.		60.0	60.05	1.00	B	1 3 2 3 3 4 5 4 4 5 6	
0.5		Firm becoming stiff brown grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		59.5					
1.0	1.10				59.15				
1.5	1.50	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		59.0		1.40	B	12 12 9 9 11 15 15 14	
		Obstruction - boulders.			58.75				
2.0		**Pit terminated at 1.50m**		58.5				7 7 8 12 13 35	
2.5				58.0					
3.0				57.5					
3.5				57.0					
4.0				56.5					
4.5				56.0					
				55.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP28**
Contract:	Kellystown	Easting:	705880.619	Date:	27/11/2019
Location:	Porterstown, Dublin 15	Northing:	737637.530	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.36	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.40 x 0.40 x 2.10	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.						1	
	0.20				60.16			1	
		Firm brown grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		60.0				3	
0.5								3	
								3	
								3	
								2	
								4	
	0.90			59.5	59.46			6	
1.0		Stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).				1.00	B	6	
								6	
								5	
	1.30			59.0	59.06			10	
		Medium dense becoming dense grey silty sandy fine to coarse, subangular to subrounded GRAVEL of limestone with high cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).						14	
1.5						1.50	B	12	
								29	
				58.5				35	
2.0						2.00	B		
	2.10				58.26				
		Obstruction - possible boulders or bedrock.							
		Pit terminated at 2.10m		58.0					
2.5									
				57.5					
3.0									
				57.0					
3.5									
				56.5					
4.0									
				56.0					
4.5									
				55.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	1.30 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP29**
Contract:	Kellystown	Easting:	705913.542	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737616.906	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.52	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.10 x 0.40 x 2.30	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.20	TOPSOIL.		60.0	60.32			0 1 2 3 5 18 12 8 8 13 10 8 10 25 35	
1.0		Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		59.5		1.00	B		
1.5	1.70	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		59.0	58.82				
2.0				58.5		2.00	B		
2.5	2.30	Obstruction - possible boulders or bedrock. **Pit terminated at 2.30m**		58.0	58.22				
3.0				57.5					
3.5				57.0					
4.0				56.5					
4.5				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP30**
Contract:	Kellystown	Easting:	705932.691	Date:	27/11/2019
Location:	Porterstown, Dublin 15	Northing:	737635.516	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.96	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.30 x 0.40 x 2.30	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.40	TOPSOIL.		60.5	60.56			1 2 2 2 2 3 3 4	
1.0	0.90	Firm brown grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		60.0	60.06	1.00	B	7 7 9 7 8	
1.5		Stiff becoming very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		59.5				26 35	
2.0	2.30	Obstruction - possible boulders or bedrock. **Pit terminated at 2.30m**		59.0	58.66	2.20	B		
2.5				58.5					
3.0				58.0					
3.5				57.5					
4.0				57.0					
4.5				56.5					
				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP31**
Contract:	Kellystown	Easting:	705953.624	Date:	26/11/2019
Location:	Porterstown, Dublin 15	Northing:	737617.591	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.90	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.80 x 0.40 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0	0.20	TOPSOIL.		60.5	60.70			1, 1	
0.5		Stiff brown grey slightly sandy slightly gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.						5, 8, 8, 5, 4, 5, 6, 6	
1.0	1.10			60.0	59.80	1.00	B	8, 10	
1.5		Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		59.5		1.50	B	15, 17, 19, 19, 21, 28, 35	
	1.70	Dense grey silty sandy fine to coarse, subangular to subrounded GRAVEL of limestone with high cobble content. Sand is fine to coarse. Cobbles are angular to subangular of limestone.		59.0	59.20	2.00	B		
2.0									
2.5				58.5					
3.0	3.00	**Pit terminated at 3.00m**		58.0	57.90				
3.5				57.5					
4.0				57.0					
4.5				56.5					
				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP32**
Contract:	Kellystown	Easting:	705936.057	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737601.948	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.54	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 2.50	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.20	TOPSOIL.		60.5	60.34			0 1 1 2 2 2 3 4 3 4 4 7 5 6 11 13 18 18 35	
1.0		Firm brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		60.0		1.00	B		
1.5	1.10	Stiff becoming very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).		59.5	59.44				
2.0				59.0					
2.5	2.50	Obstruction - possible boulders or bedrock. **Pit terminated at 2.50m**		58.5	58.04	2.00	B		
3.0				58.0					
3.5				57.5					
4.0				57.0					
4.5				56.5					
				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP33**
Contract:	Kellystown	Easting:	705995.038	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737589.348	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	60.59	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 1.60	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.20	TOPSOIL.		60.5	60.39			2	
		Firm becoming stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.						1	
								2	
								2	
								2	
								2	
								2	
1.0				60.0				6	
								4	
						1.00	B	4	
				59.5				5	
1.5	1.20	Stiff becoming very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).			59.39			6	
								5	
								5	
						1.50	B	13	
	1.60	Obstruction - possible boulders or bedrock.		59.0	58.99			21	
		Pit terminated at 1.60m						35	
2.0				58.5					
2.5				58.0					
3.0				57.5					
3.5				57.0					
4.0				56.5					
4.5				56.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP34**
Contract:	Kellystown	Easting:	706012.125	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737637.917	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.19	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.80 x 0.40 x 1.60	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.						0	
	0.20	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.0	60.99			2	
0.5								1	
				60.5				2	
								3	
								3	
								5	
	0.90	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.29	1.00	B	5	
1.0				60.0				6	
								9	
								8	
								5	
								5	
1.5	1.50	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).			59.69	1.50	B	11	
	1.60	Obstruction - possible boulders or bedrock.		59.5	59.59			35	
2.0		**Pit terminated at 1.60m**							
				59.0					
2.5									
				58.5					
3.0									
				58.0					
3.5									
				57.5					
4.0									
				57.0					
4.5									
				56.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP35**
Contract:	Kellystown	Easting:	705985.469	Date:	28/11/2019
Location:	Porterstown, Dublin 15	Northing:	737672.796	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.58	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.60 x 0.40 x 2.60	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.10	TOPSOIL.		61.5	61.48			0	
		Firm brown grey slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.						1	
	0.60	Firm brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.0	60.98			2	
1.0								3	
								3	
								3	
								2	
								3	
								2	
						1.00	B	2	
				60.5				2	
	1.20				60.38			3	
		Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).						7	
1.5								10	
								9	
						1.50	B	10	
				60.0				11	
	1.80				59.78			10	
		Medium dense grey silty sandy fine to coarse, subangular to subrounded GRAVEL of limestone with high cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).						10	
2.0								10	
						2.00	B	14	
				59.5				13	
								9	
								35	▼
2.5	2.60	Obstruction - possible boulders or bedrock.		59.0	58.98				
		Pit terminated at 2.60m							
3.0				58.5					
3.5				58.0					
4.0				57.5					
4.5				57.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	2.40 Slow	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP36**
Contract:	Kellystown	Easting:	706033.157	Date:	25/11/2019
Location:	Porterstown, Dublin 15	Northing:	737679.038	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.86	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 1.80	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.			61.66			0 2 2 3 3 4 4 2 2 9 28 27 31 35	
	0.20	Firm light brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.5					
0.5	0.70	Firm brown grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			61.16				
				61.0					
1.0	1.10	Very stiff black slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			60.76	1.00	B		
				60.5					
1.5						1.50	B		
	1.80	Obstruction - possible boulders or bedrock. **Pit terminated at 1.80m**			60.06				
2.0				60.0					
				59.5					
2.5									
				59.0					
3.0									
				58.5					
3.5									
				58.0					
4.0									
				57.5					
4.5									
				57.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	1.80 Slow	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP37**
Contract:	Kellystown	Easting:	705999.491	Date:	25/11/2019
Location:	Porterstown, Dublin 15	Northing:	737710.735	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.90	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.10 x 0.40 x 1.10	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.10	TOPSOIL.		61.5	61.80	1.00	B	2	
	0.30	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			61.60			3	
		Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.0				7	
1.0	1.10	Obstruction - boulders.			60.80			11	
		Pit terminated at 1.10m		60.5				24	
1.5								21	
2.0				60.0				23	
2.5				59.5				25	
3.0				59.0				25	
3.5				58.5				27	
4.0				58.0				29	
4.5				57.5				29	
				57.0				30	
								31	
								35	

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP38**
Contract:	Kellystown	Easting:	706025.992	Date:	25/11/2019
Location:	Porterstown, Dublin 15	Northing:	737712.636	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	61.95	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.20 x 0.40 x 1.80	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0	0.20	TOPSOIL.		61.5	61.75			1	
0.5		Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.						1 3 6 11 10 13 19 24	
1.0	1.00	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.0	60.95	0.90	B	21 18 35	
1.5				60.5		1.50	B		
	1.70				60.25				
	1.80	Grey silty sandy fine to coarse, subangular to subrounded GRAVEL of limestone with high cobble content. Sand is fine to coarse. Cobbles are angular to subangular of limestone.			60.15				▼
2.0		Obstruction - possible boulders or bedrock.		60.0					
		Pit terminated at 1.80m							
2.5				59.5					
3.0				59.0					
3.5				58.5					
4.0				58.0					
4.5				57.5					
				57.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	1.80 Rapid	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5662	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP39**
Contract:	Kellystown	Easting:	706042.152	Date:	25/11/2019
Location:	Porterstown, Dublin 15	Northing:	737711.912	Excavator:	JCB 3CX
Client:	Castlethorn	Elevation:	62.04	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	4.00 x 0.40 x 2.70	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.		62.0				1	
	0.30	Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.			61.74			2	
0.5								2	
	0.70	Stiff brown grey slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles are angular to subangular of limestone.		61.5	61.34			9	
								13	
								18	
								23	
								27	
								29	
1.0				61.0		1.00	B	31	
								32	
								32	
1.5				60.5				35	
2.0				60.0		2.00	B		
	2.20	Very stiff black slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Cobbles and boulders are angular to subangular of limestone (up to 400mm diameter).			59.84				
2.5				59.5		2.50	B		
	2.70	Obstruction - possible boulders or bedrock.			59.34				
		Pit terminated at 2.70m							
3.0				59.0					
3.5				58.5					
4.0				58.0					
4.5				57.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

TP01 Sidewall

TP01 Spoil

TP02 Sidewall

TP02 Spoil

TP03 Sidewall

TP03 Spoil

TP04 Sidewall

TP04 Spoil

TP05 Sidewall

TP05 Spoil

TP06 Sidewall

TP06 Spoil

TP07 Sidewall

TP07 Spoil

TP08 Sidewall

TP08 Spoil

TP09 Sidewall

TP09 Spoil

TP10 Sidewall

TP10 Spoil

TP11 Sidewall

TP11 Spoil

TP12 Sidewall

TP12 Spoil

TP13 Sidewall

TP13 Spoil

TP14 Sidewall

TP14 Spoil

TP15 Sidewall

TP15 Spoil

TP16 Sidewall

TP16 Spoil

TP17 Sidewall

TP17 Spoil

TP18 Sidewall

TP18 Spoil

TP19 Sidewall

TP19 Spoil

TP20 Sidewall

TP20 Spoil

TP21 Sidewall

TP21 Spoil

TP22 Sidewall

TP22 Spoil

TP23 Sidewall

TP23 Spoil

TP24 Sidewall

TP24 Spoil

TP25 Sidewall

TP25 Spoil

TP26 Sidewall

TP26 Spoil

TP27 Sidewall

TP27 Spoil

TP28 Sidewall

TP28 Spoil

TP29 Sidewall

TP29 Spoil

TP30 Sidewall

TP30 Spoil

TP31 Sidewall

TP31 Spoil

TP32 Sidewall

TP32 Spoil

TP33 Sidewall

TP33 Spoil

TP34 Sidewall

TP34 Spoil

TP35 Sidewall

TP35 Spoil

TP36 Sidewall

TP36 Spoil

TP37 Sidewall

TP37 Spoil

TP38 Sidewall

TP38 Spoil

TP39 Photographs Missing

Appendix 3

Soakaway Test Results

SOAKAWAY TEST

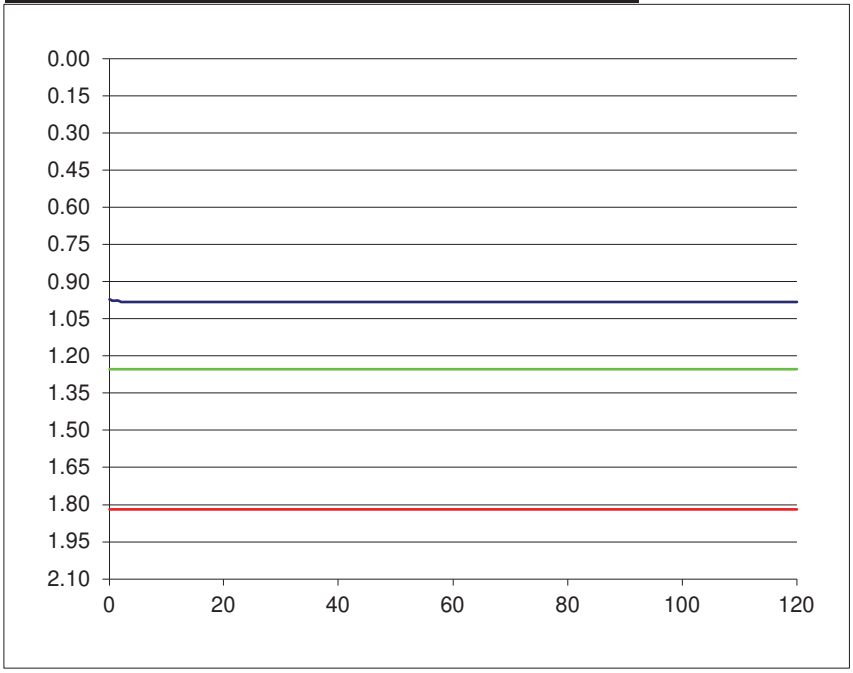
Project Reference:	5662
Contract name:	Residential Development
Location:	Kellystown, Porterstown, Dublin 15
Test No:	SA01
Date:	27/11/2019

Ground Conditions

From	To	
0.00	0.20	TOPSOIL.
0.20	0.80	Firm grey brown slightly sandy gravelly silty CLAY with high cobble content.
0.80	2.10	Firm grey slightly sandy gravelly silty CLAY with high cobble and low boulder content.

Elapsed Time (mins)	Fall of Water (m)
0	0.97
0.5	0.98
1	0.98
1.5	0.98
2	0.98
2.5	0.98
3	0.98
3.5	0.98
4	0.98
4.5	0.98
5	0.98
6	0.98
7	0.98
8	0.98
9	0.98
10	0.98
12	0.98
14	0.98
16	0.98
18	0.98
20	0.98
25	0.98
30	0.98
40	0.98
50	0.98
60	0.98
75	0.98
90	0.98
120	0.98

Pit Dimensions (m)		
Length (m)	2.70	m
Width (m)	0.40	m
Depth	2.10	m
Water		
Start Depth of Water	0.97	m
Depth of Water	1.13	m
75% Full	1.25	m
25% Full	1.82	m
75%-25%	0.57	m
Volume of water (75%-25%)	**0.61**	m3
Area of Drainage	**13.02**	m2
Area of Drainage (75%-25%)	**4.583**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

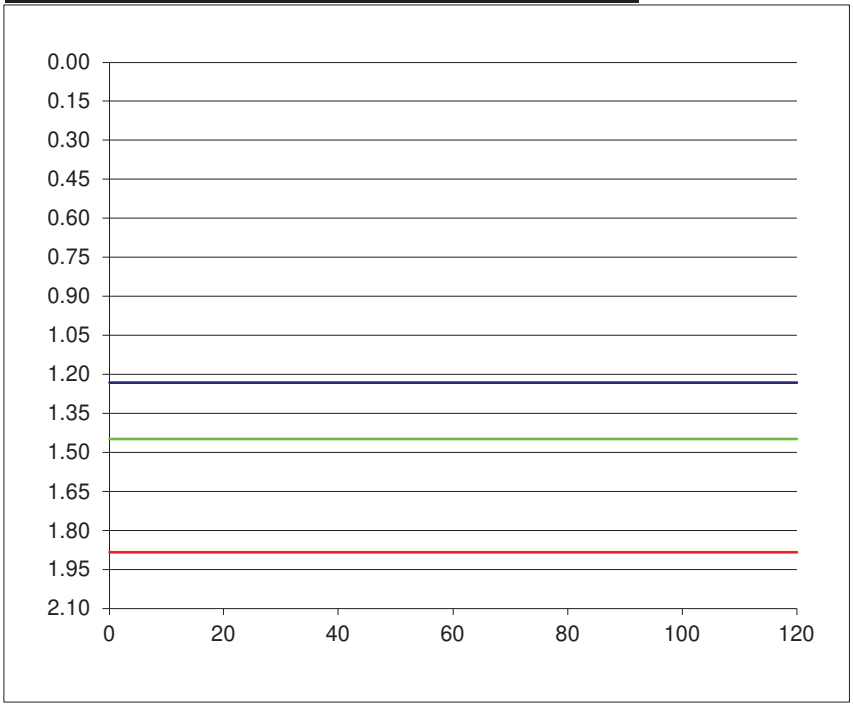
Project Reference:	5662
Contract name:	Residential Development
Location:	Kellystown, Porterstown, Dublin 15
Test No:	SA02
Date:	26/11/2019

Ground Conditions

From	To	
0.00	0.20	TOPSOIL.
0.20	1.20	Firm grey brown slightly sandy gravelly silty CLAY with medium cobble content.
1.20	2.10	Stiff black slightly sandy gravelly silty CLAY with high cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.23
0.5	1.23
1	1.23
1.5	1.23
2	1.23
2.5	1.23
3	1.23
3.5	1.23
4	1.23
4.5	1.23
5	1.23
6	1.23
7	1.23
8	1.23
9	1.23
10	1.23
12	1.23
14	1.23
16	1.23
18	1.23
20	1.23
25	1.23
30	1.23
40	1.23
50	1.23
60	1.23
75	1.23
90	1.23
120	1.23

Pit Dimensions (m)		
Length (m)	3.30	m
Width (m)	0.40	m
Depth	2.10	m
Water		
Start Depth of Water	1.23	m
Depth of Water	0.87	m
75% Full	1.45	m
25% Full	1.88	m
75%-25%	0.44	m
Volume of water (75%-25%)	**0.57**	m3
Area of Drainage	**15.54**	m2
Area of Drainage (75%-25%)	**4.539**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

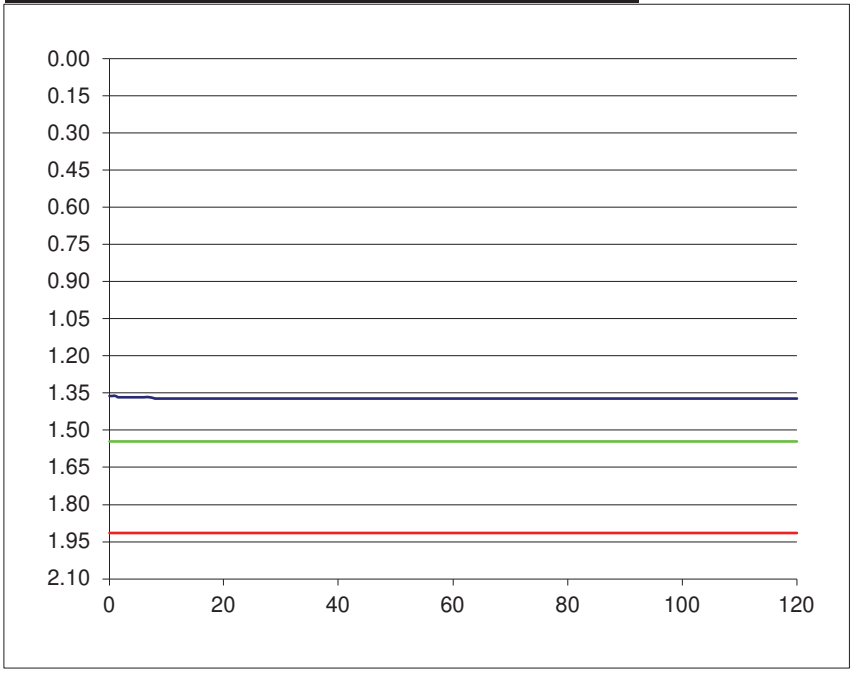
Project Reference:	5662
Contract name:	Residential Development
Location:	Kellystown, Porterstown, Dublin 15
Test No:	SA03
Date:	26/11/2019

Ground Conditions

From	To	
0.00	0.30	TOPSOIL.
0.30	0.70	Firm grey brown slightly sandy gravelly silty CLAY with medium cobble content.
0.70	1.60	Firm grey slightly sandy gravelly silty CLAY with low cobble content.
1.60	2.10	Stiff black slightly sandy gravelly silty CLAY with high cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.36
0.5	1.36
1	1.36
1.5	1.37
2	1.37
2.5	1.37
3	1.37
3.5	1.37
4	1.37
4.5	1.37
5	1.37
6	1.37
7	1.37
8	1.37
9	1.37
10	1.37
12	1.37
14	1.37
16	1.37
18	1.37
20	1.37
25	1.37
30	1.37
40	1.37
50	1.37
60	1.37
75	1.37
90	1.37
120	1.37

Pit Dimensions (m)		
Length (m)	3.20	m
Width (m)	0.40	m
Depth	2.10	m
Water		
Start Depth of Water	1.36	m
Depth of Water	0.74	m
75% Full	1.55	m
25% Full	1.92	m
75%-25%	0.37	m
Volume of water (75%-25%)	**0.47**	m3
Area of Drainage	**15.12**	m2
Area of Drainage (75%-25%)	**3.94**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** **m/min** or **Fail** **m/s**

SOAKAWAY TEST

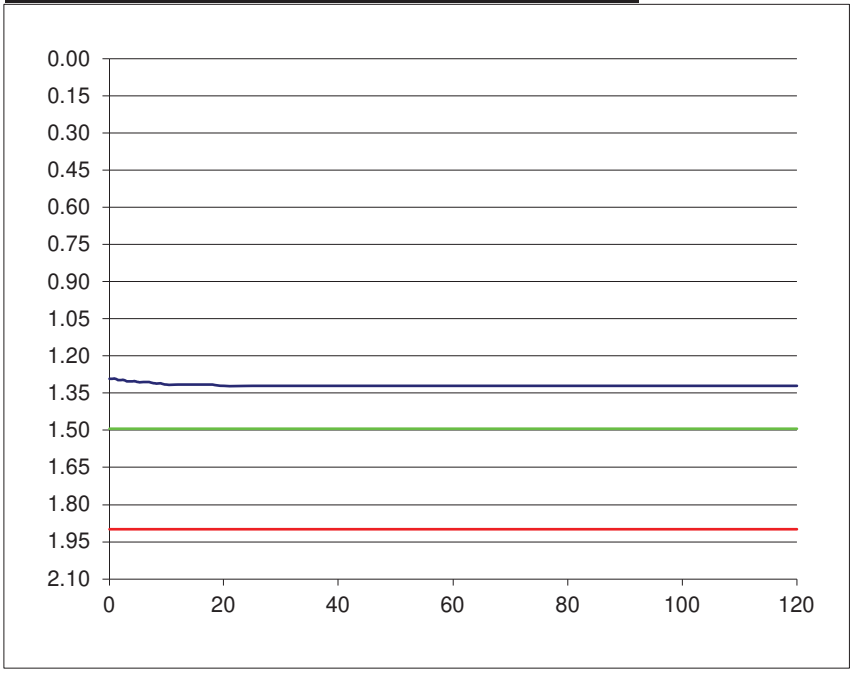
Project Reference:	5662
Contract name:	Residential Development
Location:	Kellystown, Porterstown, Dublin 15
Test No:	SA04
Date:	26/11/2019

Ground Conditions

From	To	
0.00	0.20	TOPSOIL.
0.20	0.60	Soft brown slightly sandy gravelly silty CLAY with medium cobble content.
0.60	2.10	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with high cobble and low boulder content.

Elapsed Time (mins)	Fall of Water (m)
0	1.29
0.5	1.29
1	1.29
1.5	1.30
2	1.30
2.5	1.30
3	1.30
3.5	1.30
4	1.30
4.5	1.30
5	1.31
6	1.31
7	1.31
8	1.31
9	1.31
10	1.32
12	1.32
14	1.32
16	1.32
18	1.32
20	1.32
25	1.32
30	1.32
40	1.32
50	1.32
60	1.32
75	1.32
90	1.32
120	1.32

Pit Dimensions (m)		
Length (m)	3.10	m
Width (m)	0.40	m
Depth	2.10	m
Water		
Start Depth of Water	1.29	m
Depth of Water	0.81	m
75% Full	1.49	m
25% Full	1.90	m
75%-25%	0.41	m
Volume of water (75%-25%)	**0.50**	m3
Area of Drainage	**14.70**	m2
Area of Drainage (75%-25%)	**4.08**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** **m/min** or **Fail** **m/s**

SOAKAWAY TEST

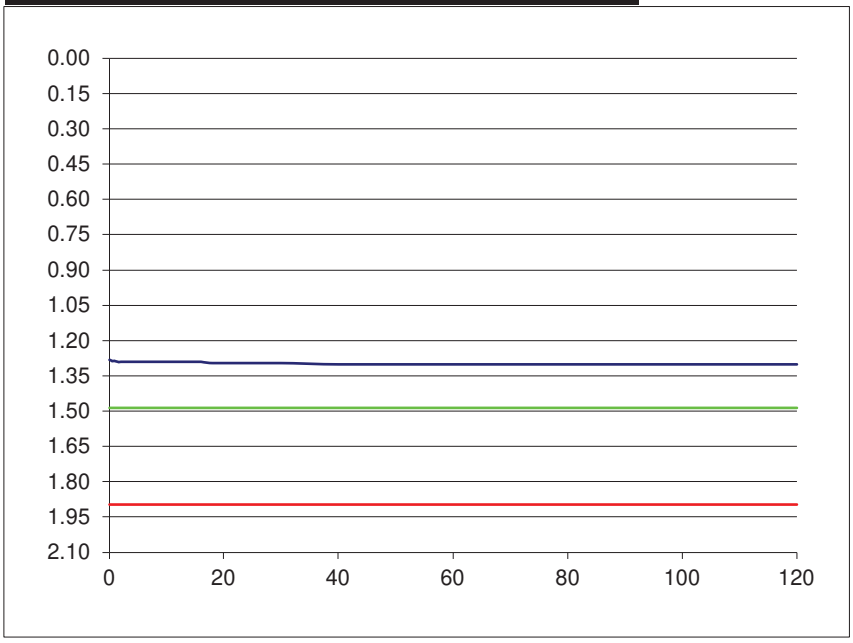
Project Reference:	5662
Contract name:	Residential Development
Location:	Kellystown, Porterstown, Dublin 15
Test No:	SA05
Date:	26/11/2019

Ground Conditions

From	To	
0.00	0.20	TOPSOIL.
0.20	0.90	Soft brown slightly sandy gravelly silty CLAY with low cobble content.
0.90	1.20	Firm brown slightly sandy gravelly silty CLAY with high cobble content.
1.20	1.80	Firm grey slightly sandy gravelly silty CLAY with high cobble content.
1.80	2.10	Stiff grey slightly sandy gravelly silty CLAY with high cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.28
0.5	1.29
1	1.29
1.5	1.29
2	1.29
2.5	1.29
3	1.29
3.5	1.29
4	1.29
4.5	1.29
5	1.29
6	1.29
7	1.29
8	1.29
9	1.29
10	1.29
12	1.29
14	1.29
16	1.29
18	1.30
20	1.30
25	1.30
30	1.30
40	1.30
50	1.30
60	1.30
75	1.30
90	1.30
120	1.30

Pit Dimensions (m)		
Length (m)	2.60	m
Width (m)	0.40	m
Depth	2.10	m
Water		
Start Depth of Water	1.28	m
Depth of Water	0.82	m
75% Full	1.49	m
25% Full	1.90	m
75%-25%	0.41	m
Volume of water (75%-25%)	**0.43**	m3
Area of Drainage	**12.60**	m2
Area of Drainage (75%-25%)	**3.50**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** **m/min** or **Fail** **m/s**

SA01 Photographs Missing

SA02 Sidewall

SA02 Spoil

SA03 Sidewall

SA03 Spoil

SA04 Sidewall

SA04 Spoil

SA05 Sidewall

SA05 Spoil

Appendix 4

Geotechnical Laboratory Test Results

Classification Tests in accordance with BS1377: Part 4

Client	Castlethorn Construction Ltd.
Site	Kellystown, Co. Dublin
S.I. File No	5662 / 19
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	11th December 2019

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plastic Index %	Min. Dry Density Mg/m^3	Particle Density Mg/m^3	% passing 425um	Comments	**Remarks** **C**=Clay; **M**=Silt **Plasticity**: **L**=Low; **I**=Intermediate; **H**=High; **V**=Very High; **E**=Extremely High
TP01	1.00	MK02	19/1570	B	13.4	36	22	14			50.8		CI
TP09	1.50	MK18	19/1572	B	15.5	37	21	16			41.3		CI
TP31	1.00	MK62	19/1573	B	15.5	34	20	14			71.9		CL

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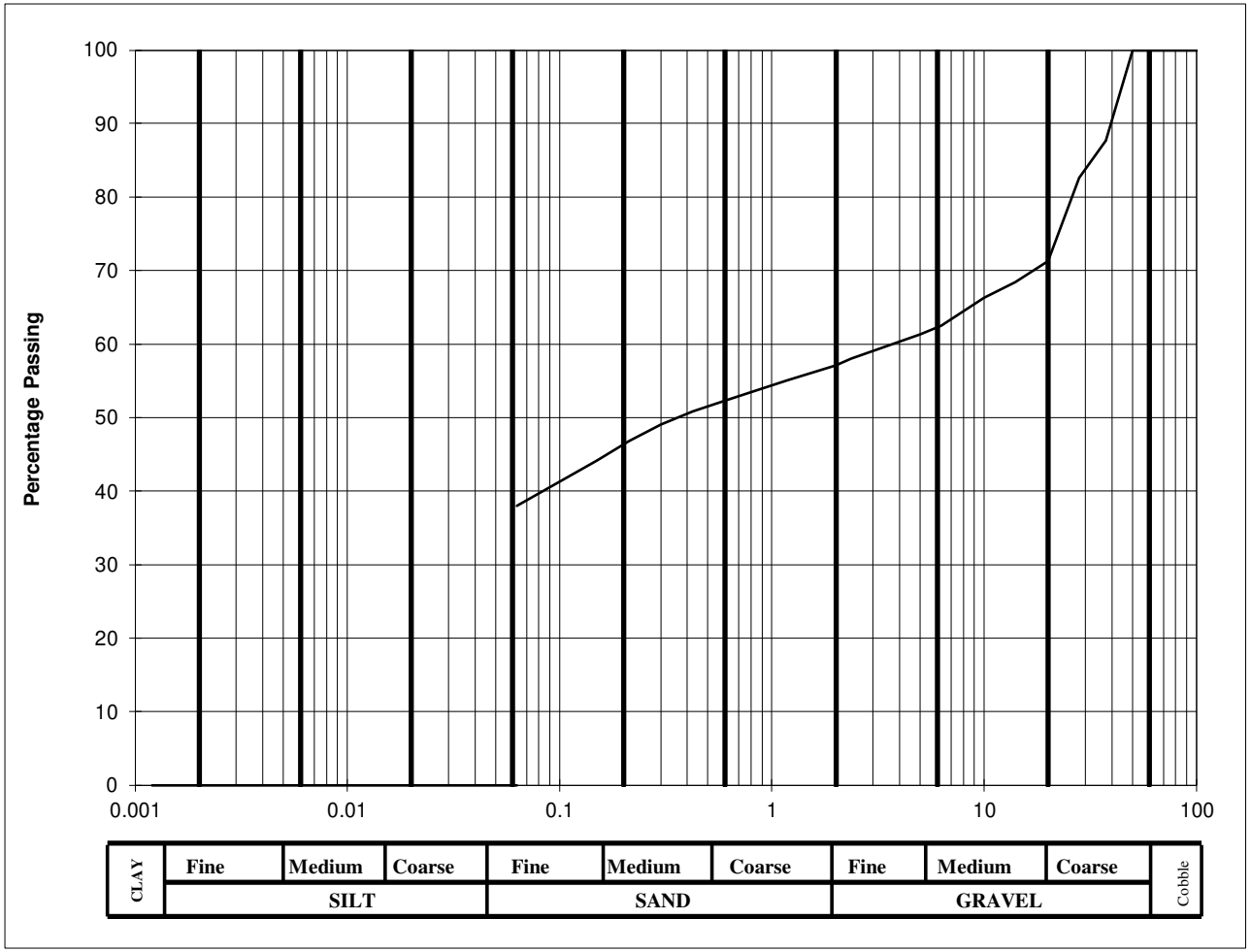
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	87.7		
28	82.6		
20	71.3		
14	68.4		
10	66.3		
6.3	62.5		
5.0	61.3		
2.36	58		
2.00	57.1		
1.18	55.1		
0.600	52.3		
0.425	50.8		
0.300	49.1		
0.212	46.8		
0.150	44.2		
0.063	38		

Cobbles, %	0
Gravel, %	43
Sand, %	19
Clay / Silt, %	38



Client :	Castlethorn Construction Ltd.
Project :	Kellystown, Co. Dublin

Lab. No :	19/1570
Sample No :	MK02

Hole ID :	TP 01
Depth, m :	1.00

Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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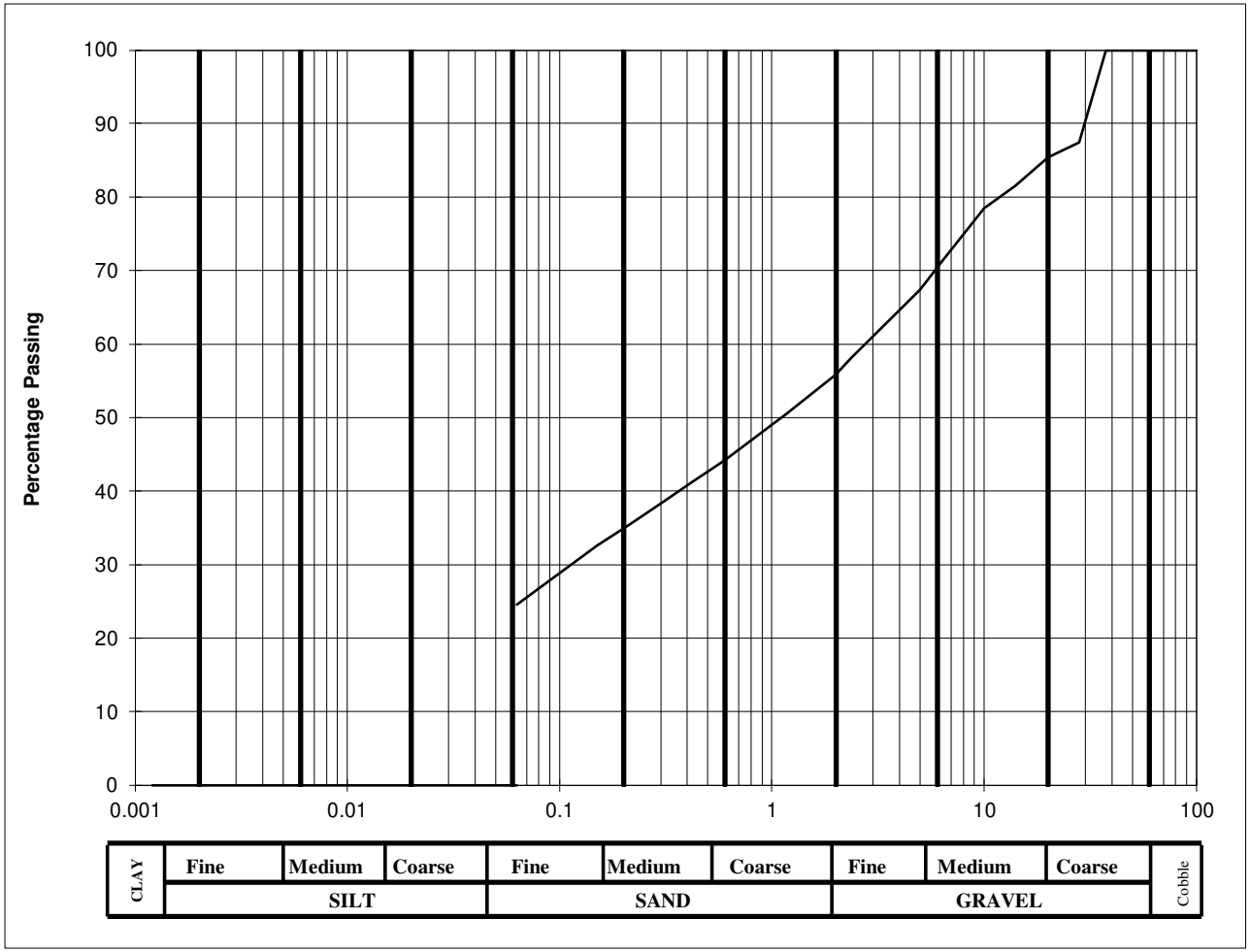
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	87.4		
20	85.4		
14	81.5		
10	78.5		
6.3	71.1		
5.0	67.4		
2.36	58.1		
2.00	55.8		
1.18	50.6		
0.600	44.2		
0.425	41.3		
0.300	38.3		
0.212	35.4		
0.150	32.6		
0.063	25		

Cobbles, %	0
Gravel, %	44
Sand, %	31
Clay / Silt, %	25



Client :	Castlethorn Construction Ltd.
Project :	Kellystown, Co. Dublin

Lab. No :	19/1572
Sample No :	MK18

Hole ID :	TP 09
Depth, m :	1.50

Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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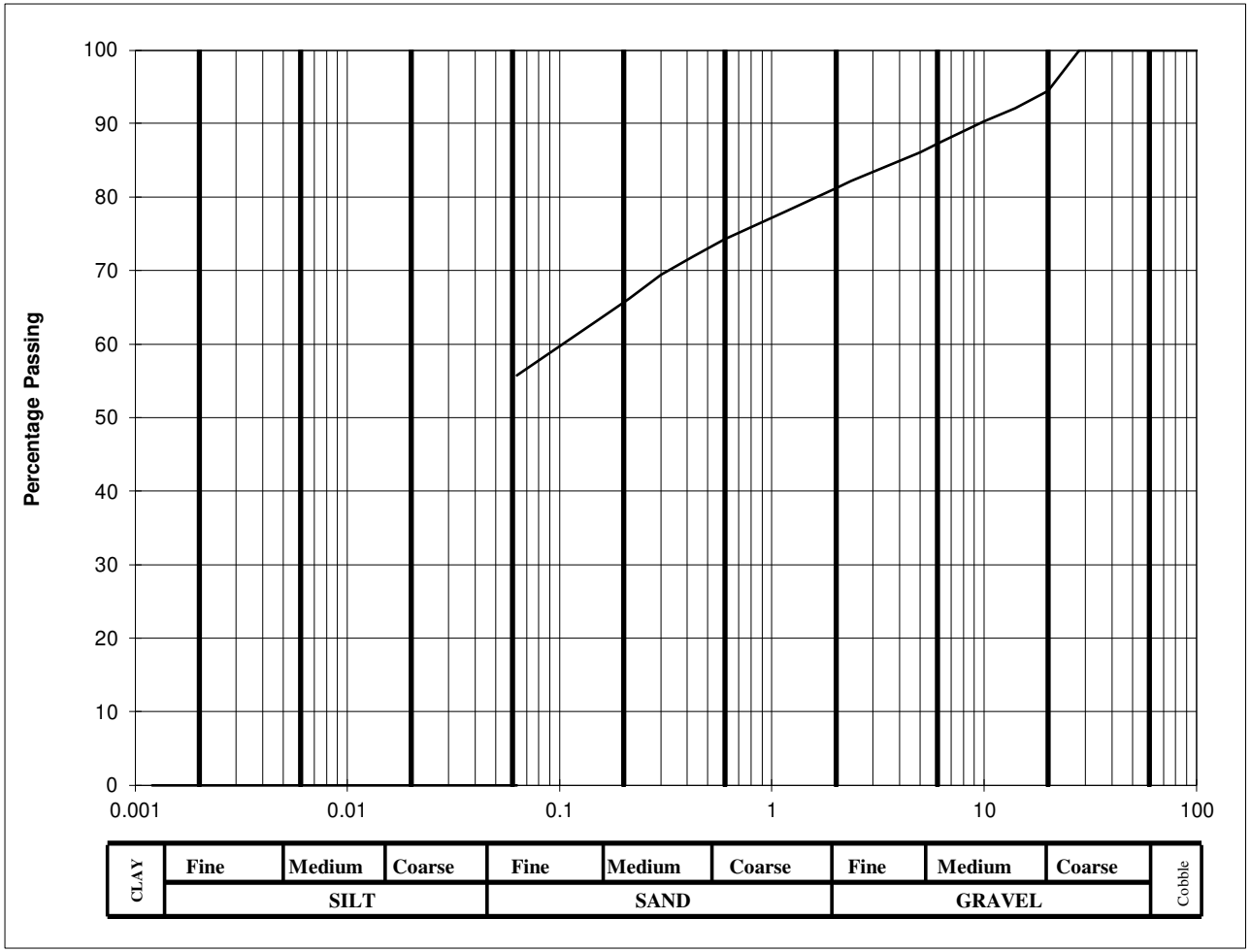
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	94.4		
14	92.1		
10	90.3		
6.3	87.5		
5.0	86.1		
2.36	82.2		
2.00	81.2		
1.18	78.1		
0.600	74.2		
0.425	71.9		
0.300	69.4		
0.212	66.1		
0.150	63.2		
0.063	56		

Cobbles, %	0
Gravel, %	19
Sand, %	25
Clay / Silt, %	56



Client :	Castlethorn Construction Ltd.
Project :	Kellystown, Co. Dublin

Lab. No :	19/1573
Sample No :	MK62

Hole ID :	TP 31
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Castlethorn Construction Ltd.
Site	Kellystown, Co. Dublin
S.I. File No	5662 / 19
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	11th December 2019

CBR No	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Location / Remarks
CBR01	0.50	MK30	B	19/1579	24.7	5.8	
CBR02	0.50	MK31	B	19/1580	24.5	6.2	
CBR03	0.50	MK32	B	19/1581	24.8	6.6	
CBR04	0.50	MK33	B	19/1582	17.1	6.2	
CBR05	0.50	MK34	B	19/1583	20.1	8.1	
CBR06	0.50	MK35	B	19/1584	26.1	6.9	
CBR07	0.50	MK36	B	19/1585	19.1	6.6	
CBR08	0.50	MK37	B	19/1586	22.4	7.1	
CBR09	0.50	MK38	B	19/1587	17.2	6.7	
CBR10	0.50	MK39	B	19/1588	17.9	6.8	
CBR11	0.50	MK40	B	19/1589	23.1	6.9	
CBR12	0.50	MK41	B	19/1590	22.5	5.9	
CBR13	0.50	MK42	B	19/1591	22.6	6.9	
CBR14	0.50	MK43	B	19/1592	31.4	6.8	
CBR15	0.50	MK44	B	19/1593	25.0	6.6	
CBR16	0.50	MK45	B	19/1594	23.1	7.7	
CBR17	0.50	MK46	B	19/1595	25.8	7.3	
CBR18	0.50	MK47	B	19/1596	20.9	6.2	
CBR19	0.50	MK48	B	19/1597	32.6	6.1	
CBR20	0.50	MK49	B	19/1598	23.2	8.5	
CBR21	0.50	MK50	B	19/1599	23.9	5.8	
CBR22	0.50	MK51	B	19/1600	20.6	6.6	
CBR23	0.50	MK52	B	19/1601	34.3	11.6	

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Site Investigations Ltd

California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Castlethorn Construction Ltd.
Site	Kellystown, Co. Dublin
S.I. File No	5662 / 19
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	11th December 2019

CBR No	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Location / Remarks
CBR24	0.50	MK53	B	19/1602	13.6	6.2	
CBR25	0.50	MK54	B	19/1603	15.6	8.5	

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Site Investigations Ltd

Chemical Testing
In accordance with BS 1377: Part 3

Client	Castlethorn Construction Ltd.
Site	Kellystown, Co. Dublin
S.I. File No	5662 / 19
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	11th December 2019

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Loss on Ignition (Organic Content) %	Chloride ion Content (water:soil ratio 2:1) %	% passing 2mm	Remarks
TP01	1.00	MK02	19/1570	7.38	0.120	0.069		0.18	57.1	
TP09	0.50	MK17	19/1571	7.77	0.123	0.069		0.17	55.8	
TP31	1.00	MK62	19/1573	7.96	0.122	0.099		0.22	81.2	

Printed 10/01/2020

_____Paddy McGonagle
Site Investigations Ltd.

Appendix 5

Environmental Laboratory Test Results

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date of report Generation:	19 December 2019
Customer:	Site Investigations Ltd
Sample Delivery Group (SDG):	191210-138
Your Reference:	5662
Location:	Kellystown
Report No:	534878

We received 6 samples on Tuesday December 10, 2019 and 6 of these samples were scheduled for analysis which was completed on Thursday December 19, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
21332039	TP01		1.00	09/12/2019
21332040	TP03		0.50	09/12/2019
21332041	TP06		0.50	09/12/2019
21332042	TP09		0.50	09/12/2019
21332043	TP15		0.50	09/12/2019
21332044	TP31		1.00	09/12/2019

Maximum Sample/Coolbox Temperature (°C) : **5.2**

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			21332039	21332040				21332041				21332042	21332043					21332044					
Customer Sample Reference			TP01	TP03				TP06				TP09	TP15					TP31					
AGS Reference																							
Depth (m)			1.00	0.50				0.50				0.50	0.50					1.00					
Container			250g Amber Jar (ALE210)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)		1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)		250g Amber Jar (ALE210)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)			250g Amber Jar (ALE210)					
Sample Type			S	S	S	S		S	S	S		S	S	S	S			S					
Anions by Kone (w)	All	NDPs: 0 Tests: 3		X				X					X										
CEN Readings	All	NDPs: 0 Tests: 3		X				X					X										
Chromium III	All	NDPs: 0 Tests: 3			X				X					X									
Coronene	All	NDPs: 0 Tests: 3			X				X					X									
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 3		X				X					X										
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 3		X				X					X										
EPH CWG GC (S)	All	NDPs: 0 Tests: 3			X				X					X									
Fluoride	All	NDPs: 0 Tests: 3		X				X					X										
GRO by GC-FID (S)	All	NDPs: 0 Tests: 3				X				X					X								
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 3			X				X					X									
Loss on Ignition in soils	All	NDPs: 0 Tests: 6	X		X				X			X		X				X					
Mercury Dissolved	All	NDPs: 0 Tests: 3		X				X					X										
Metals in solid samples by OES	All	NDPs: 0 Tests: 3			X				X					X									
Mineral Oil	All	NDPs: 0 Tests: 3			X				X					X									
PAH by GCMS	All	NDPs: 0 Tests: 3			X				X					X									

Validated

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

Results Legend

X **Test**

N **No Determination Possible**

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)	21332039	21332040			21332041			21332042	21332043				21332044	
Customer Sample Reference	TP01	TP03			TP06			TP09	TP15				TP31	
AGS Reference														
Depth (m)	1.00	0.50			0.50			0.50	0.50				1.00	
Container	250g Amber Jar (ALE210)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	250g Amber Jar (ALE210)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)		250g Amber Jar (ALE210)	
Sample Type	S	S	S	S	S	S	S	S	S	S	S		S	
PCBs by GCMS	All	NDPs: 0 Tests: 3		X			X				X			
Phenols by HPLC (W)	All	NDPs: 0 Tests: 3		X			X				X			
Sample description	All	NDPs: 0 Tests: 6	X		X			X		X				X
Total Dissolved Solids on Leachates	All	NDPs: 0 Tests: 3		X			X				X			
Total Organic Carbon	All	NDPs: 0 Tests: 3			X			X			X			
TPH CWG GC (S)	All	NDPs: 0 Tests: 3			X			X			X			
VOC MS (S)	All	NDPs: 0 Tests: 3				X			X			X		

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
21332039	TP01	1.00	Dark Brown	Loamy Sand	Stones	None
21332040	TP03	0.50	Light Brown	Silt Loam	Stones	Vegetation
21332041	TP06	0.50	Light Brown	Silt Loam	Stones	Vegetation
21332042	TP09	0.50	Dark Brown	Loamy Sand	Vegetation	Stones
21332043	TP15	0.50	Light Brown	Silt Loam	Stones	Vegetation
21332044	TP31	1.00	Dark Brown	Loamy Sand	Vegetation	Stones

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-3+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP01	TP03	TP06	TP09	TP15	TP31
			Depth (m)	1.00	0.50	0.50	0.50	0.50	1.00
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019
			Sample Time	.	.	.	.	.	.
			Date Received	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019
			SDG Ref	191210-138	191210-138	191210-138	191210-138	191210-138	191210-138
			Lab Sample No.(s)	21332039	21332040	21332041	21332042	21332043	21332044
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		12	11	19	19	17	12
Loss on ignition	<0.7 %	TM018		2.75 M	0.831 M	5.75 M	4.78 M	3.84 M	3.81 M
Mineral oil >C10-C40	<1 mg/kg	TM061			35.5	<1		<1	
Organic Carbon, Total	<0.2 %	TM132			0.847 M	0.828 M		0.534 M	
Chromium, Hexavalent	<0.6 mg/kg	TM151			<0.6 #	<0.6 #		<0.6 #	
PCB congener 28	<3 µg/kg	TM168			<3 M	<3 M		<3 M	
PCB congener 52	<3 µg/kg	TM168			<3 M	<3 M		<3 M	
PCB congener 101	<3 µg/kg	TM168			<3 M	<3 M		<3 M	
PCB congener 118	<3 µg/kg	TM168			<3 M	<3 M		<3 M	
PCB congener 138	<3 µg/kg	TM168			<3 M	<3 M		<3 M	
PCB congener 153	<3 µg/kg	TM168			<3 M	<3 M		<3 M	
PCB congener 180	<3 µg/kg	TM168			<3 M	<3 M		<3 M	
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168			<21	<21		<21	
Chromium, Trivalent	<0.9 mg/kg	TM181			<0.9	19.7		15.3	
Antimony	<0.6 mg/kg	TM181			<6 #	2.74 #		1.55 #	
Arsenic	<0.6 mg/kg	TM181			22.9 M	19.6 M		12.7 M	
Barium	<0.6 mg/kg	TM181			272 #	116 #		129 #	
Cadmium	<0.02 mg/kg	TM181			1.69 M	3.08 M		1.7 M	
Chromium	<0.9 mg/kg	TM181			<9 M	19.7 M		15.3 M	
Copper	<1.4 mg/kg	TM181			39.7 M	48.3 M		25.2 M	
Lead	<0.7 mg/kg	TM181			35.3 M	34.2 M		23.1 M	
Mercury	<0.14 mg/kg	TM181			<1.4 M	<0.14 M		<0.14 M	
Molybdenum	<0.1 mg/kg	TM181			3.06 #	4.39 #		2.68 #	
Nickel	<0.2 mg/kg	TM181			47.2 M	81.5 M		38.2 M	
Selenium	<1 mg/kg	TM181			<10 #	2.14 #		3.2 #	
Zinc	<1.9 mg/kg	TM181			108 M	155 M		134 M	
Coronene	<200 µg/kg	TM410			<200	<200		<200	

Validated

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-3+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP03	TP06	TP15			
			Depth (m)	0.50	0.50	0.50			
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
			Date Sampled	09/12/2019	09/12/2019	09/12/2019			
			Sample Time	.	.	.			
			Date Received	10/12/2019	10/12/2019	10/12/2019			
			SDG Ref	191210-138	191210-138	191210-138			
			Lab Sample No.(s)	21332040	21332041	21332043			
			AGS Reference						
Naphthalene	<9 µg/kg	TM218		<45 M	<9 M	<9 M			
Acenaphthylene	<12 µg/kg	TM218		<60 M	<12 M	<12 M			
Acenaphthene	<8 µg/kg	TM218		<40 M	<8 M	<8 M			
Fluorene	<10 µg/kg	TM218		<50 M	<10 M	<10 M			
Phenanthrene	<15 µg/kg	TM218		112 M	25.9 M	<15 M			
Anthracene	<16 µg/kg	TM218		<80 M	<16 M	<16 M			
Fluoranthene	<17 µg/kg	TM218		1160 M	60.6 M	<17 M			
Pyrene	<15 µg/kg	TM218		1230 M	55.2 M	<15 M			
Benz(a)anthracene	<14 µg/kg	TM218		791 M	36.3 M	<14 M			
Chrysene	<10 µg/kg	TM218		647 M	35.4 M	<10 M			
Benzo(b)fluoranthene	<15 µg/kg	TM218		1560 M	51.1 M	<15 M			
Benzo(k)fluoranthene	<14 µg/kg	TM218		570 M	18.2 M	<14 M			
Benzo(a)pyrene	<15 µg/kg	TM218		1150 M	33.3 M	<15 M			
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		837 M	22.9 M	<18 M			
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		<115 M	<23 M	<23 M			
Benzo(g,h,i)perylene	<24 µg/kg	TM218		741 M	<24 M	<24 M			
PAH, Total Detected USEPA 16	<118 µg/kg	TM218		8800	339	<118			

Validated

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

TPH CWG (S)

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-3+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP03	TP06	TP15			
			Depth (m)	0.50	0.50	0.50			
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
			Date Sampled	09/12/2019	09/12/2019	09/12/2019			
			Sample Time	.	.	.			
			Date Received	10/12/2019	10/12/2019	10/12/2019			
			SDG Ref	191210-138	191210-138	191210-138			
			Lab Sample No.(s)	21332040	21332041	21332043			
			AGS Reference						
GRO Surrogate % recovery**	%	TM089		74	108	72.2			
Aliphatics >C5-C6	<10 µg/kg	TM089		<10	<10	<10			
Aliphatics >C6-C8	<10 µg/kg	TM089		<10	<10	<10			
Aliphatics >C8-C10	<10 µg/kg	TM089		<10	<10	<10			
Aliphatics >C10-C12	<1000 µg/kg	TM414		<1000	<1000	<1000			
Aliphatics >C12-C16	<1000 µg/kg	TM414		<1000	<1000	<1000			
Aliphatics >C16-C21	<1000 µg/kg	TM414		1010	<1000	<1000			
Aliphatics >C21-C35	<1000 µg/kg	TM414		3520	1210	<1000			
Aliphatics >C35-C44	<1000 µg/kg	TM414		3700	<1000	<1000			
Total Aliphatics >C10-C44	<5000 µg/kg	TM414		8320	<5000	<5000			
Total Aliphatics & Aromatics >C10-C44	<10000 µg/kg	TM414		39700	<10000	<10000			
Aromatics >EC5-EC7	<10 µg/kg	TM089		<10	<10	<10			
Aromatics >EC7-EC8	<10 µg/kg	TM089		<10	<10	<10			
Aromatics >EC8-EC10	<10 µg/kg	TM089		<10	<10	<10			
Aromatics > EC10-EC12	<1000 µg/kg	TM414		<1000	<1000	<1000			
Aromatics > EC12-EC16	<1000 µg/kg	TM414		<1000	<1000	<1000			
Aromatics > EC16-EC21	<1000 µg/kg	TM414		2190	<1000	<1000			
Aromatics > EC21-EC35	<1000 µg/kg	TM414		21300	3240	1380			
Aromatics >EC35-EC44	<1000 µg/kg	TM414		7960	<1000	<1000			
Aromatics > EC40-EC44	<1000 µg/kg	TM414		1790	<1000	<1000			
Total Aromatics > EC10-EC44	<5000 µg/kg	TM414		31400	<5000	<5000			
Total Aliphatics & Aromatics >C5-C44	<10000 µg/kg	TM414		39700	<10000	<10000			
GRO >C5-C6	<20 µg/kg	TM089		<20	<20	<20			
GRO >C6-C7	<20 µg/kg	TM089		<20	<20	<20			
GRO >C7-C8	<20 µg/kg	TM089		<20	<20	<20			
GRO >C8-C10	<20 µg/kg	TM089		<20	<20	<20			
GRO >C10-C12	<20 µg/kg	TM089		<20	<20	<20			
Total Aliphatics >C5-C10	<50 µg/kg	TM089		<50	<50	<50			
Total Aromatics >EC5-EC10	<50 µg/kg	TM089		<50	<50	<50			
GRO >C5-C10	<20 µg/kg	TM089		<20	<20	<20			

Validated

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

VOC MS (S)

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-3+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP03	TP06	TP15			
			Depth (m)	0.50	0.50	0.50			
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
			Date Sampled	09/12/2019	09/12/2019	09/12/2019			
			Sample Time	.	.	.			
			Date Received	10/12/2019	10/12/2019	10/12/2019			
			SDG Ref	191210-138	191210-138	191210-138			
			Lab Sample No.(s)	21332040	21332041	21332043			
			AGS Reference						
Dibromofluoromethane**	%	TM116		105	107	102			
Toluene-d8**	%	TM116		92.8	95.9	97			
4-Bromofluorobenzene**	%	TM116		79.9	84.5	84.6			
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116		<10 M	<10 M	<10 M			
Benzene	<9 µg/kg	TM116		<9 M	<9 M	<9 M			
Toluene	<7 µg/kg	TM116		<7 M	<7 M	<7 M			
Ethylbenzene	<4 µg/kg	TM116		<4 M	<4 M	<4 M			
p/m-Xylene	<10 µg/kg	TM116		<10 #	<10 #	<10 #			
o-Xylene	<10 µg/kg	TM116		<10 M	<10 M	<10 M			

Validated

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Kellystown
Mass Sample taken (kg)	0.106	**Natural Moisture Content (%)**	17.4
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	85.2
Particle Size <4mm	>95%		

Case	
SDG	191210-138
Lab Sample Number(s)	21332040
Sampled Date	09-Dec-2019
Customer Sample Ref.	TP03
Depth (m)	0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.847	3	5	6
Loss on Ignition (%)	0.831	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	35.5	500	-	-
PAH Sum of 17 (mg/kg)	-	-	-	-
pH (pH Units)	-	-	-	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Conc^n in 10:1 eluate (mg/l)		**A_2** 10:1 conc^n leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	0.000506	<0.0005	0.00506	<0.005	0.5	2	25
Barium	0.194	<0.0002	1.94	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00113	<0.0003	0.0113	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00628	<0.003	0.0628	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00306	<0.001	0.0306	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	7	<2	70	<20	1000	20000	50000
Total Dissolved Solids	97.3	<10	973	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	13-Dec-2019
pH (pH Units)	8.68
Conductivity (µS/cm)	116.00
Temperature (°C)	19.30
Volume Leachant (Litres)	0.884

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
19/12/2019 16:40:49

16:40:06 19/12/2019

Validated

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Kellystown
Mass Sample taken (kg)	0.112	**Natural Moisture Content (%)**	25.2
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	79.9
Particle Size <4mm	>95%		

Case	
SDG	191210-138
Lab Sample Number(s)	21332041
Sampled Date	09-Dec-2019
Customer Sample Ref.	TP06
Depth (m)	0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.828	3	5	6
Loss on Ignition (%)	5.75	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	<1	500	-	-
PAH Sum of 17 (mg/kg)	-	-	-	-
pH (pH Units)	-	-	-	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Conc^n in 10:1 eluate (mg/l)		**A_2** 10:1 conc^n leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	0.000587	<0.0005	0.00587	<0.005	0.5	2	25
Barium	0.105	<0.0002	1.05	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	0.00104	<0.001	0.0104	<0.01	0.5	10	70
Copper	0.00241	<0.0003	0.0241	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00419	<0.003	0.0419	<0.03	0.5	10	30
Nickel	0.00145	<0.0004	0.0145	<0.004	0.4	10	40
Lead	0.000431	<0.0002	0.00431	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00536	<0.001	0.0536	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	41.5	<10	415	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	3.72	<3	37.2	<30	500	800	1000

Leach Test Information

Date Prepared	13-Dec-2019
pH (pH Units)	8.28
Conductivity (µS/cm)	39.90
Temperature (°C)	19.40
Volume Leachant (Litres)	0.878

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
19/12/2019 16:40:49

16:40:06 19/12/2019

Validated

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Kellystown
Mass Sample taken (kg)	0.110	**Natural Moisture Content (%)**	22.2
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	81.8
Particle Size <4mm	>95%		

Case	
SDG	191210-138
Lab Sample Number(s)	21332043
Sampled Date	09-Dec-2019
Customer Sample Ref.	TP15
Depth (m)	0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.534	3	5	6
Loss on Ignition (%)	3.84	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	<1	500	-	-
PAH Sum of 17 (mg/kg)	-	-	-	-
pH (pH Units)	-	-	-	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Conc^n in 10:1 eluate (mg/l)		**A_2** 10:1 conc^n leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.0365	<0.0002	0.365	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	0.00101	<0.001	0.0101	<0.01	0.5	10	70
Copper	0.000696	<0.0003	0.00696	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00212	<0.001	0.0212	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	36	<10	360	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	3.04	<3	30.4	<30	500	800	1000

Leach Test Information

Date Prepared	13-Dec-2019
pH (pH Units)	8.51
Conductivity (µS/cm)	39.90
Temperature (°C)	1,902.00
Volume Leachant (Litres)	0.880

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
19/12/2019 16:40:49

16:40:06 19/12/2019

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water
TM132	In - house Method	ELTRA CS800 Operators Guide
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC
TM410	Shaker extraction-In house coronene method	Determination of Coronene in soils by GCMS
TM414	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

CERTIFICATE OF ANALYSIS

SDG:	191210-138	**Client Reference:**	5662	**Report Number:**	534878
Location:	Kellystown	**Order Number:**	26/B/19	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	21332039	21332040	21332041	21332042	21332043	21332044
Customer Sample Ref.	TP01	TP03	TP06	TP09	TP15	TP31
AGS Ref.						
Depth	1.00	0.50	0.50	0.50	0.50	1.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (w)		18-Dec-2019	18-Dec-2019		18-Dec-2019	
CEN 10:1 Leachate (1 Stage)		13-Dec-2019	13-Dec-2019		13-Dec-2019	
CEN Readings		17-Dec-2019	17-Dec-2019		17-Dec-2019	
Chromium III		18-Dec-2019	18-Dec-2019		18-Dec-2019	
Coronene		17-Dec-2019	17-Dec-2019		17-Dec-2019	
Dissolved Metals by ICP-MS		18-Dec-2019	18-Dec-2019		18-Dec-2019	
Dissolved Organic/Inorganic Carbon		19-Dec-2019	19-Dec-2019		18-Dec-2019	
EPH CWG GC (S)		17-Dec-2019	17-Dec-2019		17-Dec-2019	
Fluoride		19-Dec-2019	19-Dec-2019		19-Dec-2019	
GRO by GC-FID (S)		17-Dec-2019	17-Dec-2019		18-Dec-2019	
Hexavalent Chromium (s)		17-Dec-2019	16-Dec-2019		17-Dec-2019	
Loss on Ignition in soils	18-Dec-2019	18-Dec-2019	17-Dec-2019	18-Dec-2019	17-Dec-2019	18-Dec-2019
Mercury Dissolved		18-Dec-2019	18-Dec-2019		18-Dec-2019	
Metals in solid samples by OES		18-Dec-2019	18-Dec-2019		18-Dec-2019	
Mineral Oil		17-Dec-2019	17-Dec-2019		17-Dec-2019	
PAH by GCMS		17-Dec-2019	17-Dec-2019		17-Dec-2019	
PCBs by GCMS		18-Dec-2019	18-Dec-2019		18-Dec-2019	
Phenols by HPLC (W)		18-Dec-2019	18-Dec-2019		18-Dec-2019	
Sample description	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019
Total Dissolved Solids on Leachates		18-Dec-2019	18-Dec-2019		17-Dec-2019	
Total Organic Carbon		18-Dec-2019	18-Dec-2019		18-Dec-2019	
TPH CWG GC (S)		17-Dec-2019	17-Dec-2019		18-Dec-2019	
VOC MS (S)		17-Dec-2019	17-Dec-2019		17-Dec-2019	

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
§	**Sampled on date not provided**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**

19. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.
Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2107).*

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Waste Classification Report

NKL4Z-U756B-YAD7K

Job name

5662

Description/Comments

Client: Castlethorn
Engineer: Waterman Moylan

Project

Kellystown

Site

Porterstown, Dublin 15

Related Documents

#	Name	Description
1	191210-138.hwol	.hwol file used to create the Job

Waste Stream Template

Rilta Suite NEW

Classified by

Name:
Stephen Letch
Date:
10 Jan 2020 11:35 GMT
Telephone:
353 1 6108 768

Company:
Site Investigations Ltd
Carhugar, The Grange
12th Lock Road, Lucan
Dublin

Report

Created by: Stephen Letch
Created date: 10 Jan 2020 11:35 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	TP03-091219--0.50	0.50	Non Hazardous		2
2	TP06-091219--0.50	0.50	Non Hazardous		5
3	TP15-091219--0.50	0.50	Non Hazardous		8

Classification of sample: TP03-091219--0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP03-091219--0.50
Sample Depth:
0.50 m
Moisture content:
11%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		39.7 mg/kg		39.7 mg/kg	0.00397 %		
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<6 mg/kg	1.197	<7.183 mg/kg	<0.000718 %		<LOD
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		22.9 mg/kg	1.534	31.262 mg/kg	0.00313 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		272 mg/kg	1.233	298.604 mg/kg	0.0299 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		1.69 mg/kg	1.855	2.789 mg/kg	0.000279 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		39.7 mg/kg	1.126	39.781 mg/kg	0.00398 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	35.3 mg/kg		31.417 mg/kg	0.00314 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1.4 mg/kg	1.353	<1.895 mg/kg	<0.000189 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		3.06 mg/kg	1.5	4.086 mg/kg	0.000409 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		47.2 mg/kg	2.637	110.762 mg/kg	0.0111 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<10 mg/kg	2.554	<25.536 mg/kg	<0.00255 %		<LOD
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		108 mg/kg	2.469	237.349 mg/kg	0.0237 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		<0.9	mg/kg	1.462	<1.315	mg/kg	<0.000132 %		<LOD
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.045	mg/kg		<0.045	mg/kg	<0.0000045 %		<LOD
17		acenaphthylene		205-917-1	208-96-8		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
18		acenaphthene		201-469-6	83-32-9		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
20		phenanthrene		201-581-5	85-01-8		0.112	mg/kg		0.0997	mg/kg	0.00000997 %	✓	
21		anthracene		204-371-1	120-12-7		<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<LOD
22		fluoranthene		205-912-4	206-44-0		1.16	mg/kg		1.032	mg/kg	0.000103 %	✓	
23		pyrene		204-927-3	129-00-0		1.23	mg/kg		1.095	mg/kg	0.000109 %	✓	
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.791	mg/kg		0.704	mg/kg	0.0000704 %	✓	
25		chrysene	601-048-00-0	205-923-4	218-01-9		0.647	mg/kg		0.576	mg/kg	0.0000576 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.56	mg/kg		1.388	mg/kg	0.000139 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.57	mg/kg		0.507	mg/kg	0.0000507 %	✓	
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.15	mg/kg		1.023	mg/kg	0.000102 %	✓	
29		indeno[123-cd]pyrene		205-893-2	193-39-5		0.837	mg/kg		0.745	mg/kg	0.0000745 %	✓	
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.115	mg/kg		<0.115	mg/kg	<0.0000115 %		<LOD
31		benzo[ghi]perylene		205-883-8	191-24-2		0.741	mg/kg		0.659	mg/kg	0.0000659 %	✓	
32		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
36		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
37		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
											Total:	0.0841 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00397%)

Classification of sample: TP06-091219--0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP06-091219--0.50
Sample Depth:
0.50 m
Moisture content:
19%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol					☑					
3	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2.74 mg/kg	1.197	2.657 mg/kg	0.000266 %	✓	
4	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		19.6 mg/kg	1.534	24.352 mg/kg	0.00244 %	✓	
5	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		116 mg/kg	1.233	115.899 mg/kg	0.0116 %	✓	
6	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		3.08 mg/kg	1.855	4.627 mg/kg	0.000463 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		48.3 mg/kg	1.126	44.048 mg/kg	0.0044 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	34.2 mg/kg		27.702 mg/kg	0.00277 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14 mg/kg	1.353	<0.189 mg/kg	<0.0000189 %		<LOD
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		4.39 mg/kg	1.5	5.335 mg/kg	0.000533 %	✓	
11	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		81.5 mg/kg	2.637	174.061 mg/kg	0.0174 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2.14 mg/kg	2.554	4.426 mg/kg	0.000443 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		155 mg/kg	2.469	310.02 mg/kg	0.031 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		19.7 mg/kg	1.462	23.322 mg/kg	0.00233 %	✓	
15	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<LOD
16	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
17	acenaphthylene		205-917-1	208-96-8		<0.012 mg/kg		<0.012 mg/kg	<0.0000012 %		<LOD
18	acenaphthene		201-469-6	83-32-9		<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<LOD
19	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
20	phenanthrene		201-581-5	85-01-8		0.0259 mg/kg		0.021 mg/kg	0.0000021 %	✓	
21	anthracene		204-371-1	120-12-7		<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %		<LOD
22	fluoranthene		205-912-4	206-44-0		0.0606 mg/kg		0.0491 mg/kg	0.00000491 %	✓	
23	pyrene		204-927-3	129-00-0		0.0552 mg/kg		0.0447 mg/kg	0.00000447 %	✓	
24	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.0363 mg/kg		0.0294 mg/kg	0.00000294 %	✓	
25	chrysene	601-048-00-0	205-923-4	218-01-9		0.0354 mg/kg		0.0287 mg/kg	0.00000287 %	✓	
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.0511 mg/kg		0.0414 mg/kg	0.00000414 %	✓	
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.0182 mg/kg		0.0147 mg/kg	0.00000147 %	✓	
28	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.0333 mg/kg		0.027 mg/kg	0.0000027 %	✓	
29	indeno[123-cd]pyrene		205-893-2	193-39-5		0.0229 mg/kg		0.0185 mg/kg	0.00000185 %	✓	
30	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		<LOD
31	benzo[ghi]perylene		205-883-8	191-24-2		<0.024 mg/kg		<0.024 mg/kg	<0.0000024 %		<LOD
32	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021 mg/kg		<0.021 mg/kg	<0.0000021 %		<LOD
33	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
34	benzene	601-020-00-8	200-753-7	71-43-2		<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
35	toluene	601-021-00-3	203-625-9	108-88-3		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
36	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
37	coronene		205-881-7	191-07-1		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
38	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
								Total:	0.0748 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP15-091219--0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP15-091219--0.50
Sample Depth:
0.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	TPH (C6 to C40) petroleum group TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	confirm TPH has NOT arisen from diesel or petrol		☑					
3	antimony { antimony trioxide } 051-005-00-X / 215-175-0 / 1309-64-4		1.55 mg/kg	1.197	1.54 mg/kg	0.000154 %	✓	
4	arsenic { arsenic pentoxide } 033-004-00-6 / 215-116-9 / 1303-28-2		12.7 mg/kg	1.534	16.169 mg/kg	0.00162 %	✓	
5	barium { barium sulphide } 016-002-00-X / 244-214-4 / 21109-95-5		129 mg/kg	1.233	132.07 mg/kg	0.0132 %	✓	
6	cadmium { cadmium sulfate } 048-009-00-9 / 233-331-6 / 10124-36-4		1.7 mg/kg	1.855	2.617 mg/kg	0.000262 %	✓	
7	copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		25.2 mg/kg	1.126	23.549 mg/kg	0.00235 %	✓	
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	23.1 mg/kg		19.173 mg/kg	0.00192 %	✓	
9	mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.14 mg/kg	1.353	<0.189 mg/kg	<0.0000189 %		<LOD
10	molybdenum { molybdenum(VI) oxide } 042-001-00-9 / 215-204-7 / 1313-27-5		2.68 mg/kg	1.5	3.337 mg/kg	0.000334 %	✓	
11	nickel { nickel sulfate } 028-009-00-5 / 232-104-9 / 7786-81-4		38.2 mg/kg	2.637	83.599 mg/kg	0.00836 %	✓	
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		3.2 mg/kg	2.554	6.782 mg/kg	0.000678 %	✓	
13	zinc { zinc sulphate } 030-006-00-9 / 231-793-3 [1] 231-793-3 [2] / 7446-19-7 [1] 7733-02-0 [2]		134 mg/kg	2.469	274.635 mg/kg	0.0275 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium in chromium(III) compounds { chromium(III) oxide }				15.3	mg/kg	1.462	18.56	mg/kg	0.00186 %	✓	
			215-160-9	1308-38-9									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
18		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
19		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
20		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
21		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
22		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
23		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
29		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
31		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
32		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
34		benzene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
35		toluene				<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
36		ethylbenzene				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
37		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
38		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0594 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

confirm TPH has NOT arisen from diesel or petrol

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

barium sulphide (EC Number: 244-214-4, CAS Number: 21109-95-5)

CLP index number: 016-002-00-X
Description/Comments:
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): EUH031 >= 0.8 %
Reason for additional Hazards Statement(s)/Risk Phrase(s):
14 Dec 2015 - EUH031 >= 0.8 % hazard statement sourced from: WM3, Table C12.2

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 1; Carcinogenic to humans; Lead REACH Consortium considers some lead compounds Carcinogenic category 1A
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2 H371

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case scenario.

arsenic {arsenic pentoxide}

Arsenic pentoxide used as most hazardous species.

barium {barium sulphide}

Chromium VII at limits of detection. Barium sulphide used as the next most hazardous species. No chromate present.

cadmium {cadmium sulfate}

Cadmium sulphate used as the most hazardous species.

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Chromium VII at limits of detection. Lead compounds used as the next most hazardous species. No chromate present.

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight.

nickel {nickel sulfate}

Chromium VII at limits of detection. Nickel sulphate used as the next most hazardous species. No chromate present.

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

zinc {zinc sulphate}

Chromium VII at limits of detection. Zinc sulphate used as the next most hazardous species. No chromate present.

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2020.8.4129.8241 (08 Jan 2020)
HazWasteOnline Database: 2020.8.4129.8241 (08 Jan 2020)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

Appendix 6

Survey Data

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	706066.529	737456.859	61.17	306138.783	237431.241
BH02	706041.742	737508.553	61.27	306113.991	237482.946
BH03	705739.563	737540.229	60.73	305811.746	237514.627
BH04	705975.213	737597.506	60.78	306047.446	237571.918
Trial Pits					
TP01	706061.699	737437.955	61.21	306133.952	237412.333
TP02	706091.521	737509.203	61.26	306163.780	237483.596
TP03	705998.201	737457.656	62.19	306070.441	237432.038
TP04	706028.269	737511.536	61.25	306100.515	237485.929
TP05	705949.850	737466.642	61.89	306022.079	237441.025
TP06	705968.854	737523.898	61.89	306041.087	237498.294
TP07	705980.829	737566.711	61.11	306053.064	237541.116
TP08	705961.176	737541.093	61.65	306033.407	237515.492
TP09	705958.291	737510.084	61.74	306030.522	237484.477
TP10	705952.670	737577.442	60.65	306024.899	237551.849
TP11	705931.128	737482.664	61.88	306003.353	237457.051
TP12	705839.339	737497.150	61.58	305911.544	237471.539
TP13	705899.897	737517.227	62.50	305972.115	237491.621
TP14	705910.723	737547.182	61.69	305982.943	237521.583
TP15	705887.712	737549.128	61.82	305959.927	237523.529
TP16	705820.103	737528.588	60.96	305892.304	237502.984
TP17	705784.809	737511.471	60.74	305857.002	237485.863
TP18	705790.803	737540.254	60.67	305862.997	237514.652
TP19	705762.342	737532.911	60.95	305834.530	237507.307
TP20	705715.182	737540.018	60.24	305787.360	237514.416
TP21	705801.936	737607.409	60.20	305874.132	237581.822
TP22	705824.790	737570.436	60.22	305896.991	237544.841
TP23	705840.489	737601.985	60.18	305912.694	237576.397
TP24	705867.394	737570.820	60.72	305939.605	237545.225
TP25	705883.358	737579.562	60.54	305955.572	237553.969
TP26	705914.200	737588.331	60.39	305986.420	237562.740
TP27	705882.318	737602.217	60.25	305954.532	237576.629
TP28	705880.619	737637.530	60.36	305952.832	237611.950
TP29	705913.542	737616.906	60.52	305985.762	237591.322
TP30	705932.691	737635.516	60.96	306004.915	237609.936
TP31	705953.624	737617.591	60.90	306025.853	237592.007
TP32	705936.057	737601.948	60.54	306008.282	237576.361
TP33	705995.038	737589.348	60.59	306067.276	237563.758
TP34	706012.125	737637.917	61.19	306084.366	237612.338

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
TP35	705985.469	737672.796	61.58	306057.704	237647.224
TP36	706033.157	737679.038	61.86	306105.402	237653.468
TP37	705999.491	737710.735	61.90	306071.729	237685.172
TP38	706025.992	737712.636	61.95	306098.235	237687.073
TP39	706042.152	737711.912	62.04	306114.399	237686.349
Soakaway Tests					
SA01	706058.594	737508.084	61.24	306130.846	237482.477
SA02	705971.434	737575.889	60.77	306043.667	237550.296
SA03	705939.823	737573.313	60.60	306012.049	237547.719
SA04	705829.426	737502.223	61.38	305901.629	237476.613
SA05	705688.700	737541.598	59.78	305760.873	237515.996
California Bearing Ratio Tests					
CBR01	706018.192	737723.981	61.97	306090.434	237698.421
CBR02	705991.309	737705.476	61.81	306063.545	237679.911
CBR03	706033.048	737684.784	61.79	306105.293	237659.215
CBR04	705970.288	737641.005	61.15	306042.520	237615.426
CBR05	706002.202	737621.052	60.93	306074.441	237595.469
CBR06	705969.107	737569.509	61.12	306041.339	237543.915
CBR07	705992.569	737568.204	60.88	306064.806	237542.610
CBR08	705916.979	737552.707	61.52	305989.200	237527.109
CBR09	705919.893	737618.844	60.67	305992.114	237593.260
CBR10	705861.079	737564.348	60.80	305933.288	237538.752
CBR11	705853.084	737620.710	60.21	305925.291	237595.126
CBR12	705811.257	737614.837	60.00	305883.455	237589.252
CBR13	705780.971	737521.539	60.74	305853.163	237495.933
CBR14	705713.569	737554.556	60.23	305785.747	237528.957
CBR15	705778.400	737505.303	60.91	305850.592	237479.694
CBR16	705893.016	737546.152	61.84	305965.232	237520.552
CBR17	705838.384	737507.750	61.54	305910.589	237482.142
CBR18	705944.624	737546.758	61.64	306016.851	237521.159
CBR19	705936.304	737482.494	61.86	306008.530	237456.881
CBR20	705958.030	737469.044	62.10	306030.261	237443.428
CBR21	705974.000	737533.372	61.94	306046.234	237507.770
CBR22	706073.231	737513.002	61.18	306145.486	237487.396
CBR23	706119.083	737510.131	61.41	306191.348	237484.525
CBR24	706107.692	737491.697	61.12	306179.955	237466.087
CBR25	706089.481	737461.055	61.11	306161.740	237435.438

Site Investigations Ltd The Grange 12th Lock Road Lucan Co. Dublin T: 01 6108768 e: info@siteinvestigations.ie	Contract No:	5662	Client:	Castlethorn
	Contract Name:	Kellystown	Engineer:	Waterman Moylan
	Location:	Porterstown, Dublin 15	Scale:	1:2000
	Title:	Site Plan	Drawn By:	SL

Legend Key

- Locations By Type - CP
- Locations By Type - ICBR
- Locations By Type - IP