Appendix 10.1

Ground Investigations Ireland
Sandford Park Milltown
DBFL
Ground Investigation Report
October 2020

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

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APPENDICES

1.0 Preamble

On the instructions of DBFL Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between January and June 2020 at the site of the proposed residential development in Milltown Park in Milltown, Dublin 6, Co. Dublin. A second phase of investigation was undertaken in October 2020.

2.0 Overview

2.1. Background

It is proposed to construct a new residential development including apartments and town houses with associated services, access roads and car parking at the site. The site is currently the grounds of Millfield Park and is partly greenfield with a portion on the eastern side of the site occupied by a car park and existing access road. The proposed construction is envisaged to consist of conventional or piles foundations and pavement make up with some local excavations for services and plant. A basement is proposed as part of the proposed scheme beneath the apartments at the centre of the site which will require excavation of approximately 4m BGL.

2.2. Purpose and Scope

The purpose of the site investigation was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification. The scope of the work undertaken, including both phases of this investigation for this project included the following:

- Visit project site to observe existing conditions
- Carry out 11 No. Trial / Foundation Inspection Pits to determine existing foundation details
- Carry out 3 No. Soakaways to determine a soil infiltration value to BRE digest 365
- Carry out 14 No. Window Sample Boreholes to recover soil samples
- Carry out 13 No. Dynamic Probes to determine soil strength/density characteristics
- Carry out 16 No. Cable Percussion boreholes to a maximum depth of 8m BGL
- Carry out 5 No. Rotary Core follow on boreholes to a maximum depth of 20m BGL
- Carry out 9 No. Plate Load tests to determine CBR Value
- Carry out 1 No TRL probe to determine CBR Value
- Installation of 7 No. Groundwater monitoring wells
- Geotechnical & Environmental Laboratory testing
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling.
The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015.

3.2. Trial Pits / Foundation Pits

The trial pits were excavated using a JCB 3CX or 3T excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and the exposed foundations were logged and sketched prior to backfilling and reinstatement. The logs and sketches are provided in Appendix 2 of this Report.

3.3. Soakaway Testing

The soakaway testing was carried out in selected trial pits at the locations shown in the exploratory hole location plan in Appendix 1. These pits were carefully excavated and filled with water to assess the infiltration characteristics of the proposed site. The pits were allowed to drain and the drop in water level was recorded over time as required by BRE Digest 365. The pits were logged prior to completing the soakaway test and were backfilled with arising's upon completion. The soakaway test results are provided in Appendix 3 of this Report.

3.4. Window Sampling

The window sampling was carried out at the locations shown in the location plan in Appendix 1 using a Tecopsa SPT Tec 10 percussion drilling rig. The window sampling consists of a 1m long steel tube with a cutting edge and an internal plastic liner which is mechanically driven into the ground utilising a 50kg weight falling a height of 500mm. Upon completion of the 1m sample, the tube is withdrawn and the plastic liner removed and sealed for logging and sub sampling by a Geotechnical Engineer/Engineering Geologist. The tube is replaced in the borehole and a subsequent 1m sample can be recovered. Occasionally outer casing or a reduced diameter tube is utilised to enable the window sample to progress in difficult drilling conditions. Geotechnical or environmental soil samples can be recovered from each of the liners following logging. The window sample records are provided in Appendix 6 of this Report.

3.5. Dynamic Probing

The dynamic probe tests (DPH) were carried out at the locations shown in the location plan in Appendix 1 in accordance with B.S. 1377: Part 9 1990. The test consists of mechanically driving a cone with a 50kg weight in 100mm intervals and monitoring the number of blows required. An equivalent Standard Penetration Test (SPT) 'N' value may be calculated by dividing the total number of blows over a 300mm drive length by 1.5. The dynamic probe logs are provided in Appendix 5 of this Report.

3.6. Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing.

The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata.

Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60º cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix 7 of this Report.

3.7. Rotary Boreholes

The rotary coring was carried out by a track mounted T44 Beretta rig at the locations shown on the location plan in Appendix 1. The rotary boreholes were completed from the ground surface or alternatively, where noted on the individual borehole log, from the base of the cable percussion borehole where a temporary liner was installed to facilitate follow-on rotary coring.

The T44 Beretta is equipped with rubber tracks which allow for short travel on pavement surfaces avoiding any damage to the surface. The T44 Beretta utilises a triple tube core barrel system operated using a wireline drilling process. The outer barrel is rotated by the drill rods and at its lower end, carries the coring bit. The inner barrel is mounted on a swivel so that it does not rotate during the process. The third barrel or

liner is placed within the second one to retain the core intact and to preserve as much as possible the fabric of the drilling stratum. The core is cut by the coring bit and passes to the inner liner. The core is brought up to the surface within the inner barrel on a small diameter wire rope or line attached to the "overshoot" recovery tool which is then placed into a core box in order of recovery. A drilling fluid, typically air mist or water flush is passed from the surface through hollow drill rods to the drill bit and is used to cool the drill bit. Temporary casing is used in some situations to support unstable ground or to seal off fissures or voids. It should be noted that the rotary coring can only achieve limited recovery in overburden, particularly granular or weakly cemented strata due to the flushing medium washing away the cohesive fraction during coring. The recovery achieved, where required is noted on the borehole logs and core photographs are provided to allow assessment of the core recovered. The rotary borehole logs are provided in Appendix 7 of this Report.

3.8. Surveying

The exploratory hole locations have been recorded using a KQ GEO Technologies KQ-M8 System which records the coordinates and elevation of the locations to ITM or Irish National Grid as required by the project specification. The coordinates and elevations will be included on the exploratory hole logs in the appendices of the final Report. Where levels are not shown on the logs coordinates were taken from GIS.

3.9. Groundwater/Gas Monitoring Installations

Groundwater and or Gas Monitoring Installation were installed upon the completion of the boreholes to enable sampling and the determination of the equilibrium groundwater level. The typical groundwater monitoring installation consists of a 50mm HDPE slotted pipe with a pea gravel response zone and bentonite seal installed to the Engineers specification. Where required the standpipe is sealed with a gas tap and finished with a durable steel cover fixed in place with a concrete surround. The installation details are provided on the exploratory hole logs in the appendices of this Report.

3.10. Insitu Plate Bearing Test

The plate bearing tests were carried out using a 305mm or 450mm diameter plate at the locations shown on the site plan in Appendix 1. The plate was loaded in increments using a hydraulic jack and an excavator to provide a reaction and the displacement was monitored in accordance with BS1377 Part 9 using independently mounted digital strain gauges. The constrained modulus and equivalent CBR are calculated in accordance with HD29/75 and are provided on the test reports in Appendix 4 of this Report.

3.1. TRL Dynamic Cone Penetrometer

The TRL DCP tests were carried out at locations where plate load tests were not possible, to determine a CBR design value for the design of external pavements. The testing was carried out below the Topsoil or existing pavement at the depths detailed on the test report. The test consists of dropping a 10kg weight on

an anvil to drive a small diameter cone and recording the blows for a given penetration. The results of the DCP testing is included in Appendix 4 of this Report.

3.2. Laboratory Testing

Samples were selected from the exploratory holes for a range of geotechnical and environmental testing to assist in the classification of soils and to provide information for the proposed design.
Environmental & Chemical testing as required by the specification, including the Rilta Suite pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK. The Rilta suite testing includes both Solid Waste and Leachate Waste Acceptance Criteria.
Geotechnical testing consisting of moisture content, Atterberg limits, Particle Size Distribution (PSD), hydrometer tests were carried out in NMTL's Geotechnical Laboratory in Carlow.
The results of the laboratory testing are included in Appendix 8 of this Report.

4.0 Ground Conditions

4.1. General

The ground conditions encountered during the investigation are summarised below with reference to insitu and laboratory test results. The full details of the strata encountered during the ground investigation are provided in the exploratory hole logs included in the appendices of this report.

The sequence of strata encountered were consistent across the site and are generally comprised;

- Topsoil/Surfacing
- Made Ground
- Cohesive Deposits
- Granular Deposits (Rarely Encountered)
- Bedrock

TOPSOIL/SURFACING: Topsoil was encountered in the majority of the exploratory holes and was typically present to a depth of between 0.20 and 0.40m BGL with a maximum depth of 0.7m BGL encountered in TP05. Tarmac surfacing was present in WS04, WS12, BH05 and BH11 typically to a depth of between 0.08m and 0.10mBGL. Concrete was encountered in BH08 to a depth on 0.10m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil/Surfacing in some investigation locations and were present to a depth of between 0.5m and 1.0m BGL. These deposits were described generally as *brown slightly sandy slightly gravelly CLAY with occasional cobbles* or *grey sandy angular Gravel.* In some locations the made ground contained *occasional fragments of mortar, red brick, and charcoal.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Topsoil or Made Ground and were described typically as *brown slightly sandy slightly gravelly CLAY with occasional cobbles* overlying a *stiff or very stiff dark grey /black slightly sandy slightly gravelly CLAY with occasional cobbles*. A brown *very stiff slightly sandy slightly gravelly CLAY* was also encountered in some boreholes below the dark grey/black clay. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits typically increased with depth and was very stiff below 2.2m BGL in the majority of the exploratory holes with some extending to 2.6m BGL before very stiff deposits were encountered.

GRANULAR DEPOSITS: Granular deposits were encountered in BH16 within the cohesive deposits and were typically described as G*rey brown slightly clayey sandy sub angular sub rounded fine to coarse GRAVEL with occasional cobbles.*
Based on the SPT N values the deposits are typically medium dense. A significant groundwater strike was noted in the borehole on encountering the granular deposits.

BEDROCK: The rotary core boreholes recovered weak to strong grey/dark grey fine to medium grained LIMESTONE w calcite veining. In some locations the beds of stiff brown clay were encountered which have been interpreted as residual weathered mudstone. This is typical of the Calp Formation, which is noted on the geological mapping to the east of the proposed site.
The depth to rock varies from 9.0m BGL in BH11 to a maximum of 18.45m BGL in BH03. In BH03 there was poor recovery and where cobbles of limestone where recovered that presumed to be rock. Generally rock was encountered at higher levels in the eastern area of the site. The total core recovery is good, typically 100% with some of the uppermost runs dropping to 80 or 90%. The SCR and RQD vary in the borehole across the site, with some core recovered as non-intact and some hole encountering clay bands within the limestone, however generally both indices show an increase with depth.

4.2. Insitu Strength Testing

The correlated DPH blow counts indicate that the overburden deposits are typically soft to depths of between 0.7 and 1.6m BGL and become firm to stiff and stiff to very stiff with depth. Generally stiff soils were encountered from between depths of 1.2 and 2.4m BGL at the dynamic probe locations.

4.3. Groundwater

Groundwater strikes are noted on the exploratory hole logs where they occurred and where possible drilling was suspended for twenty minutes to allow the subsequent rise in groundwater to be recorded. We would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the tide, time of year, rainfall, nearby construction and other factors. For this reason, standpipes were installed in BH02, BH03, BH07, BH09, BH11 BH14 and BH16 to allow the equilibrium groundwater level to be determined. The groundwater monitoring will be included in Appendix 9 of the final Report.

4.4. Laboratory Testing

4.4.1. Geotechnical Laboratory Testing

The geotechnical testing carried out on soil samples recovered generally confirm the descriptions on the logs with the primary constituent of the cohesive deposits found to be a CLAY of low to intermediate plasticity. The Particle Size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 20% and 30% generally with fines contents of 40% to 60%.

4.4.1. Chemical Laboratory Testing

The pH and sulphate testing carried out indicate that pH results are near neutral and that the water soluble sulphate results is low when compared to the guideline values from BRE Special Digest 1:2005. The samples tested classify the soil as a Design Sulphate Level DS-1.

4.4.1. Environmental Laboratory Testing

A number of samples were analysed for a suite of parameters which allows for the assessment of the sampled material in terms of total pollutant content for classification of materials as *hazardous* or *non-hazardous*. The suite also allows for the assessment of the sampled material in terms of suitability for placement at licenced landfills (inert, stable non-reactive, hazardous etc.). The parameter list for the suite includes analysis of the solid samples for arsenic, barium, cadmium, chromium, copper, cyanide, lead, nickel, mercury, zinc, speciated aliphatic and aromatic petroleum hydrocarbons, pH, sulphate, sulphide, moisture content, soil organic matter and an asbestos screen.

The suite also includes those parameters specified in the EU Council Decision establishing criteria for the acceptance of waste at Landfills (Council Decision 2003/33/EC), which for the solid samples are total organic carbon (TOC), speciated aliphatic and aromatic petroleum hydrocarbons, BTEX, phenol, polychlorinated biphenyls (PCB) and PAH.

As part of the suite a leachate is generated from the solid sample which is analysed for antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, chloride, fluoride, soluble sulphate, sulphide, phenols, dissolved organic carbon (DOC) and total dissolved solids (TDS).

While the laboratory report provides a comparison with the waste acceptance criteria limits it does not provide a waste classification of the material sampled nor does it comment on any potentially hazardous properties of the materials tested. The possibility for contamination, not revealed by the testing undertaken should be borne in mind particularly where Made Ground deposits are present or the previous site use or location indicate a risk of environmental variation. The waste classification report is included under the cover of a sperate report by Ground Investigations Ireland.

5.0 Recommendations & Conclusions

5.1. General

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 exploratory hole locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the exploratory holes. Limited information has been provided at the ground investigation stage and any designs based on the recommendations or conclusions should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory hole logs.

5.2. Foundations

An allowable bearing capacity of 200 kN/m^2 is recommended for conventional strip or pad foundations on the stiff or very stiff dark grey/back cohesive deposits encountered at a depth of between 2.0m and 2.6m BGL on the northern part of the site.

On the western part of the site where the 3 storey structures are proposed in the locations of DP03 to DP06 and DP10 to DP12 a bearing capacity 100 kN/m^2 is achievable at depths of between 1.2m and 1.5m BGL.

For the area of the proposed basement a bearing capacity of 350 kN/m^2 would be achievable at 4 m below ground level in the very stiff dark grey Clay, however a settlement assessment should be carried out to ensure the structure can deal with the potential settlement, total and differential due to this increased loading.

In the area to the west on the existing building in the location of BH13, BH16, DP01 and DP02 where a 5 story building is proposed an allowable bearing capacity of 200 kN/m^2 is achievable between depths of 2.0 and 2.6mBGL for conventional strip or pad foundations on the stiff or very stiff dark grey/back cohesive deposits or medium dense granular deposits. It should be noted that the strata varied between holes in this area so foundation inspections should be undertaken and it is recommended that the foundations from the structure be placed on the same strata to avoid differential settlement.

For the area to the south of the existing building near to the location of BH13, BH14 and BH15 where a 7 story building is proposed, a bearing capacity of 200 kN/m^2 would be achievable at depths of between 2.4m to 2.7m BGL and below ground level in the very stiff dark grey Clay. A bearing capacity of 125 kN/m^2 is achievable on the firm to stiff brown clay at a depth of 2.0m BGL.

The possibility for variation in the depth of the made ground of soft ground in the vicinity of these foundations should be considered and foundation inspections should be carried out. Any soft spots encountered at the proposed foundation depths should be excavated and replaced with lean mix concrete.

A ground bearing floor slab is recommended to be based on the firm to stiff cohesive deposits with an appropriate depth of compacted hardcore specified by the consulting engineer and in accordance with the limits and guidelines in SR21:2014 +A1:2016 and/or NRA SRW CL808 Type E granular stone fill. Where the depth of Made Ground/Soft deposits exceeds 0.9m then suspended floor slabs should be considered.

Due to the potential high loading anticipated from some of the proposed structures, piled foundations may be more economically advantageous. The type, size and depth of the pile foundations should be confirmed by a specialist piling contractor based on the loading from the proposed building.

The pH and sulphate testing completed on samples recovered from the exploratory holes indicates the pH results are near neutral and the sulphate results are low, when compared to the guideline values from BRE Special Digest 1:2005. No special precautions are required for concrete foundations to prevent sulphate attack. The samples tested were below the limits of DS1 in the BRE Special Digest 1:2005.

5.3. External Pavements

The proposed pavements are recommended to be designed in accordance with the CBR test results included in the Appendixes of this Report. The low CBR test results indicate that a capping layer or a sufficient depth of crushed stone fill may be required. Plate bearing tests are recommended at the time of construction to verify the design assumptions for the proposed pavement make up and to verify adequate compaction has been achieved.

The use of a geogrid and separation membrane may improve the performance of the proposed pavement and enable a more economical pavement design to be achieved, a specialist supplier is recommended to advise of the required strength, depth and type of geotextile for the proposed design.

5.4. Excavations

Short term temporary excavations in the cohesive deposits will remain stable for a limited time only and will require to be appropriately battered or the sides supported if the excavation is below 1.25m BGL or is required to permit man entry.

Excavations in the Made Ground, or soft Cohesive Deposits will require to be appropriately battered or the sides supported due to the low strength of these deposits.

Any excavations which penetrate the granular deposits will require to be appropriately battered or the sides supported and are likely to require dewatering due to the groundwater seepages noted in the exploratory hole logs in the Appendices of this Report.

The groundwater and stability noted on the trial pit logs should be consulted when determining the most appropriate construction methods for excavations. An assessment by a specialist dewatering contractor is recommended to determine the most cost effective approach to the proposed excavation.

Excavations in the upper cohesive deposits are expected to be excavatable with conventional excavation equipment.

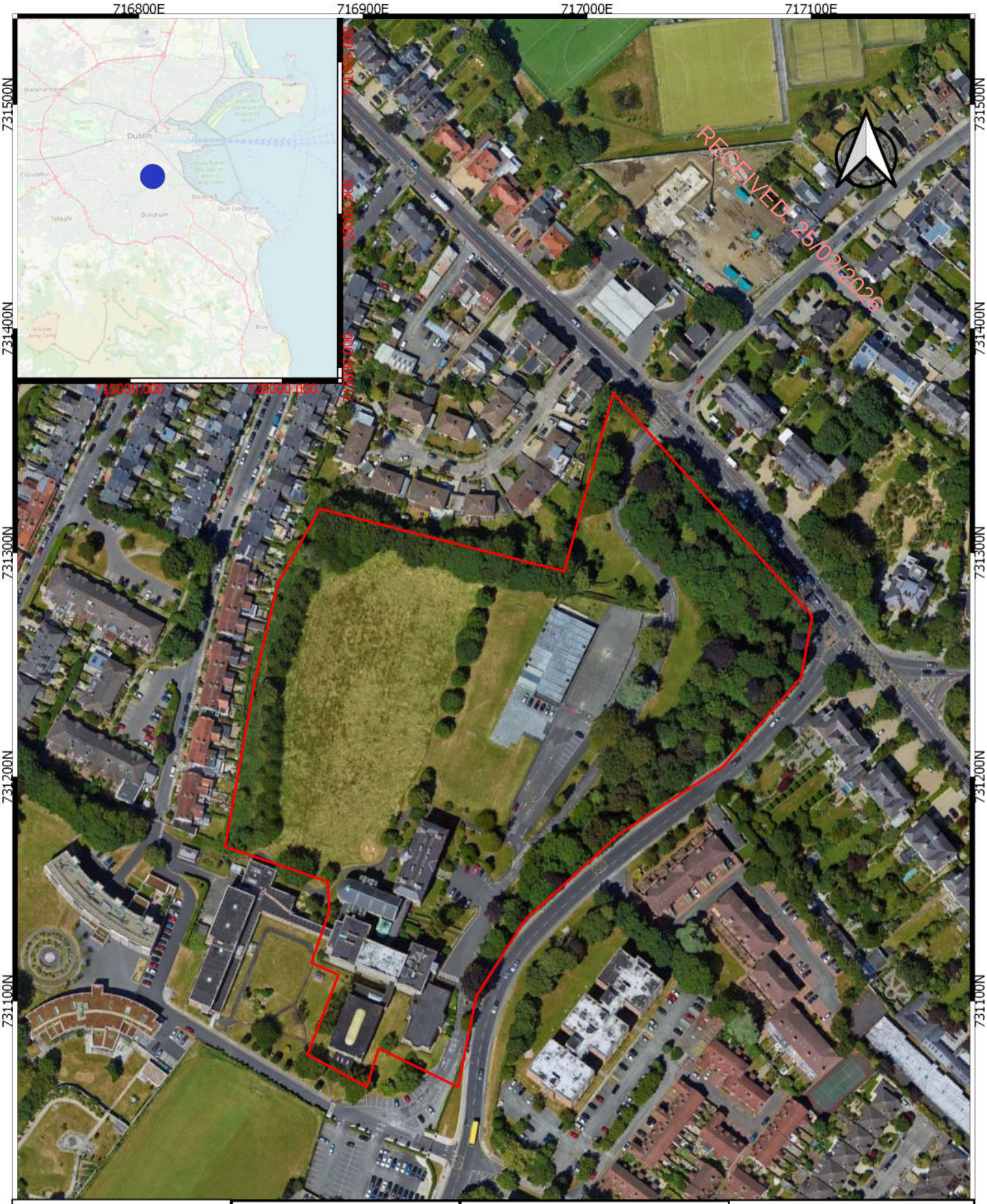
Any waste material to be removed off site should be disposed of to a suitably licenced landfill.
The environmental testing completed during the ground investigation is reported under the cover of a separate GII Waste Classification/Subsoil Assessment Report.

5.5. Soakaway Design

At the locations of SA01, SA02 and SA03 the water level dropped too slowly to allow calculation of the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction.

The recommendations provided in this report should be verified in the design of the proposed buildings, using the full details of the loading conditions and taking into consideration the allowable tolerable settlements/movements that the building can accommodate. The founding strata should be inspected and verified by a suitably qualified engineer prior to construction of the building foundations.

APPENDIX 1 - Site Location Plan



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Client:

Project Title:
Sandford Park

Drawing Title:
Figure 1 Site Location

GII Project Reference:
9338-12-19

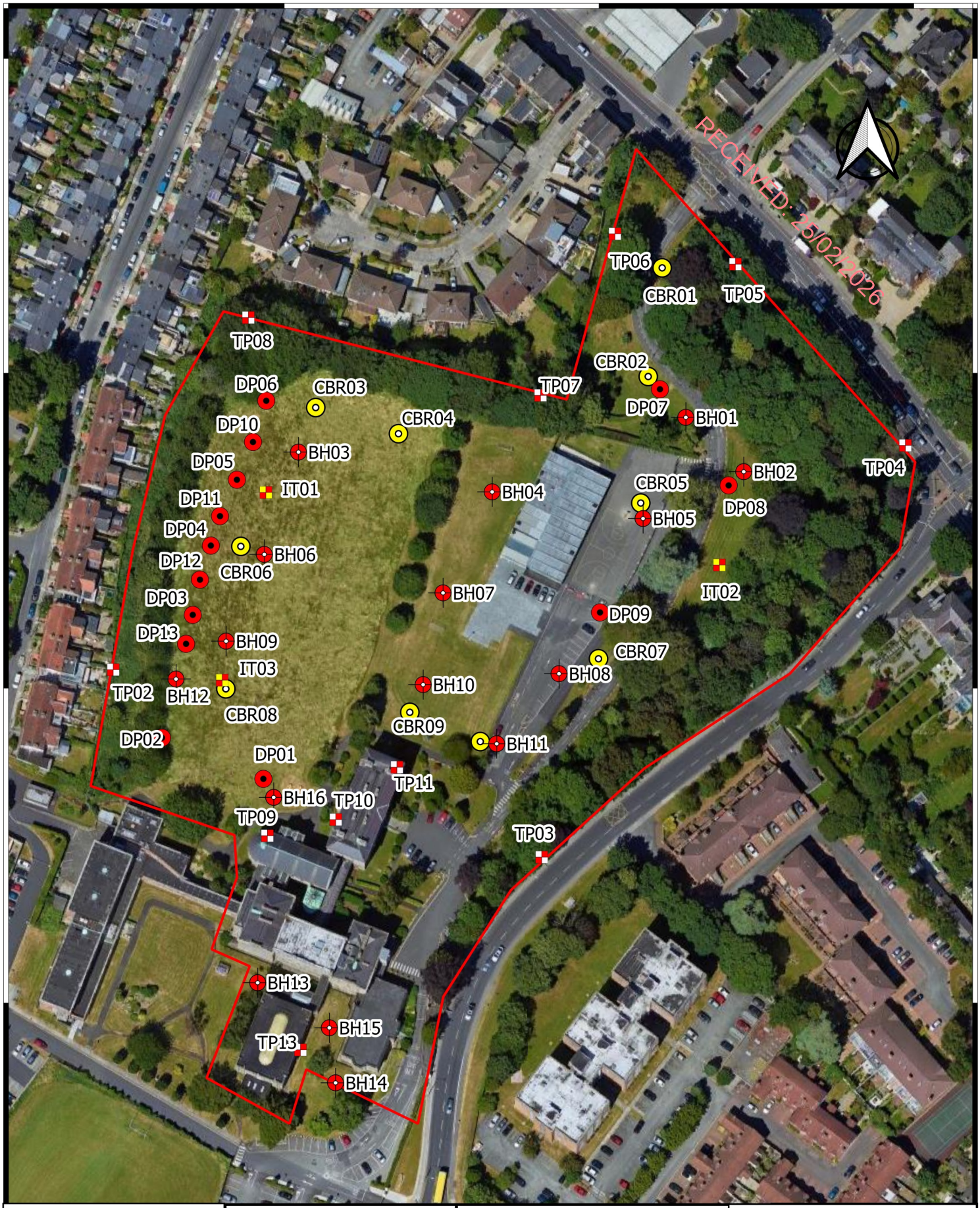
0 20 40 60 80 m

Drawn By:
NM

Date:
18/06/2020

Site Location

Indicative Site Boundary



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Client:

0 20 40 60 m

Project Title:
Sandford Park

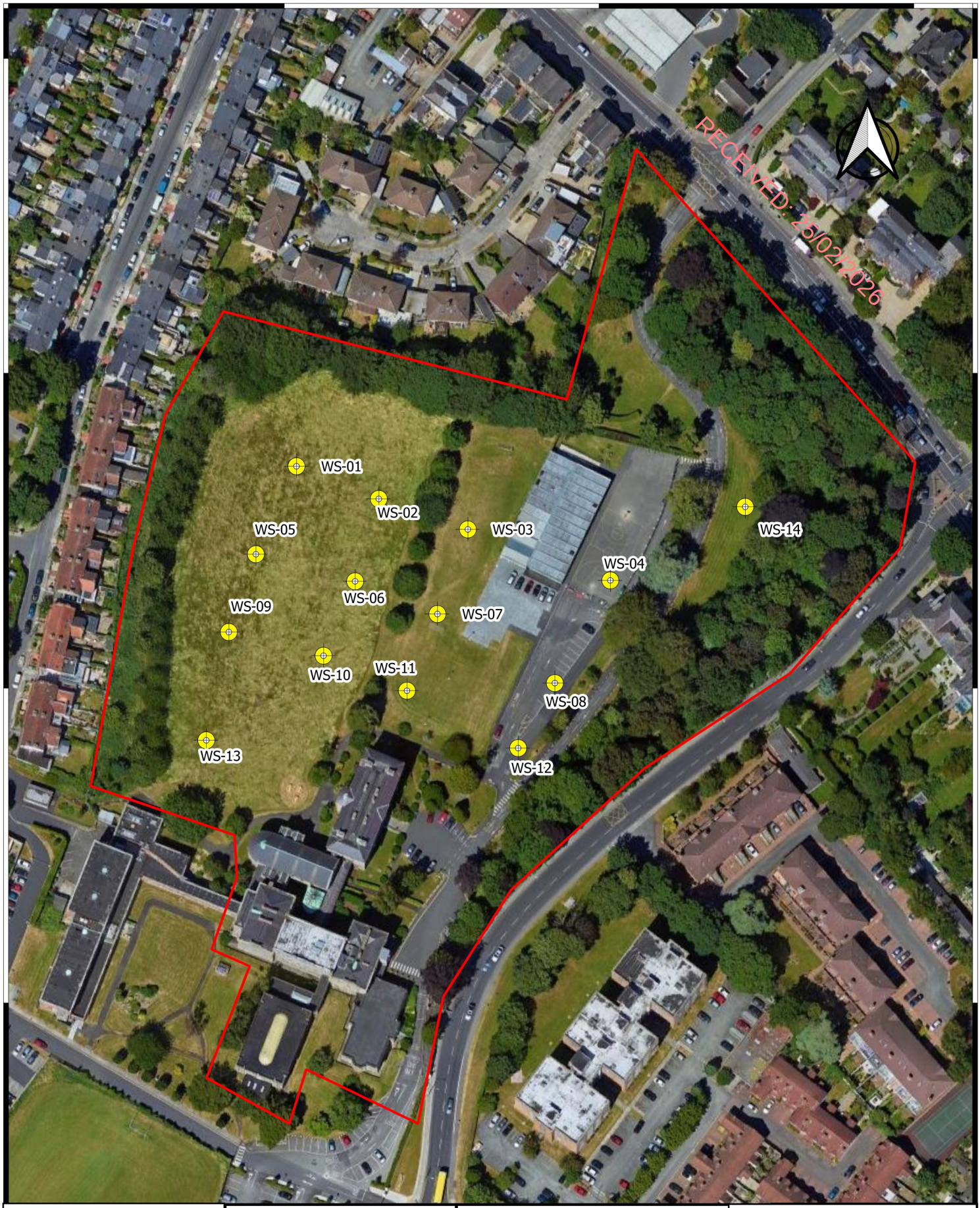
Drawing Title:
Figure 2: GI Locations

GII Project Reference:
9338-12-19

Drawn By:
NM

Date:
23/10/2020

- Indicative Site Boundary
- Borehole
- CBR
- Dynamic Probe
- Trial Pit
- Window Sample
- Soakaway



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Client:

0 20 40 60 m

Project Title:
Sandford Park

Drawing Title:
Figure 3: WS Locations

GII Project Reference:
9338-12-19

Drawn By:
NM

Date:
23/10/2020

- Indicative Site Boundary
- Borehole
- CBR
- Dynamic Probe
- Trial Pit
- Window Sample
- Soakaway

APPENDIX 2 – Trial Pit Records

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Site Sandford Park Milltown			**Trial Pit Number** TP02
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 0.6m W x 1.2m L	**Ground Level (mOD)**	**Client** DBFL
	Location 716845.6 E 731205.5 N	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	TOPSOIL.		
					(0.55) 0.75	Firm light brown slightly sandy slightly gravelly CLAY.		
					(0.30) 1.05	Firm to stiff brown slightly sandy slightly gravelly CLAY with occasional sub-angular cobbles.		
						Complete at 1.05m		

Plan

Remarks

Groundwater not encountered during excavation.
Trial pit stable.
Trial pit terminated at 1.05m BGL on exposing the foundation and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	NM	9338-12-19.TP02

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Site Sandford Park Milltown			**Trial Pit Number** TP03
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 0.6m W x 1.4m L	**Ground Level (mOD)**	**Client** DBFL
	Location 716981.8 E 731146 N	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	MADE GROUND: Topsoil with roots plastic redbrick and concrete fragments.		
					0.30	MADE GROUND: Brown slightly sandy slightly gravelly CLAY with root concrete and fragments.		
					(0.90)			
					1.20	Complete at 1.20m		

Plan

Remarks

Groundwater not encountered during excavation.
Trial pit stable.
Trial pit terminated at 1.20m BGL due to a concrete protection and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	NM	9338-12-19.TP03

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Site Sandford Park Milltown			**Trial Pit Number** TP04
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 0.6m W x 1.5m L	**Ground Level (mOD)**	**Client** DBFL
	Location 717097.4 E 731276.8 N	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	TOPSOIL with roots.		
					(0.50) 0.70	Firm dark brown slightly sandy slightly gravelly CLAY with root fragments.		
					(0.70) 1.40	Firm to stiff light brown slightly sandy slightly gravelly CLAY.		
						Complete at 1.40m		

Plan

Remarks

Groundwater not encountered during excavation.
Trial pit stable.
Trial pit terminated at 1.40m BGL on exposing the foundation and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	NM	9338-12-19.TP04

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Trial Pit Number** TP05
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 0.6m W x 1.5m L	**Ground Level (mOD)**	**Client** DBFL
	Location 717043.4 E 731334.3 N	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.70)	TOPSOIL with roots.		
					0.70			
					(0.80)	Firm to stiff brown slightly sandy slightly gravelly CLAY.		
					1.50	Complete at 1.50m		

Plan

Remarks

Groundwater not encountered during excavation.
Trial pit stable.
Trial pit terminated at 1.50m BGL on exposing the foundation and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	NM	9338-12-19.TP05

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Trial Pit Number** TP06
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 0.6m W x 1.2m L	**Ground Level (mOD)**	**Client** DBFL
	Location 717005.1 E 731344 N	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25) 0.25	TOPSOIL with small concrete and plastic fragments.		
					(0.75)	Firm dark brown slightly sandy slightly gravelly CLAY.		
					1.00	Complete at 1.00m		

Plan

Remarks

Groundwater not encountered during excavation.
Trial pit stable.
Trial pit terminated at 1.0m BGL on exposing the foundation and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	NM	9338-12-19.TP06

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Trial Pit Number** TP07
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 0.6m W x 1.3m L	**Ground Level (mOD)**	**Client** DBFL
	Location 716981.4 E 731292.7 N	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25) 0.25	TOPSOIL.		
					(0.90)	Firm to stiff light brown slightly sandy slightly gravelly CLAY.		
					1.15	Complete at 1.15m		

Plan

Remarks

Groundwater not encountered during excavation.
Trial pit stable.
Trial pit terminated at 1.15m BGL on exposing the foundation and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	NM	9338-12-19.TP07

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Trial Pit Number** TP08
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 0.6m W x 1.5m L	**Ground Level (mOD)**	**Client** DBFL
	Location 716888.6 E 731317.4 N	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40)	MADE GROUND: Topsoil with roots plastic redbrick and concrete fragments.		
					0.40			
					(0.30)	Firm light brown grey slightly sandy slightly gravelly CLAY.		
					0.70			
					(0.50)	Firm to stiff light brown slightly sandy slightly gravelly CLAY.		
					1.20	Complete at 1.20m		

Plan

Remarks

Groundwater not encountered during excavation.
Trial pit stable.
Trial pit terminated at 1.20m BGL on exposing the foundation and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	NM	9338-12-19.TP08

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Trial Pit Number** TP09
Machine : 3T 360 **Method :** Trial Pit	**Dimensions** 0.6m W x 2.0m L	**Ground Level (mOD)** 20.90	**Client** DBFL
	Location (dGPS) 716894.6 E 731152.8 N	**Dates** 27/01/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Topsoil		
				20.75	0.15	Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is angular to subrounded fine to coarse.		
0.50	B				(0.45)			
				20.30	0.60	Stiff greyish brown slightly sandy slightly gravelly CLAY with occasional subanugular cobbles and boulders. Gravel is angular to subrounded fine to coarse.		
1.00	B				(0.80)			
				19.50	1.40	Complete at 1.40m		

Plan

Remarks

Groundwater encountered at 1.40m
Trial pit stable.
Trial pit terminated at 1.40m BGL on exposing the foundation and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	PC	9338-12-19.TP09

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Trial Pit Number** TP10
Machine : 3T 360 **Method :** Trial Pit	**Dimensions** 0.6m W x 1.1m L	**Ground Level (mOD)**	**Client** DBFL
	Location (Handheld GPS) 716916.4 E 731157.9 N	**Dates** 27/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15) 0.15	Topsoil		
					(0.25) 0.40	MADE GROUND: Brown slightly gravelly sandy Clay with occassional fragments of metal and red brick.		
					(0.40) 0.80	Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is angular to subrounded fine to coarse.		
					(0.40) 1.20	Stiff brown mottled grey slightly sandy slightly gravelly CLAY with occasional subanugular cobbles and boulders. Gravel is angular to subrounded fine to coarse.		
1.20	B					Complete at 1.20m		

Plan

Remarks

Groundwater not encountered during excavation.
Trial pit stable.
Trial pit terminated at 1.20m BGL on exposing the foundation and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	PC	9338-12-19.TP10

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Trial Pit Number** TP11
Machine : 3T 360 **Method :** Trial Pit	**Dimensions** 0.6m W x 1.6m L	**Ground Level (mOD)** 20.81	**Client** DBFL
	Location (dGPS) 716935.8 E 731174.6 N	**Dates** 27/01/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Topsoil		
				20.66	0.15			
					(0.15)	MADE GROUND: Brown slightly gravelly sandy Clay with occassional fragments of red brick.		
				20.51	0.30			
						Stiff brown mottled grey slightly sandy slightly gravelly CLAY with occasional subanugular cobbles and boulders. Gravel is angular to subrounded fine to coarse.		
					(0.70)			
0.80	B							
				19.81	1.00			
						Complete at 1.00m		

Plan

Remarks

Groundwater not encountered during excavation.
Trial pit stable.
Trial pit terminated at 1.00m BGL on exposing the foundation and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	PC	9338-12-19.TP11

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Trial Pit Number** TP13
Machine : 3T 360 **Method :** Trial Pit	**Dimensions** 0.6m W x 1.0m L	**Ground Level (mOD)** 21.95	**Client** DBFL
	Location (dGPS) 716905.1 E 731084.8 N	**Dates** 27/01/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Topsoil		
				21.80	0.15	MADE GROUND: Brown slightly gravelly sandy Clay with rootlets and occassional fragments of glass and red brick.		
					(0.45)			
0.50	B			21.35	0.60	Stiff brown mottled grey slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is angular to subrounded fine to coarse. Possible madeground.		
1.00	B				(0.70)			
				20.65	1.30	Complete at 1.30m		

Plan

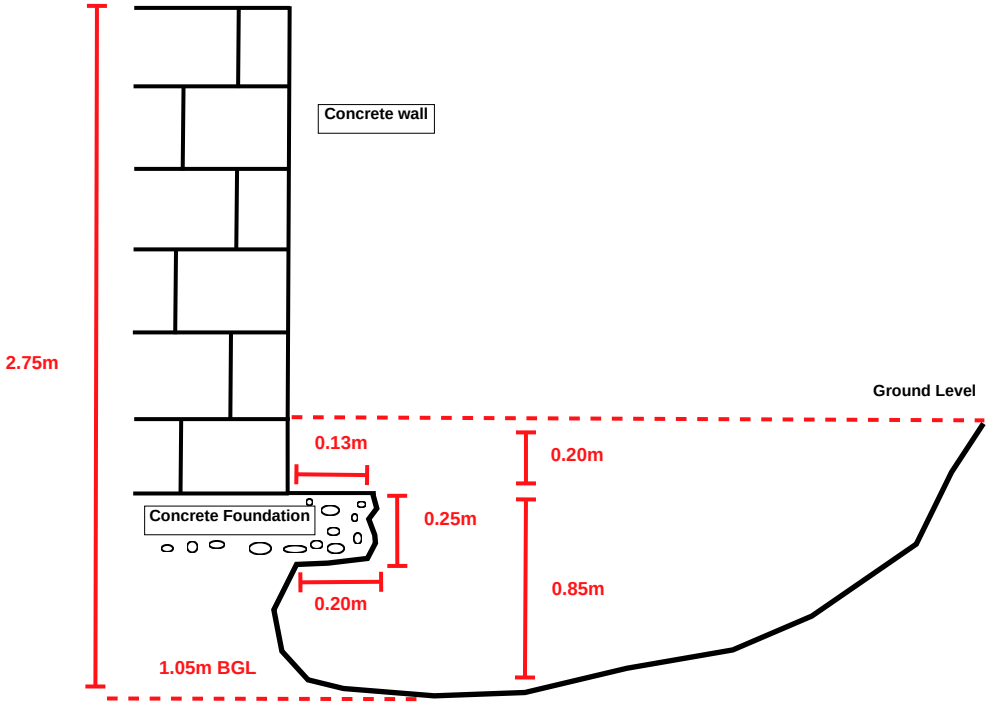
Remarks

Groundwater not encountered during excavation.
Trial pit stable.
Trial pit terminated at 1.30m BGL on exposing the foundation and backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	PC	9338-12-19.TP13

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

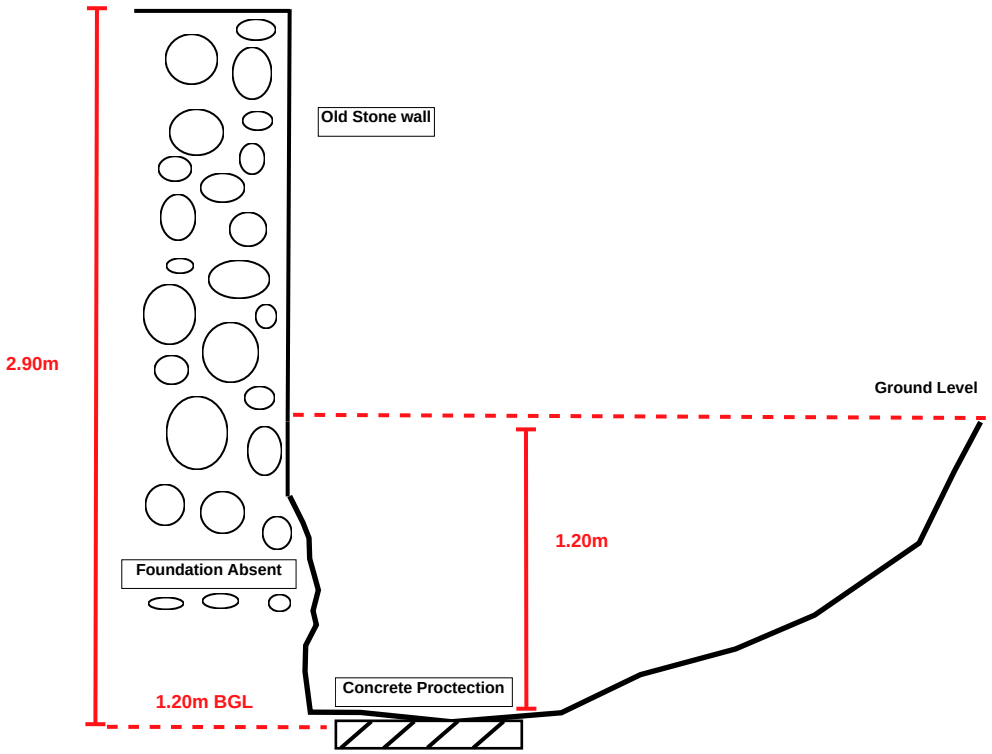
TP02 Sketch



Site	Sandford Park Milltown	**TP02 Sketch**	
Engineer	DBFL		
Contractor	Ground Investigations Ireland Ltd	Date	17/01/2020

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

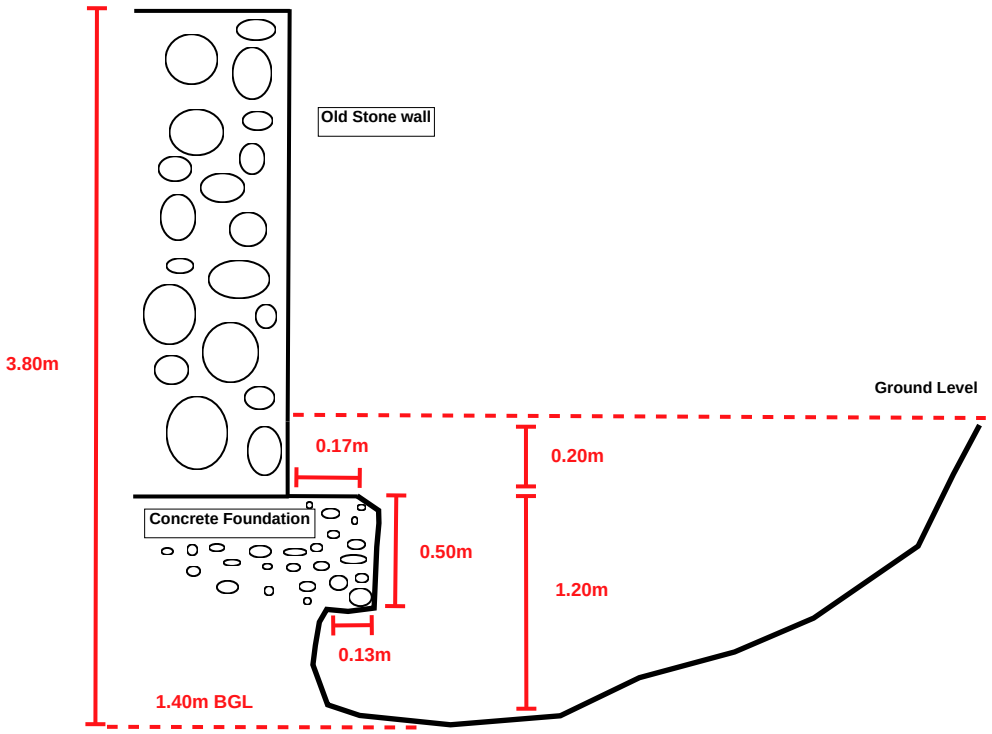
TP03 Sketch



Site	Sandford Park Milltown	**TP03 Sketch**	
Engineer	DBFL		
Contractor	Ground Investigations Ireland Ltd	Date	17/01/2020

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

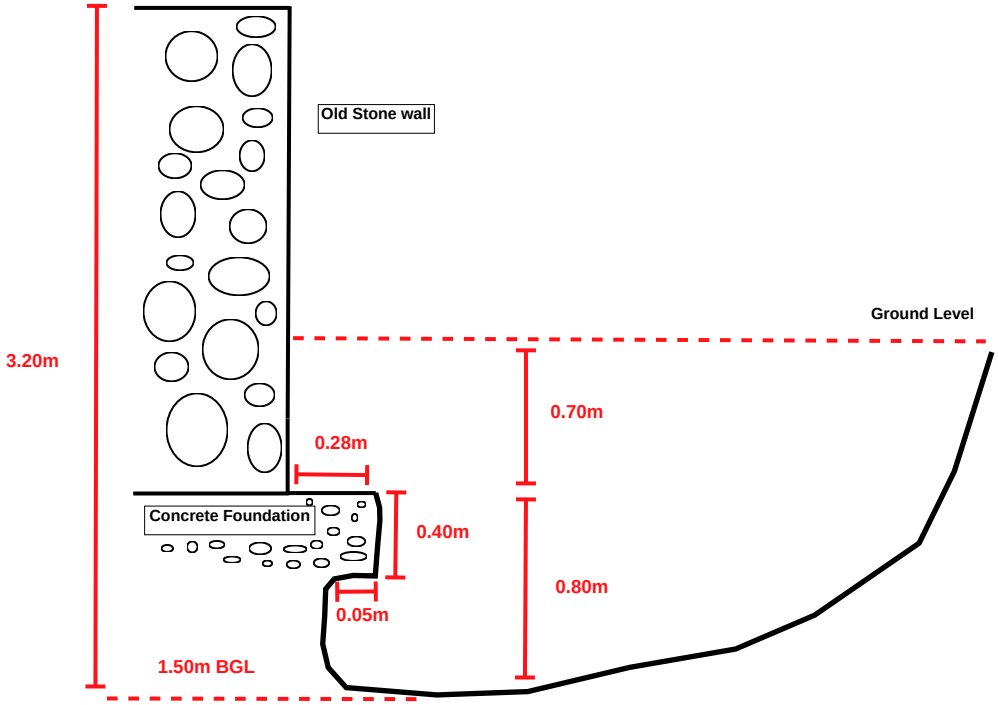
TP04 Sketch



Site	Sandford Park Milltown	**TP04 Sketch**	
Engineer	DBFL		
Contractor	Ground Investigations Ireland Ltd	Date	17/01/2020

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

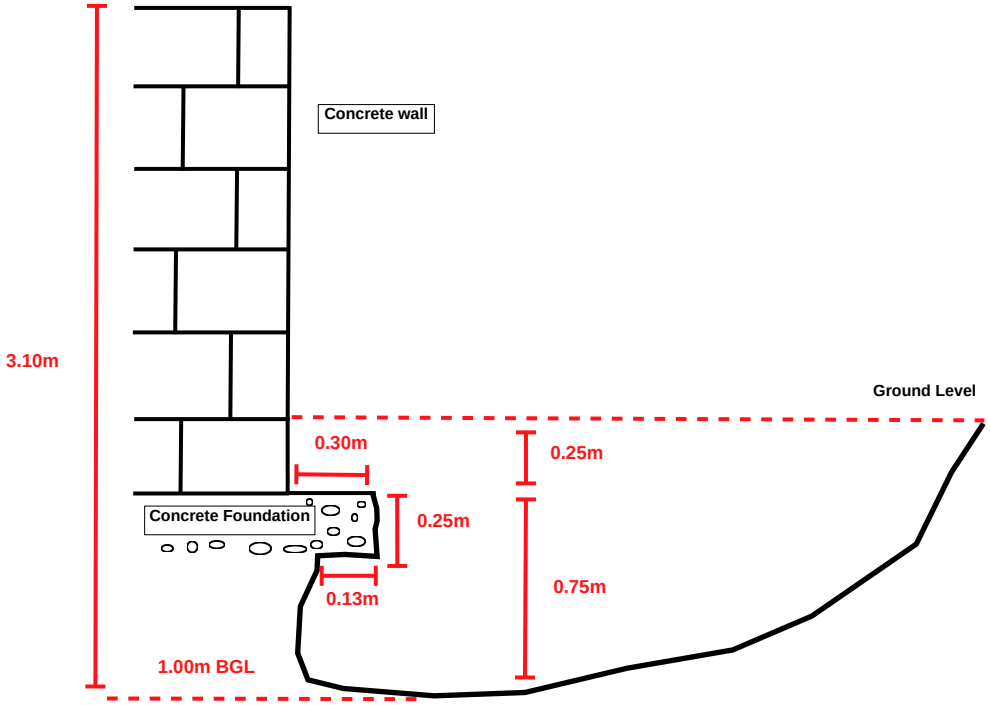
TP05 Sketch



Site	Sandford Park Milltown	**TP05 Sketch**	
Engineer	DBFL		
Contractor	Ground Investigations Ireland Ltd	Date	17/01/2020

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

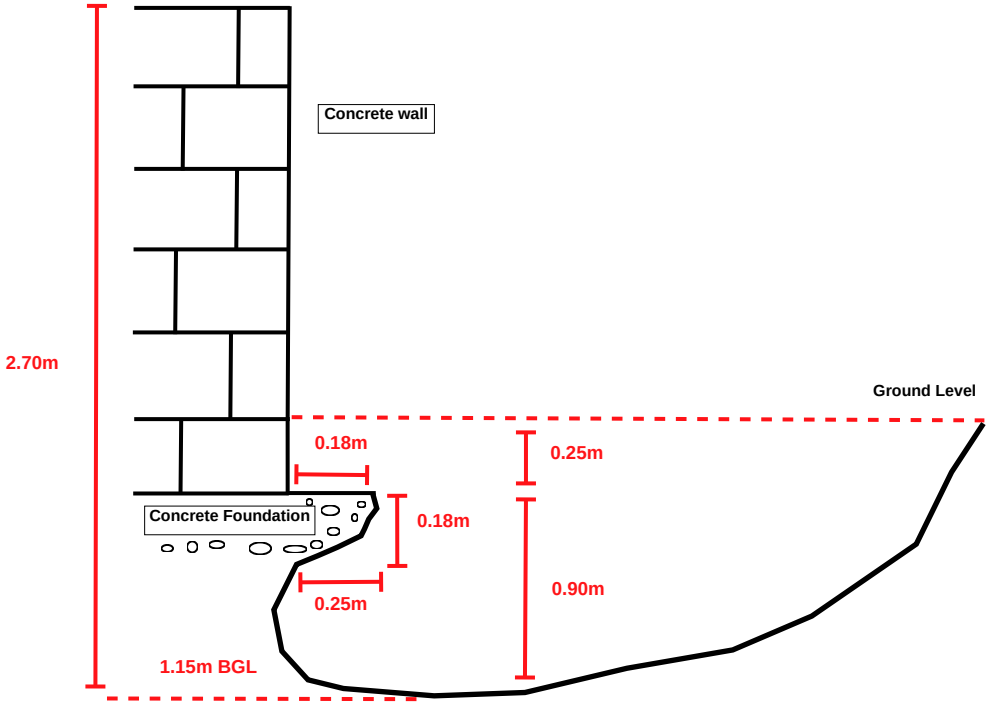
TP06 Sketch



Site	Sandford Park Milltown	**TP06 Sketch**	
Engineer	DBFL		
Contractor	Ground Investigations Ireland Ltd	Date	17/01/2020

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

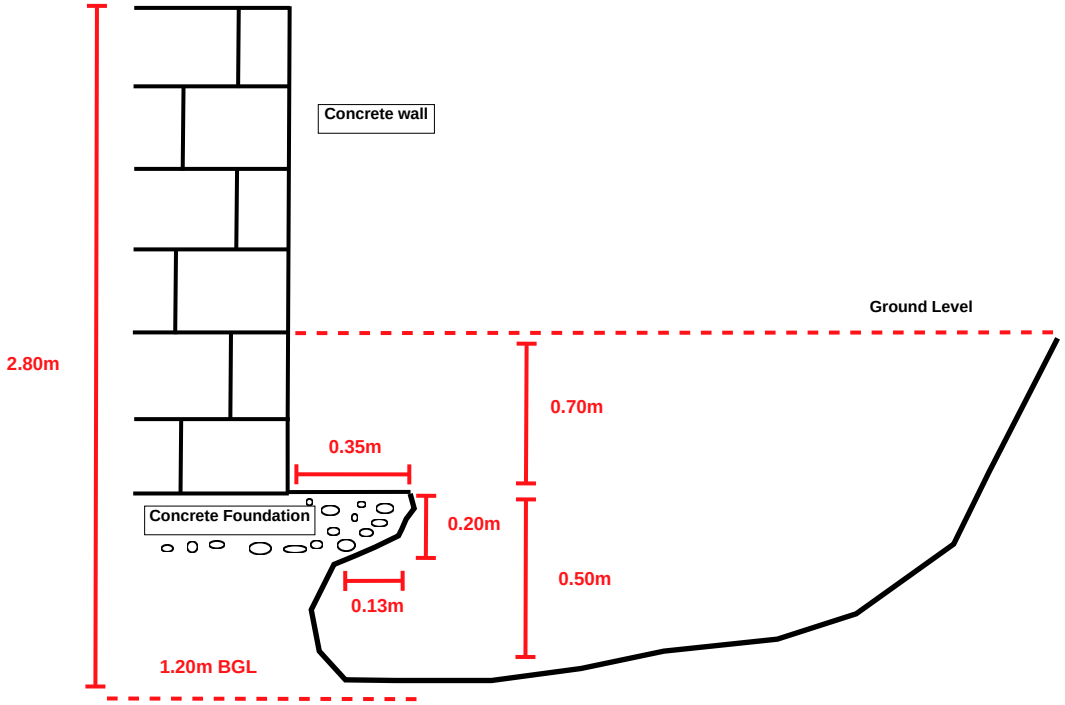
TP07 Sketch



Site	Sandford Park Milltown	**TP07 Sketch**	
Engineer	DBFL		
Contractor	Ground Investigations Ireland Ltd	Date	17/01/2020

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

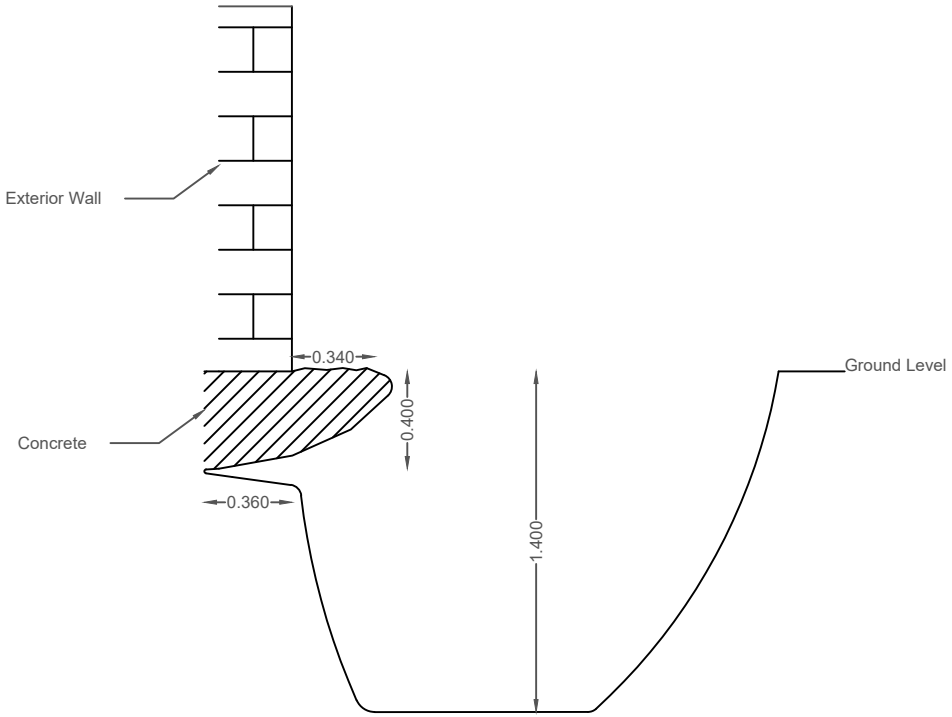
TP08 Sketch



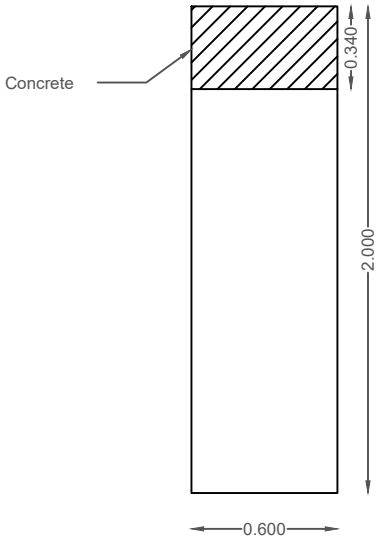
Site	Sandford Park Milltown	**TP08 Sketch**	
Engineer	DBFL		
Contractor	Ground Investigations Ireland Ltd	Date	17/01/2020

TP09

Side View



Plan View



From (m)	To (m)	Description
0.00	0.15	TOPSOIL
0.15	0.60	Firm to stiff brown mottled grey slightly gravelly slightly sandy CLAY with occasional subangular cobbles. Gravel is angular to subrounded fine to coarse
0.60	1.40	Stiff greyish brown slightly gravelly slightly sandy CLAY with occasional subangular cobbles and boulders. Gravel is angular to subrounded

Groundwater	Y/N	Depth
	Y	1.40m

Sample Type	Sample Depth
Bag	0.50m
Bag	1.00m

DATE OF EXCAVATION : 27/05/20

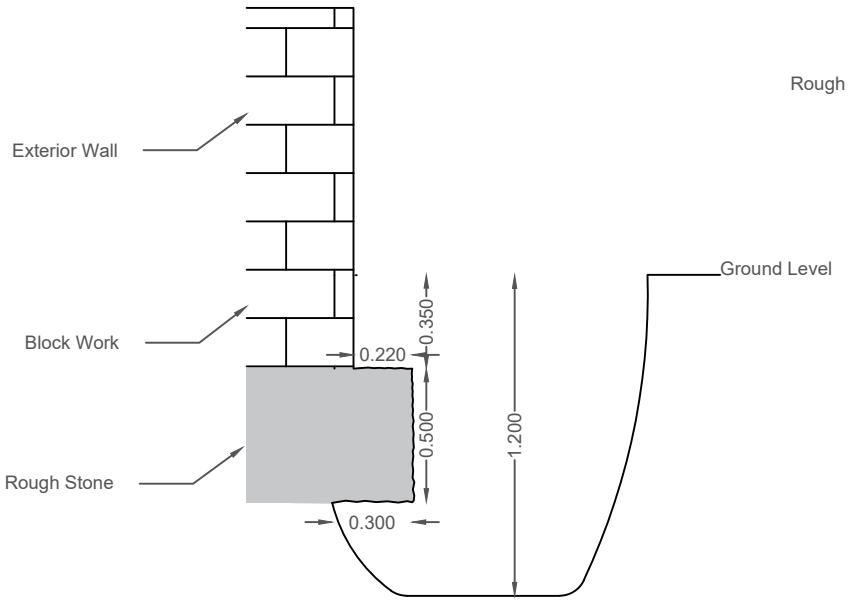
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Sandford Park, Milltown
DRAWING No.:	9338-12-19 TP09
DATE:	May 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

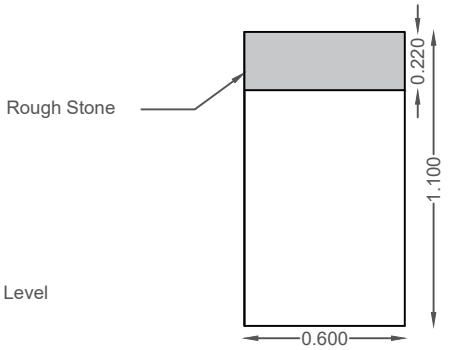
Version: No.	Date:	Drawn By:	Checked:
	Initials	Initials	Initials
	28/05/20	PC	MS

TP10

Side View



Plan View



From (m)	To (m)	Description
0.00	0.15	TOPSOIL
0.15	0.40	MADE GROUND: Brown slightly gravelly slightly sandy Clay with occasional fragments of metal and red brick
0.40	0.80	Firm to stiff brown slightly gravelly slightly sandy CLAY with occasional subangular cobbles. Gravel is angular to subrounded
0.80	1.20	Stiff brown mottled grey slightly gravelly slightly sandy CLAY with occasional subangular cobbles and boulders. Gravel is angular to subrounded fine to coarse

Groundwater	Y/N
	N

Sample Type	Sample Depth
Bag	1.20m

DATE OF EXCAVATION : 27/05/20

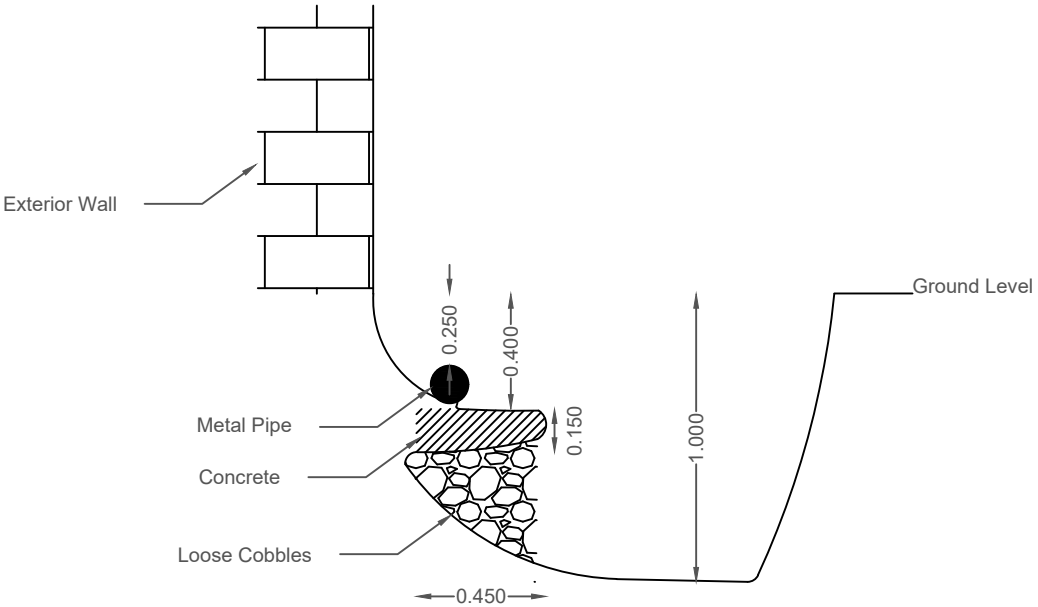
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Sandford Park, Milltown
DRAWING No.:	9338-12-19 TP10
DATE:	May 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

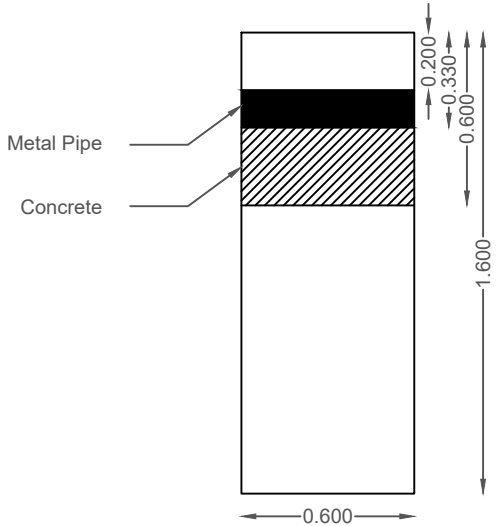
Version: No.	Date:	Drawn By:	Checked:
	Initials	Initials	Initials
	28/05/20	PC	MS

TP11

Side View



Plan View



DATE OF EXCAVATION : 27/05/20

From (m)	To (m)	Description
0.00	0.15	TOPSOIL
0.15	0.30	MADE GROUND: Brown slightly gravelly slightly sandy Clay with occasional fragments of red brick
0.30	1.00	Stiff brown mottled grey slightly gravelly slightly sandy CLAY with occasional subangular cobbles. Gravel is angular to subrounded fine to coarse

Groundwater	Y/N
	N

Sample Type	Sample Depth
Bag	0.80m

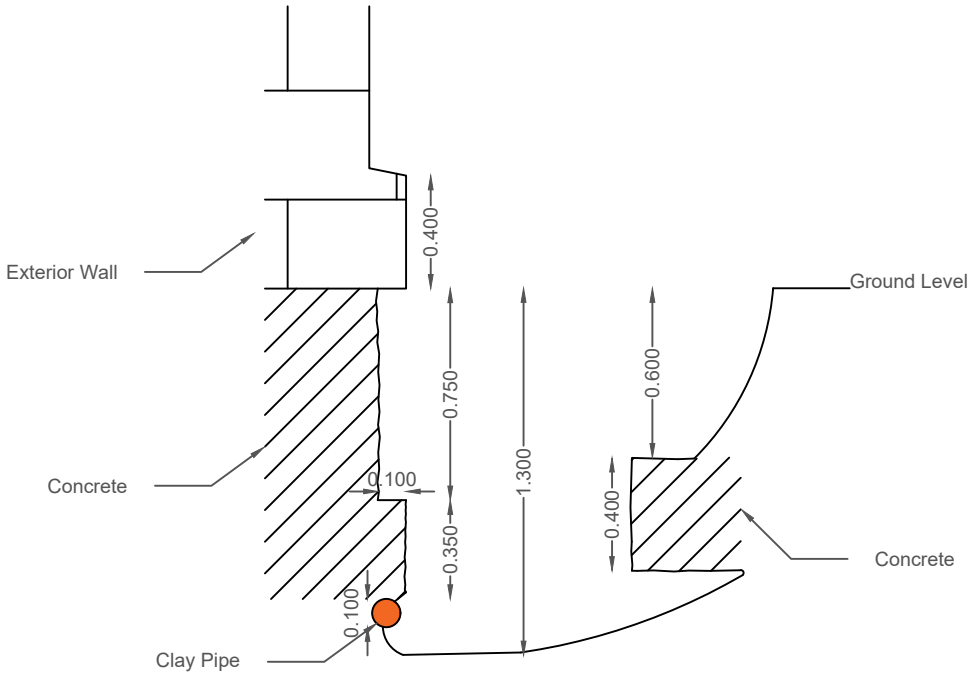
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Sandford Park, Milltown
DRAWING No.:	9338-12-19 TP11
DATE:	May 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

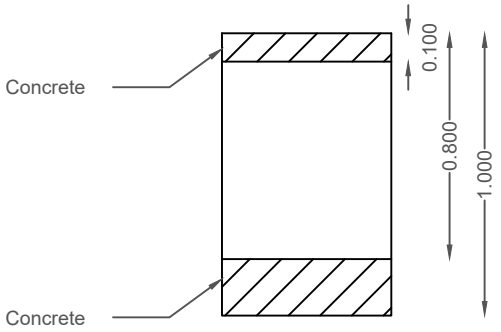
Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	28/05/20	PC	MS

TP13

Side View



Plan View



From (m)	To (m)	Description
0.00	0.15	TOPSOIL
0.15	0.60	MADE GROUND: Brown slightly gravelly slightly sandy Clay with rootlets and occasional fragments of glass and red brick
0.60	1.00	Stiff brown mottled grey slightly gravelly slightly sandy CLAY with occasional subangular cobbles. Gravel is angular to subrounded fine to coarse. Possible Made Ground

Groundwater	Y/N
	N

Sample Type	Sample Depth
Bag	0.50m
	1.00m

DATE OF EXCAVATION : 27/05/20

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Sandford Park, Milltown
DRAWING No.:	9338-12-19 TP13
DATE:	May 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	28/05/20	PC	MS

Sandford Park, Milltown: Trial Pit Photographs

TP02

TP03

TP04

TP05

TP06

TP07

TP08

Sandford Park, Milltown – Foundation Pit Photographs

TP09

Sandford Park, Milltown – Foundation Pit Photographs

TP09

Sandford Park, Milltown – Foundation Pit Photographs

TP10

Sandford Park, Milltown – Foundation Pit Photographs

TP10

Sandford Park, Milltown – Foundation Pit Photographs

TP11

Sandford Park, Milltown – Foundation Pit Photographs

TP11

Sandford Park, Milltown – Foundation Pit Photographs

TP13

Sandford Park, Milltown – Foundation Pit Photographs

TP13

APPENDIX 3 – Soakaway Records

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52
Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

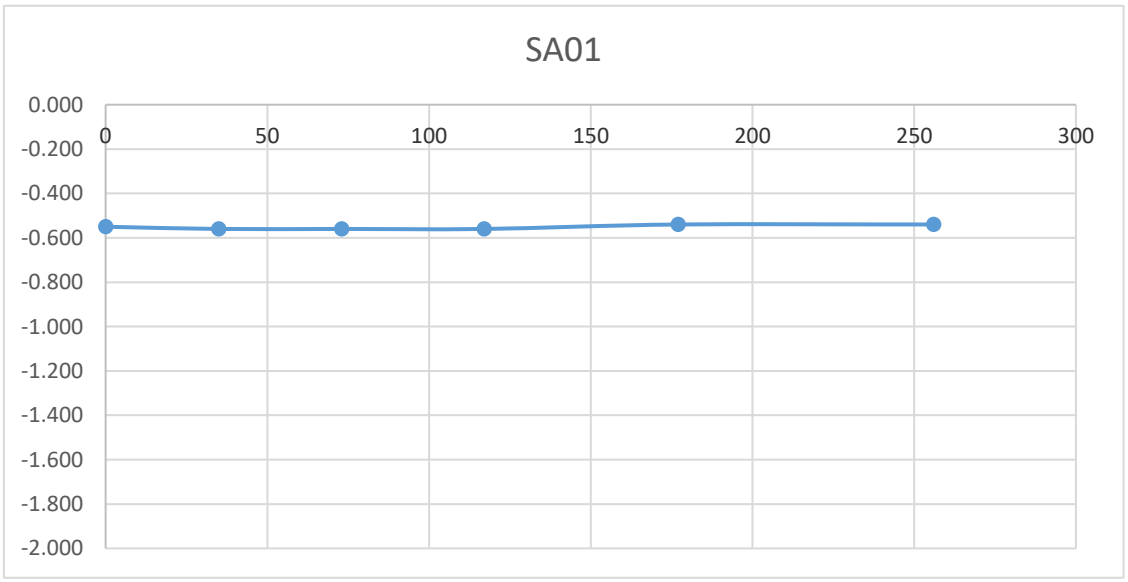
SA01

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 2.5m x 0.60m 2.5m (L x W x D)

Date	Time	Water level (m bgl)
16/01/2020	0	-0.550
16/01/2020	35	-0.560
16/01/2020	73	-0.560
16/01/2020	117	-0.560
16/01/2020	177	-0.540
16/01/2020	256	-0.540

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.55	2.500	1.950	1.0375	2.0125



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52
Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

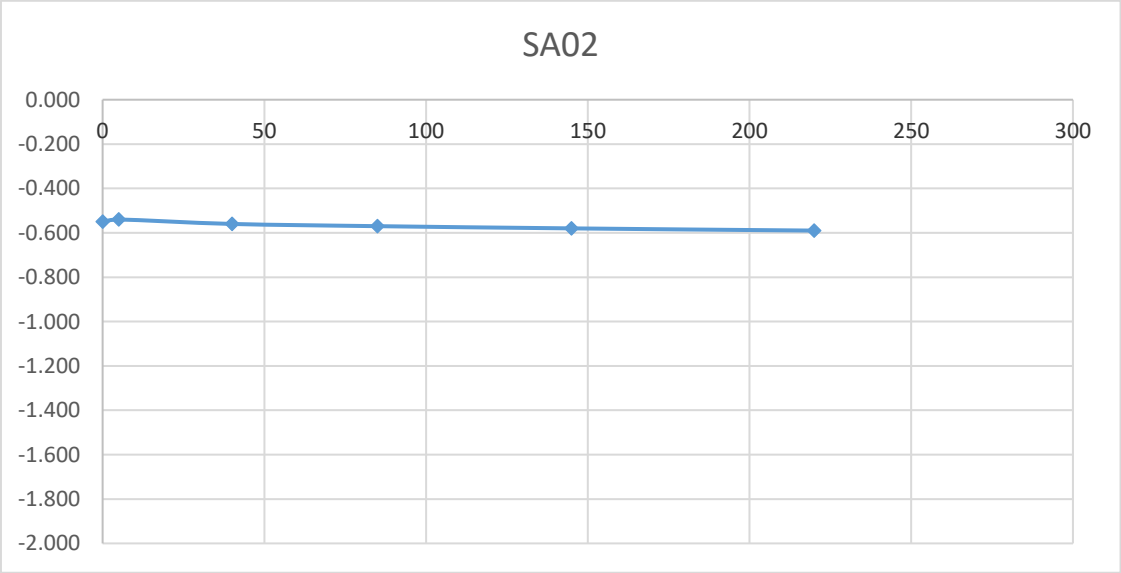
SA02

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 2.5m x 0.60m 2.5m (L x W x D)

Date	Time	Water level (m bgl)
16/01/2020	0	-0.550
16/01/2020	5	-0.540
16/01/2020	40	-0.560
16/01/2020	85	-0.570
16/01/2020	145	-0.580
16/01/2020	220	-0.590

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.55	2.500	1.950	1.0375	2.0125



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52
Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

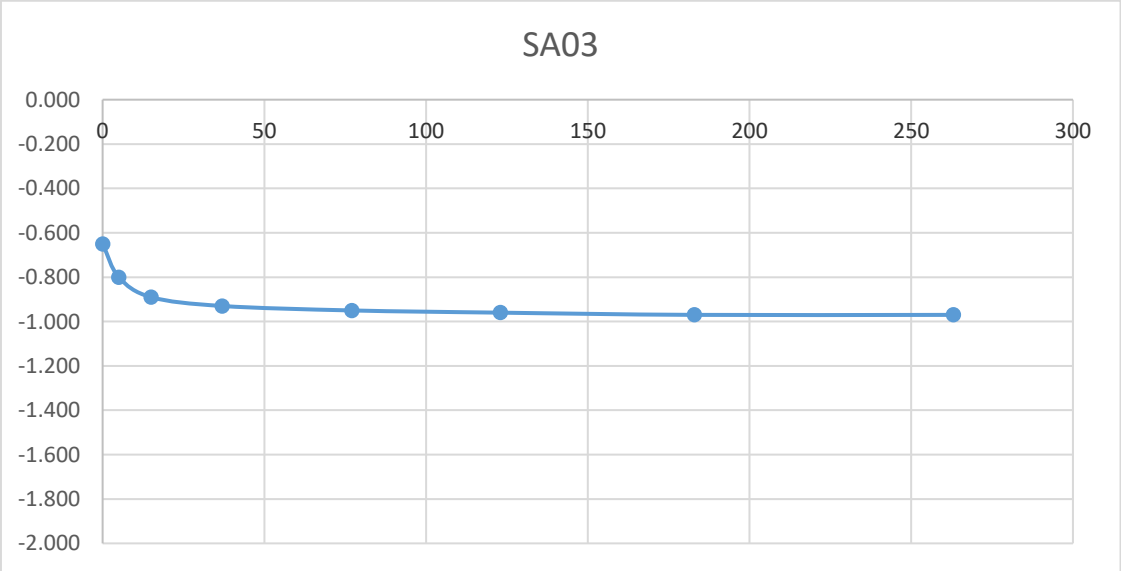
SA03

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 2.6m x 0.60m 2.60m (L x W x D)

Date	Time	Water level (m bgl)
16/01/2020	0	-0.650
16/01/2020	5	-0.800
16/01/2020	15	-0.890
16/01/2020	37	-0.930
16/01/2020	77	-0.950
16/01/2020	123	-0.960
16/01/2020	183	-0.970
16/01/2020	263	-0.970

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.65	2.600	1.950	1.1375	2.1125



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Site Sandford Park Milltown			**Trial Pit Number** SA01
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 0.6m W x 2.5m L	**Ground Level (mOD)** 20.09	**Client** DBFL
	Location 716894.1 E 731261.8 N	**Dates** 16/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL.		
				19.89	0.20	POSSIBLE MADE GROUND: Brown slightly sandy slightly gravelly Clay.		
					(0.25)			
				19.64	0.45	Firm light brown slightly sandy slightly gravelly CLAY.		
					(1.85)			
				17.79	2.30	Firm to stiff brown grey slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles and boulders		
					(0.20)			
				17.59	2.50	Complete at 2.50m		

Plan

Remarks

Groundwater not encountered during excvation.
Trial pit stable.
Trial pit terminated at 2.50m BGL and backfilled upon completion of soakaway.

Scale (approx)	Logged By	Figure No.
1:25	NM	9338-12-19.SA01

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Site Sandford Park Milltown			**Trial Pit Number** SA02
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 0.6m W x 2.5m L	**Ground Level (mOD)**	**Client** DBFL
	Location 717038.2 E 731238.8 N	**Dates** 16/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	TOPSOIL.		
					(0.20) 0.40	Soft to firm brown grey mottled sandy very gravelly CLAY with occasional sub-angular cobbles.		
					(0.80) 1.20	Brown grey sandy very clayey fine to coarse sub-angular to sub-rounded GRAVEL.		
					(0.90) 2.10	Firm brown slightly sandy slightly gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
					(0.40) 2.50	Stiff dark grey black slightly sandy slightly gravelly CLAY.		
						Complete at 2.50m		

Plan

Remarks

No groundwater encountered.
Trial pit spalling at 0.50m BGL.
Trial pit terminated at 2.50m BGL and backfilled upon completion of soakaway.

Scale (approx)	Logged By	Figure No.
1:25	NM	9338-12-19.SA02

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Site Sandford Park Milltown			**Trial Pit Number** SA03
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 0.6m W x 2.6m L	**Ground Level (mOD)** 21.18	**Client** DBFL
	Location 716880.2 E 731202.2 N	**Dates** 16/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL.		
				20.98	0.20	POSSIBLE MADE GROUND: Brown slightly sandy slightly gravelly Clay.		
					(0.20)			
				20.78	0.40	Firm light brown slightly sandy slightly gravelly CLAY.		
					(0.30)			
				20.48	0.70	Firm to stiff brown grey slightly sandy gravelly CLAY with occasional sub-angular cobbles.		
					(1.10)			
				19.38	1.80	Stiff to very stiff brown grey slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
					(0.80)			
			Water strike(1) at 2.50m.	18.58	2.60	Complete at 2.60m		▽1

Plan

Remarks

Slow ingress of groundwater encountered at 2.5m BGL.
Trial pit stable.
Trial pit terminated at 2.60m BGL and backfilled upon completion of soakaway.

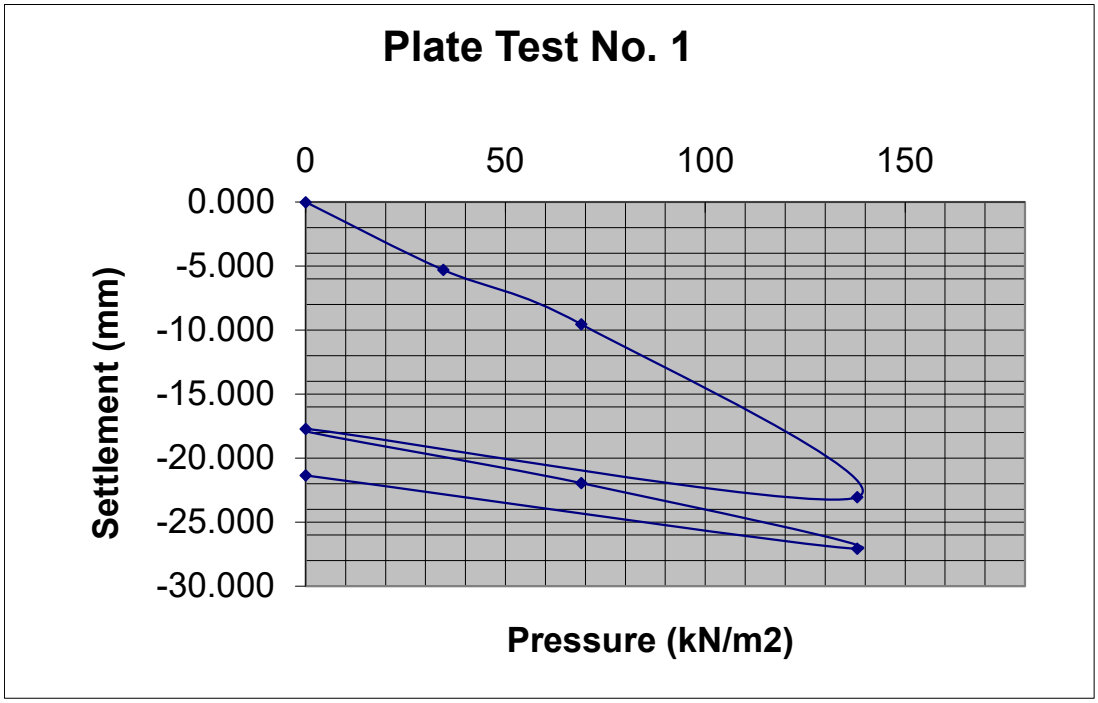
Scale (approx)	Logged By	Figure No.
1:25	NM	9338-12-19.SA03

APPENDIX 4 – Plate Load Test and TRL Probe Records

Applied Load	Gauge settlement
0	**0.000**
34.5	-5.3
69	-9.535
138	-23.05
0	-17.715
69	-21.95
138	-27.07
0	-21.335

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Sandford Park Milltown	**MATERIAL**	MADE GROUND: Light brown slightly sandy slightly gravelly Clay with rootlets and small redbrick and mortar fragments.
CONTRACT NO.	9338-12-19		
DATE	21/01/2020		
CLIENT	DBFL	**DEPTH**	0.40m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR01	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **4.89 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **11.01 MN/m2/m**

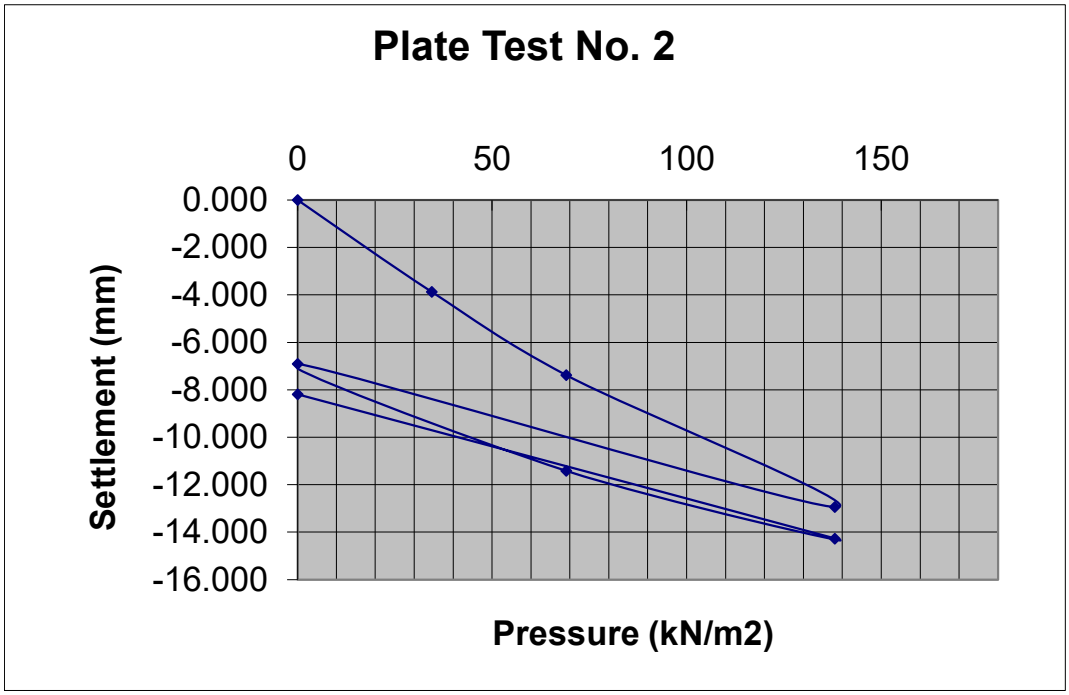
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.15 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.62 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-3.87
69	-7.38
138	-12.93
0	-6.9
69	-11.415
138	-14.265
0	-8.19

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Sandford Park Milltown	**MATERIAL**	MADE GROUND: Light brown slightly sandy slightly gravelly Clay with rootlets and small redbrick fragments.
CONTRACT NO.	9338-12-19		
DATE	21/01/2020		
CLIENT	DBFL	**DEPTH**	0.40m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR02	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **6.32 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **10.33 MN/m2/m**

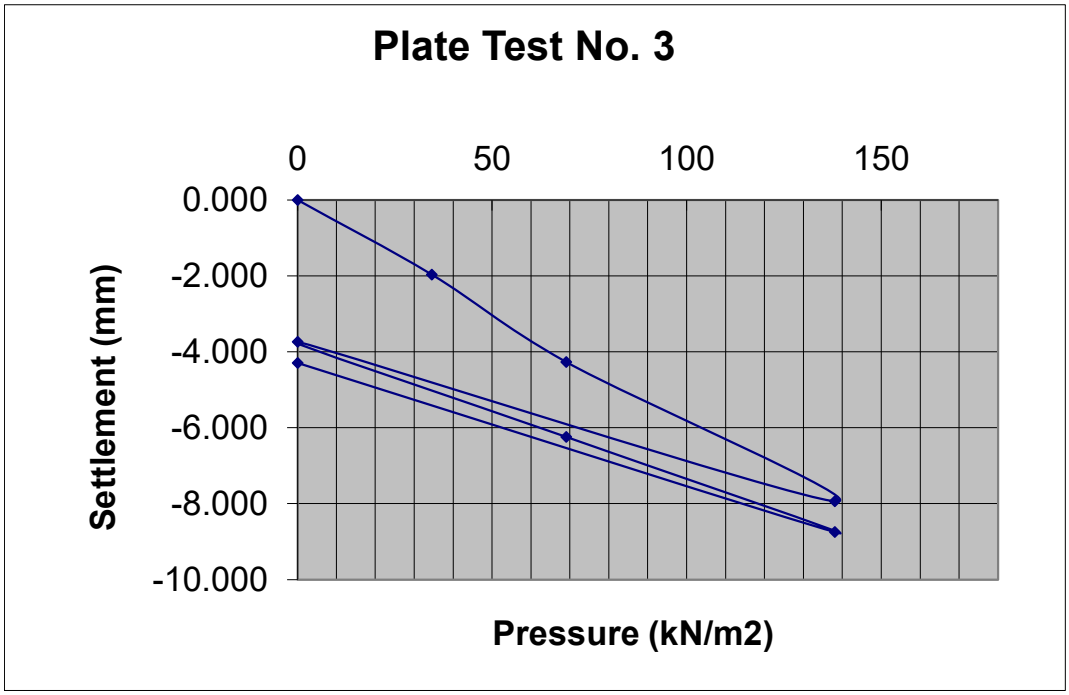
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.24 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.55 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.96
69	-4.265
138	-7.93
0	-3.73
69	-6.24
138	-8.745
0	-4.29

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Sandford Park Milltown	**MATERIAL**	POSSIBLE MADE GROUND: Light brown slightly sandy slightly gravelly Clay with rootlets.
CONTRACT NO.	9338-12-19		
DATE	21/01/2020		
CLIENT	DBFL	**DEPTH**	0.40m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR03	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **10.93 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **18.58 MN/m2/m**

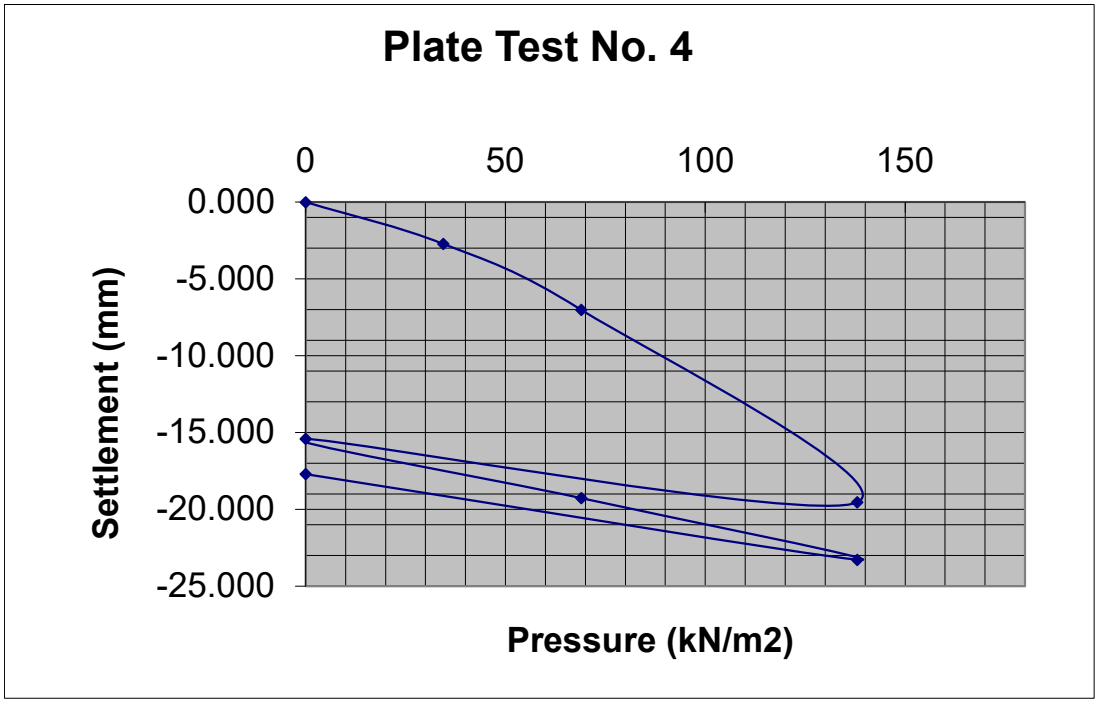
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.61 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.53 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.71
69	-7.01
138	-19.54
0	-15.41
69	-19.275
138	-23.28
0	-17.7

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Sandford Park Milltown	**MATERIAL**	POSSIBLE MADE GROUND: Light brown slightly sandy slightly gravelly Clay with rootlets
CONTRACT NO.	9338-12-19		
DATE	20/01/2020		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR04	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **6.65 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **12.06 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.26 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.72 %**

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

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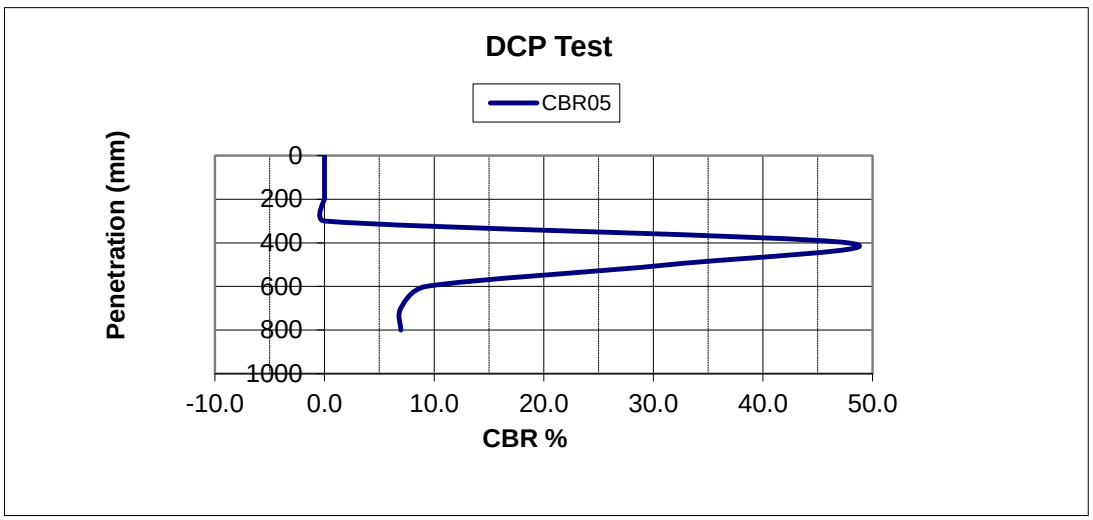
Job Name	Sandford Park Milltown	**Test Type**	Dynamic Cone Penetration Test
Job No.	9338-12-19	**Test Reference**	CBR05
Client	DBFL	**By**	N Morgan
		Date	21/01/2020
Initial Depth	0.3		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
0	-	-	0.0
100	-	-	0.0
200	-	-	0.0
300	-	-	0.0
400	18	5.6	47.7
500	13	7.7	31.5
600	5	20.0	9.3
700	4	25.0	7.0
800	4	25.0	7.0
900	4	25.0	7.0
1000	-		
1100	-		
1200	-		
1300	-		
1400	-		
1500	-		

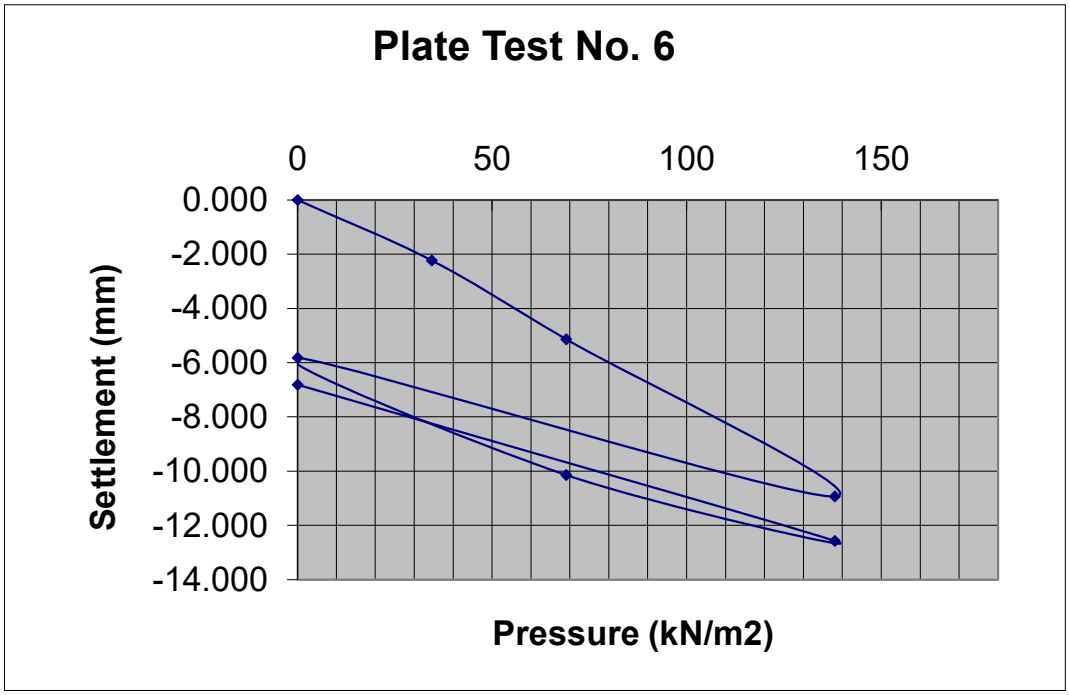
Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



Applied Load	Gauge settlement
0	**0.000**
34.5	-2.225
69	-5.135
138	-10.93
0	-5.815
69	-10.14
138	-12.565
0	-6.81

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Sandford Park Milltown	**MATERIAL**	Possible MADE GROUND: Light brown slightly sandy slightly gravelly Clay with rootlets.
CONTRACT NO.	9338-12-19		
DATE	21/01/2020		
CLIENT	DBFL	**DEPTH**	0.40m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR06	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **9.08 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **10.78 MN/m2/m**

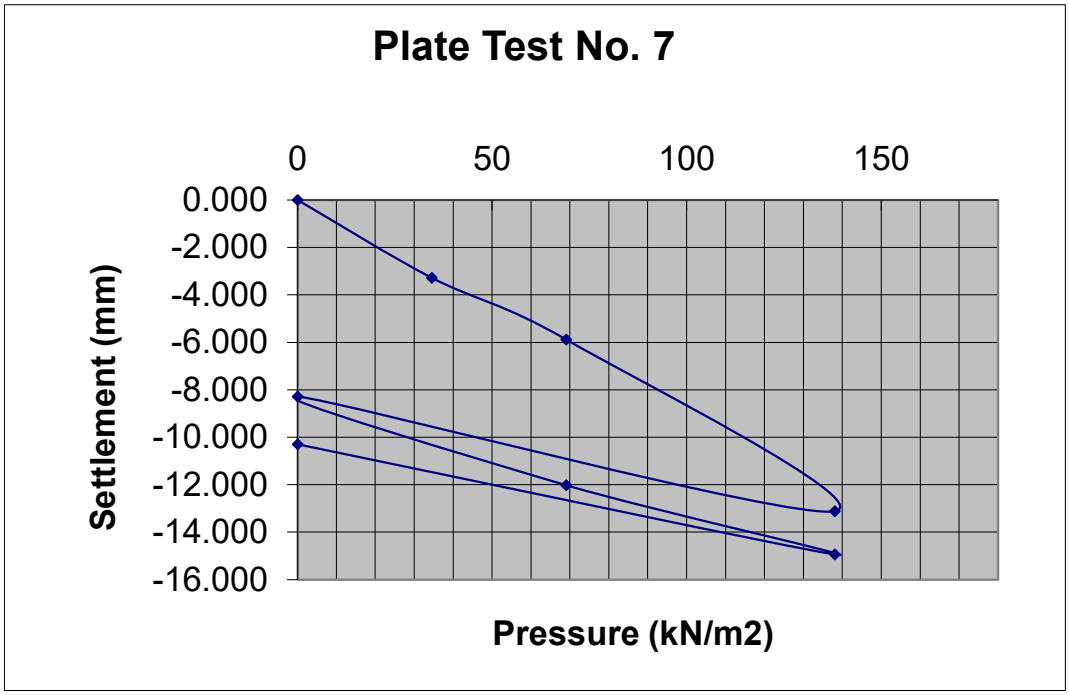
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.44 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.59 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-3.275
69	-5.88
138	-13.11
0	-8.275
69	-12.015
138	-14.935
0	-10.29

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Sandford Park Milltown	**MATERIAL**	MADE GROUND: Light brown slightly sandy slightly gravelly Clay with rootlets redbrick mortar and bone fragments.
CONTRACT NO.	9338-12-19		
DATE	21/01/2020		
CLIENT	DBFL	**DEPTH**	0.45m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR07	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **7.93 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **12.47 MN/m2/m**

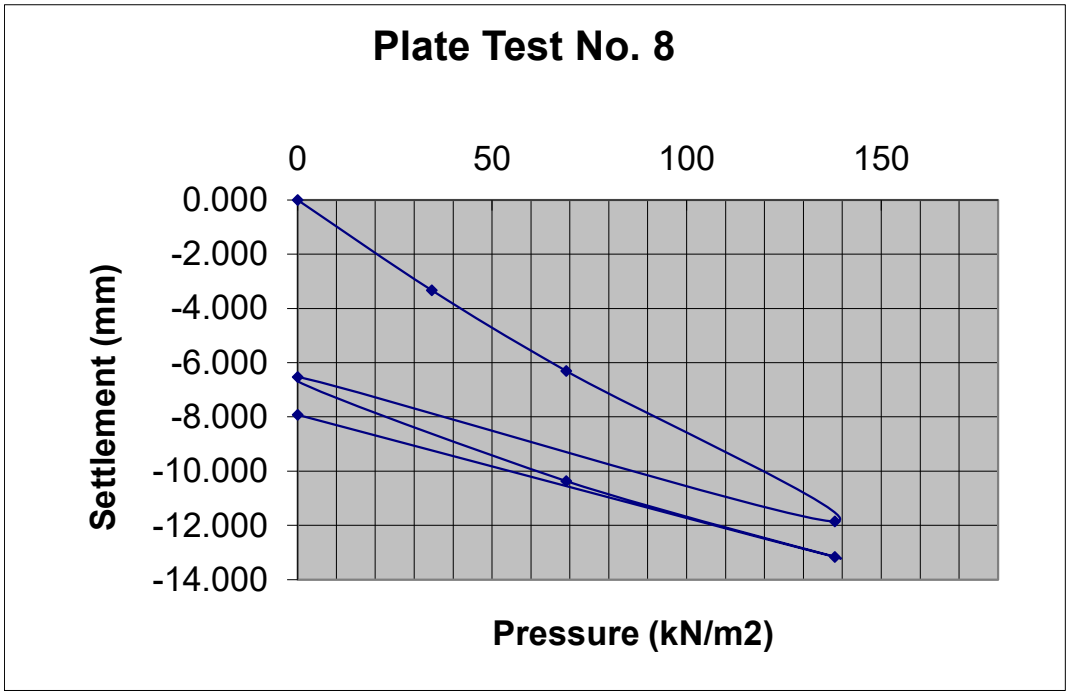
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.35 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.76 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-3.33
69	-6.305
138	-11.85
0	-6.52
69	-10.36
138	-13.16
0	-7.92

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Sandford Park Milltown	**MATERIAL**	POSSIBLE MADE GROUND: Light brown slightly sandy slightly gravelly Clay with rootlets.
CONTRACT NO.	9338-12-19		
DATE	21/01/2020		
CLIENT	DBFL	**DEPTH**	0.40m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR08	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **7.39 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **12.14 MN/m2/m**

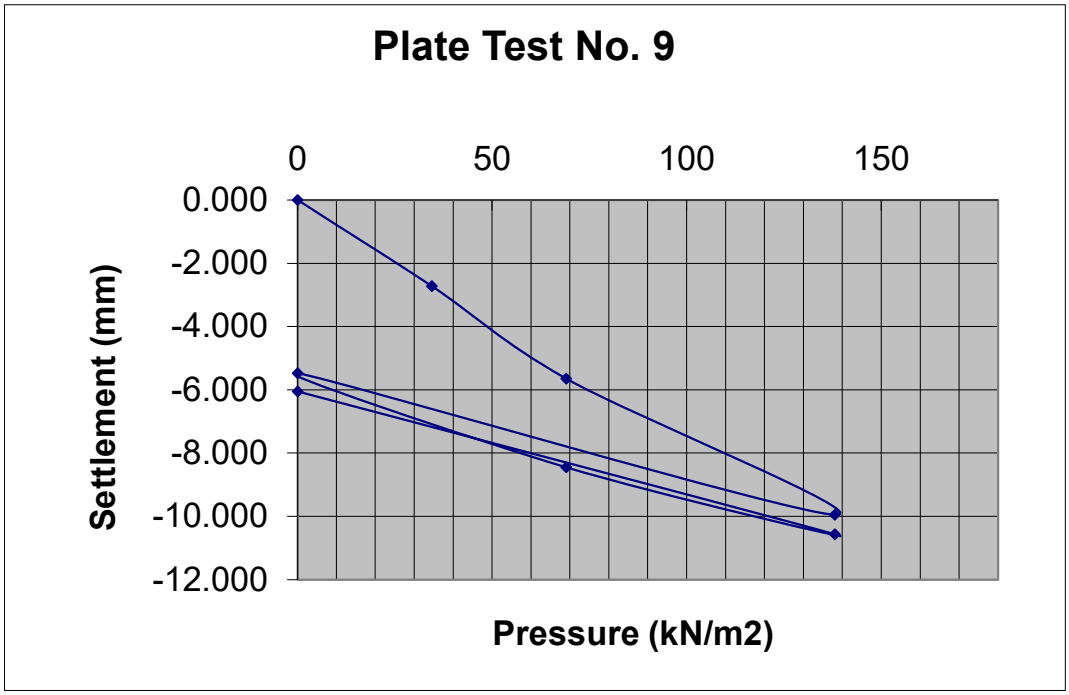
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.31 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.73 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.715
69	-5.64
138	-9.94
0	-5.47
69	-8.445
138	-10.56
0	-6.045

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Sandford Park Milltown	**MATERIAL**	MADE GROUND: Light brown slightly sandy slightly gravelly Clay with rootlets and small redbrick and plastic fragments.
CONTRACT NO.	9338-12-19		
DATE	21/01/2020		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR09	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **8.27 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **15.67 MN/m2/m**

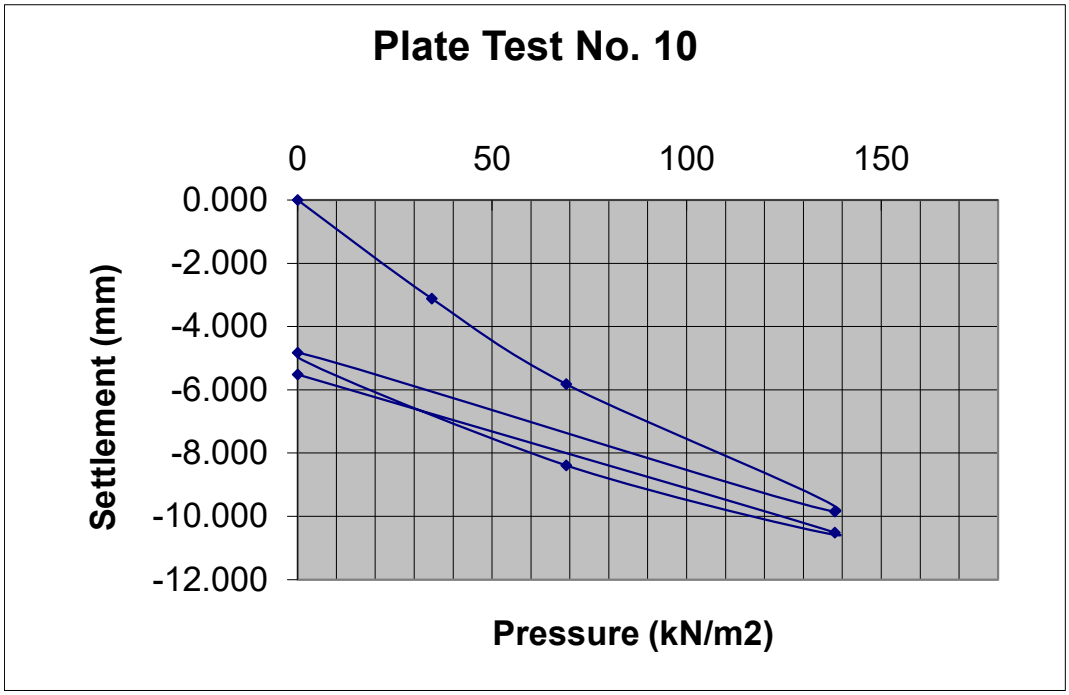
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.38 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.14 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-3.11
69	-5.82
138	-9.84
0	-4.82
69	-8.385
138	-10.515
0	-5.51

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Sandford Park Milltown	**MATERIAL**	MADE GROUND: Light brown slightly sandy slightly gravelly Clay with rootlets and small redbrick and plastic fragments.
CONTRACT NO.	9338-12-19		
DATE	21/01/2020		
CLIENT	DBFL	**DEPTH**	0.30m
PLATE DIAMETER	457mm	**NOTES**	
TEST NO.	CBR10	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **8.01 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **13.08 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.36 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.83 %**

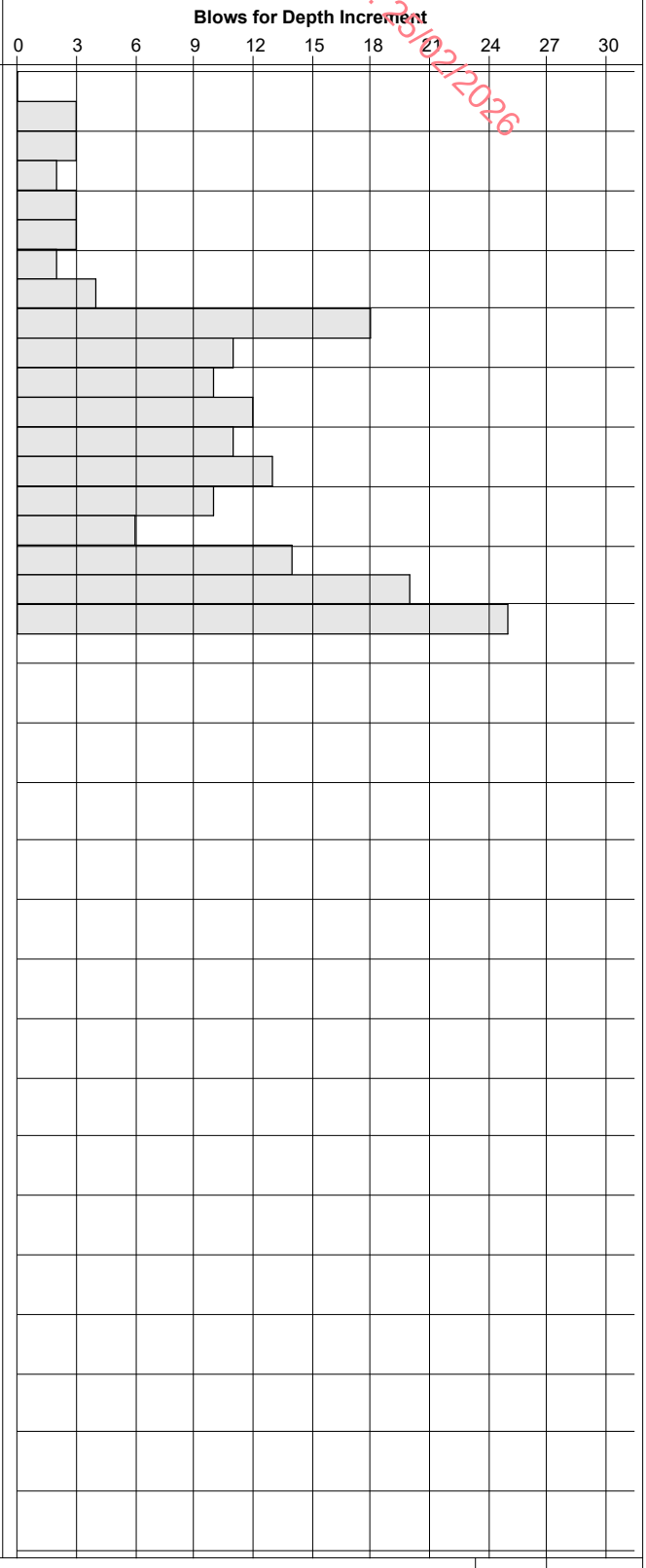
APPENDIX 5 – Dynamic Probe Records

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Sandford Park Milltown	DP01

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	21.32	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	716893.4 E 731171.4 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		21.32	0.00
0.10-0.20	3			
0.20-0.30	3			
0.30-0.40	2			
0.40-0.50	3			
0.50-0.60	3		20.82	0.50
0.60-0.70	2			
0.70-0.80	4			
0.80-0.90	18			
0.90-1.00	11			
1.00-1.10	10		20.32	1.00
1.10-1.20	12			
1.20-1.30	11			
1.30-1.40	13			
1.40-1.50	10			
1.50-1.60	6		19.82	1.50
1.60-1.70	14			
1.70-1.80	20			
1.80-1.90	25			
			19.32	2.00
			18.82	2.50
			18.32	3.00
			17.82	3.50
			17.32	4.00
			16.82	4.50
			16.32	5.00



Remarks
Refusal at 1.90m BGL, 25 Blows for 50mm

Scale (approx)	Logged By
1:25	NM

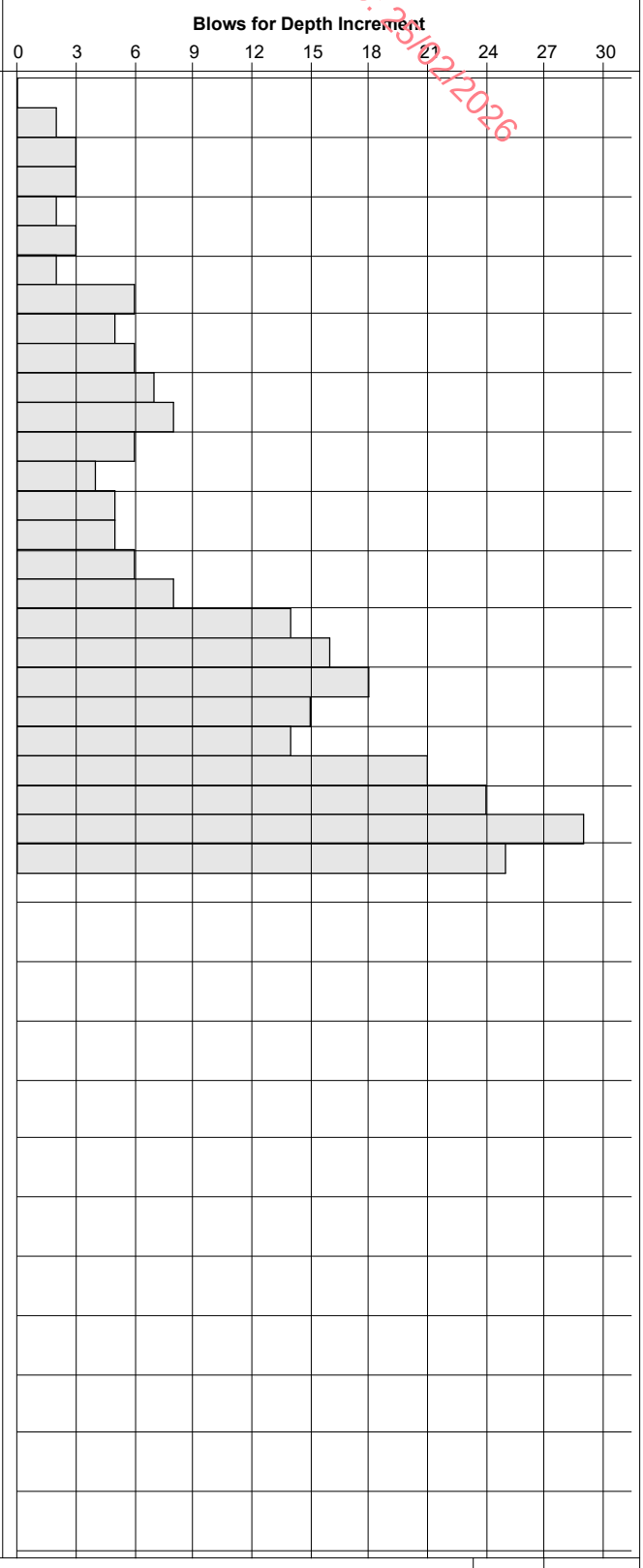
Figure No.
9338-12-19.DP01

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Sandford Park Milltown	DP02

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	21.75	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	716861.2 E 731184.4 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		21.75	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	2			
0.50-0.60	3		21.25	0.50
0.60-0.70	2			
0.70-0.80	6			
0.80-0.90	5			
0.90-1.00	6			
1.00-1.10	7		20.75	1.00
1.10-1.20	8			
1.20-1.30	6			
1.30-1.40	4			
1.40-1.50	5			
1.50-1.60	5		20.25	1.50
1.60-1.70	6			
1.70-1.80	8			
1.80-1.90	14			
1.90-2.00	16			
2.00-2.10	18		19.75	2.00
2.10-2.20	15			
2.20-2.30	14			
2.30-2.40	21			
2.40-2.50	24			
2.50-2.60	29		19.25	2.50
2.60-2.70	25			
			18.75	3.00
			18.25	3.50
			17.75	4.00
			17.25	4.50
			16.75	5.00



Remarks
Refusal at 2.70m BGL, 25 Blows for 75mm

Scale (approx)	Logged By
1:25	NM

Figure No.
9338-12-19.DP02

Ground Investigations Ireland Ltd
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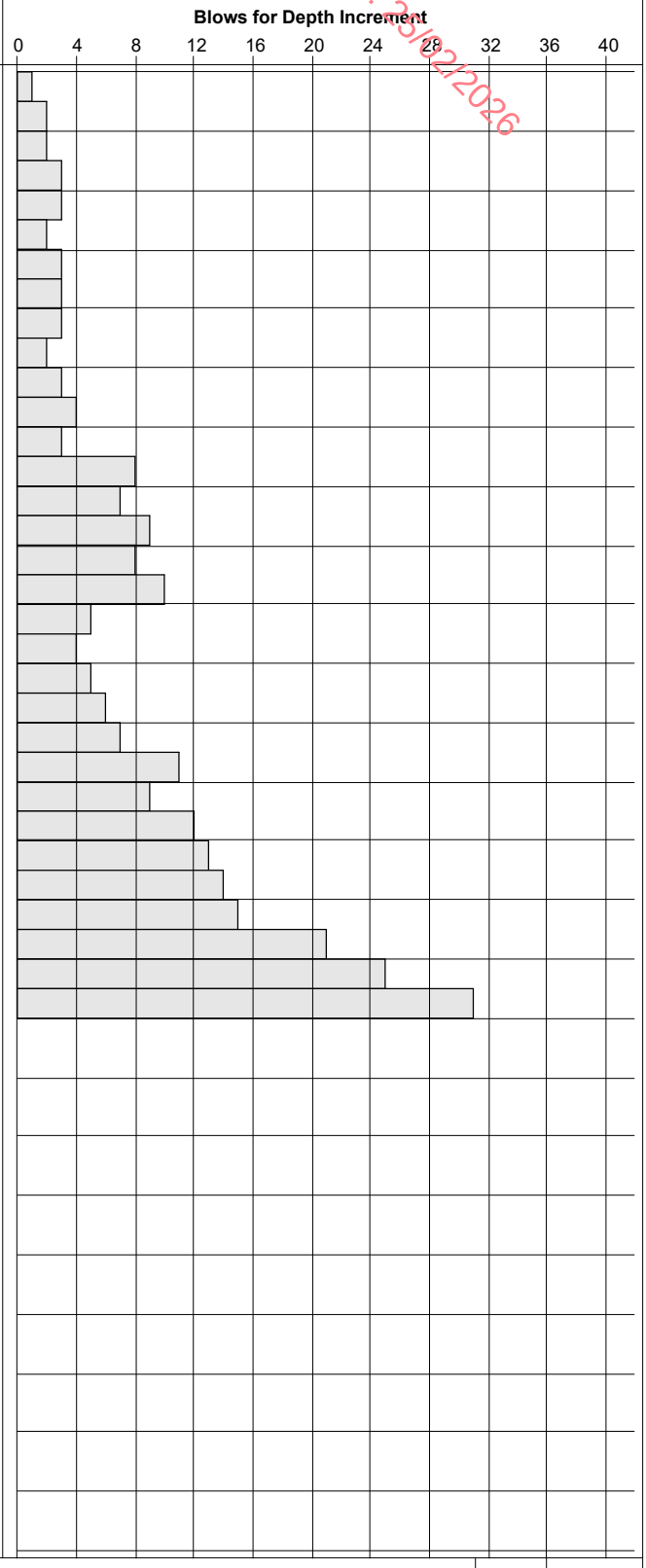
Site	Probe Number
Sandford Park Milltown	DP03

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	20.86	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	716870.9 E 731223.5 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		20.86	0.00
0.10-0.20	2			
0.20-0.30	2			
0.30-0.40	3			
0.40-0.50	3			
0.50-0.60	2		20.36	0.50
0.60-0.70	3			
0.70-0.80	3			
0.80-0.90	3			
0.90-1.00	2			
1.00-1.10	3		19.86	1.00
1.10-1.20	4			
1.20-1.30	3			
1.30-1.40	8			
1.40-1.50	7			
1.50-1.60	9		19.36	1.50
1.60-1.70	8			
1.70-1.80	10			
1.80-1.90	5			
1.90-2.00	4			
2.00-2.10	5		18.86	2.00
2.10-2.20	6			
2.20-2.30	7			
2.30-2.40	11			
2.40-2.50	9			
2.50-2.60	12		18.36	2.50
2.60-2.70	13			
2.70-2.80	14			
2.80-2.90	15			
2.90-3.00	21			
3.00-3.10	25		17.86	3.00
3.10-3.20	31			
			17.36	3.50
			16.86	4.00
			16.36	4.50
			15.86	5.00



Remarks

Scale (approx)	Logged By
1:25	NM

Figure No.
9338-12-19.DP03

Ground Investigations Ireland Ltd
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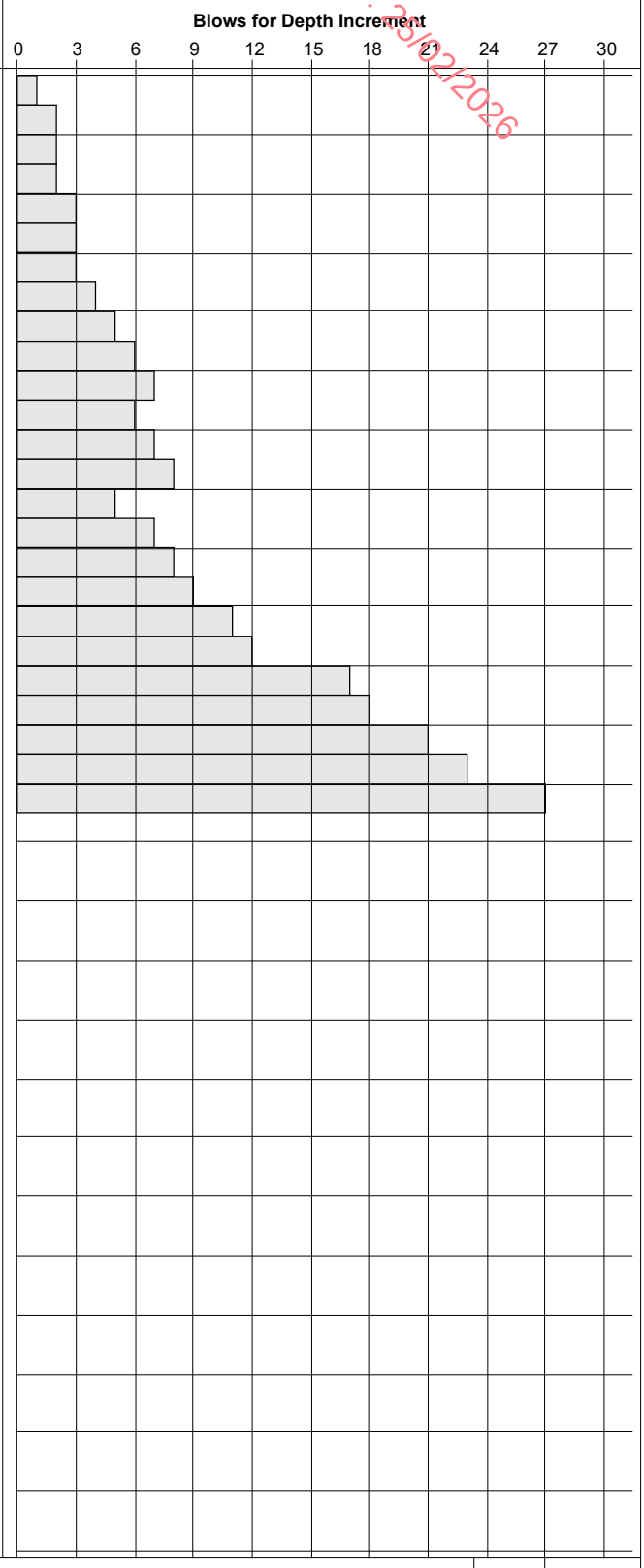
Site	Probe Number
Sandford Park Milltown	DP04

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	20.62	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	716876.7 E 731245.5 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		20.62	0.00
0.10-0.20	2			
0.20-0.30	2			
0.30-0.40	2			
0.40-0.50	3			
0.50-0.60	3		20.12	0.50
0.60-0.70	3			
0.70-0.80	4			
0.80-0.90	5			
0.90-1.00	6			
1.00-1.10	7		19.62	1.00
1.10-1.20	6			
1.20-1.30	7			
1.30-1.40	8			
1.40-1.50	5			
1.50-1.60	7		19.12	1.50
1.60-1.70	8			
1.70-1.80	9			
1.80-1.90	11			
1.90-2.00	12			
2.00-2.10	17		18.62	2.00
2.10-2.20	18			
2.20-2.30	21			
2.30-2.40	23			
2.40-2.50	27		18.12	2.50
			17.62	3.00
			17.12	3.50
			16.62	4.00
			16.12	4.50
			15.62	5.00



Remarks

Scale (approx)	Logged By
1:25	NM

Figure No.
9338-12-19.DP04

Ground Investigations Ireland Ltd
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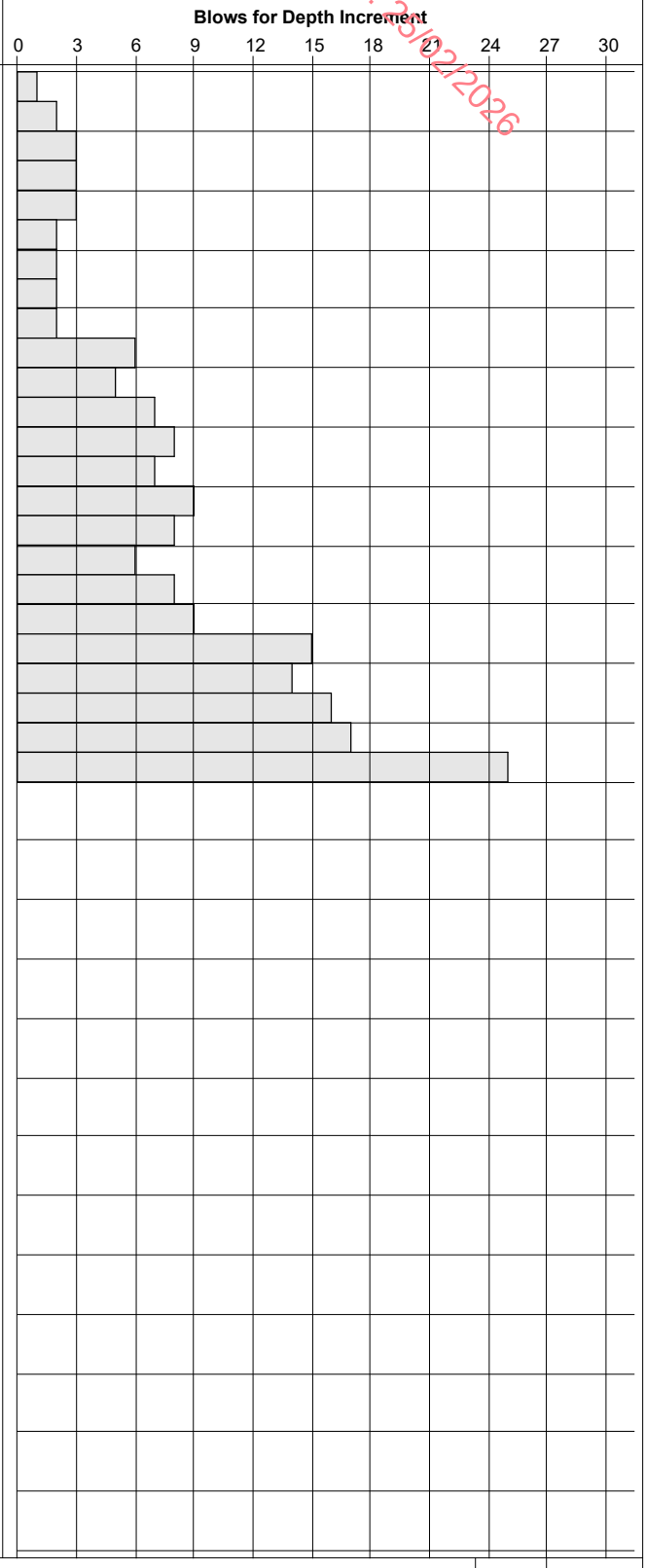
Site	Probe Number
Sandford Park Milltown	DP05

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	20.40	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	716881.6 E 731262.1 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		20.40	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	3			
0.50-0.60	2		19.90	0.50
0.60-0.70	2			
0.70-0.80	2			
0.80-0.90	2			
0.90-1.00	6			
1.00-1.10	5		19.40	1.00
1.10-1.20	7			
1.20-1.30	8			
1.30-1.40	7			
1.40-1.50	9			
1.50-1.60	8		18.90	1.50
1.60-1.70	6			
1.70-1.80	8			
1.80-1.90	9			
1.90-2.00	15			
2.00-2.10	14		18.40	2.00
2.10-2.20	16			
2.20-2.30	17			
2.30-2.40	25			
			17.90	2.50
			17.40	3.00
			16.90	3.50
			16.40	4.00
			15.90	4.50
			15.40	5.00



Remarks
Refusal at 2.40m BGL, 25 Blows for 50mm

Scale (approx)	Logged By
1:25	NM

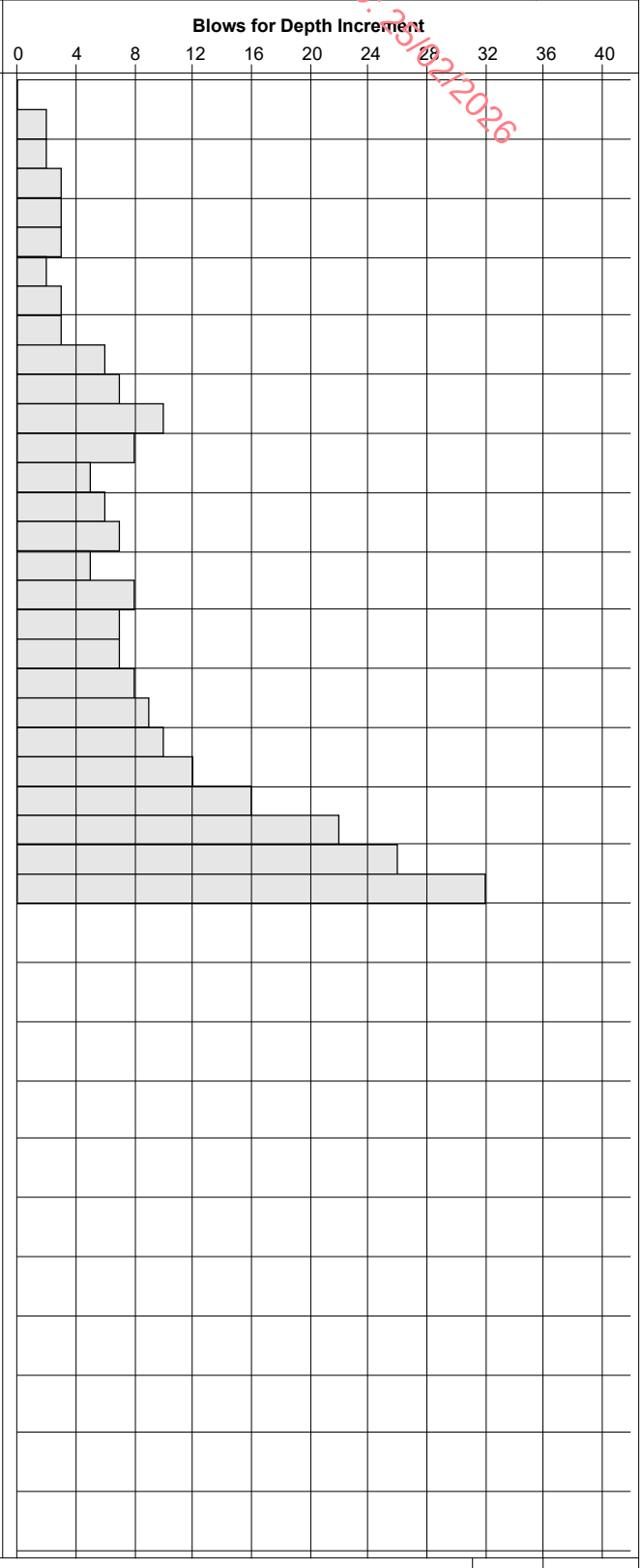
Figure No.
9338-12-19.DP05

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Sandford Park Milltown	DP06

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	19.85	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	716890.4 E 731280.8 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		19.85	0.00
0.10-0.20	2			
0.20-0.30	2			
0.30-0.40	3			
0.40-0.50	3			
0.50-0.60	3		19.35	0.50
0.60-0.70	2			
0.70-0.80	3			
0.80-0.90	3			
0.90-1.00	6			
1.00-1.10	7		18.85	1.00
1.10-1.20	10			
1.20-1.30	8			
1.30-1.40	5			
1.40-1.50	6			
1.50-1.60	7		18.35	1.50
1.60-1.70	5			
1.70-1.80	8			
1.80-1.90	7			
1.90-2.00	7			
2.00-2.10	8		17.85	2.00
2.10-2.20	9			
2.20-2.30	10			
2.30-2.40	12			
2.40-2.50	16			
2.50-2.60	22		17.35	2.50
2.60-2.70	26			
2.70-2.80	32			
			16.85	3.00
			16.35	3.50
			15.85	4.00
			15.35	4.50
			14.85	5.00



Remarks

Scale (approx)	Logged By
1:25	NM

Figure No.
9338-12-19.DP06

Ground Investigations Ireland Ltd
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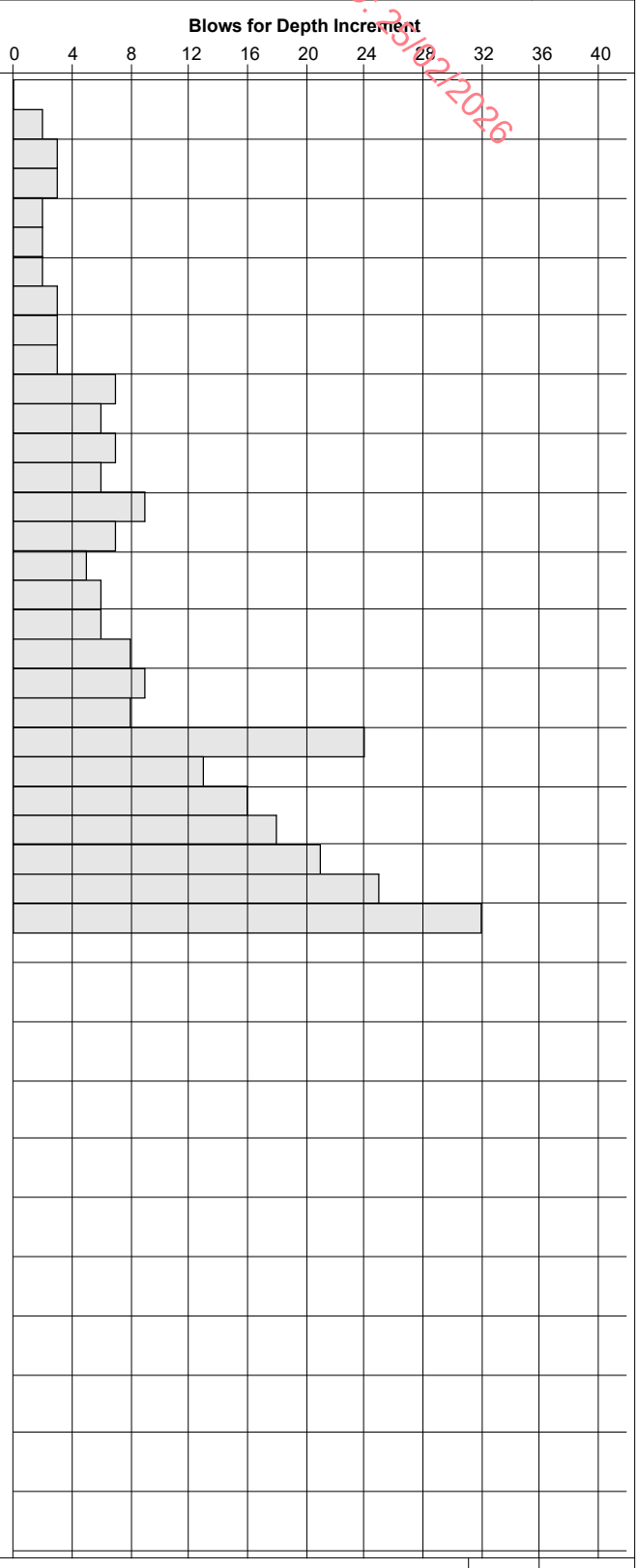
Site	Probe Number
Sandford Park Milltown	DP07

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	18.34	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	717019.4 E 731295.1 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		18.34	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	2			
0.50-0.60	2		17.84	0.50
0.60-0.70	2			
0.70-0.80	3			
0.80-0.90	3			
0.90-1.00	3			
1.00-1.10	7		17.34	1.00
1.10-1.20	6			
1.20-1.30	7			
1.30-1.40	6			
1.40-1.50	9			
1.50-1.60	7		16.84	1.50
1.60-1.70	5			
1.70-1.80	6			
1.80-1.90	6			
1.90-2.00	8			
2.00-2.10	9		16.34	2.00
2.10-2.20	8			
2.20-2.30	24			
2.30-2.40	13			
2.40-2.50	16			
2.50-2.60	18		15.84	2.50
2.60-2.70	21			
2.70-2.80	25			
2.80-2.90	32			
			15.34	3.00
			14.84	3.50
			14.34	4.00
			13.84	4.50
			13.34	5.00



Remarks

Scale (approx)	Logged By
1:25	NM

Figure No.
9338-12-19.DP07

Ground Investigations Ireland Ltd
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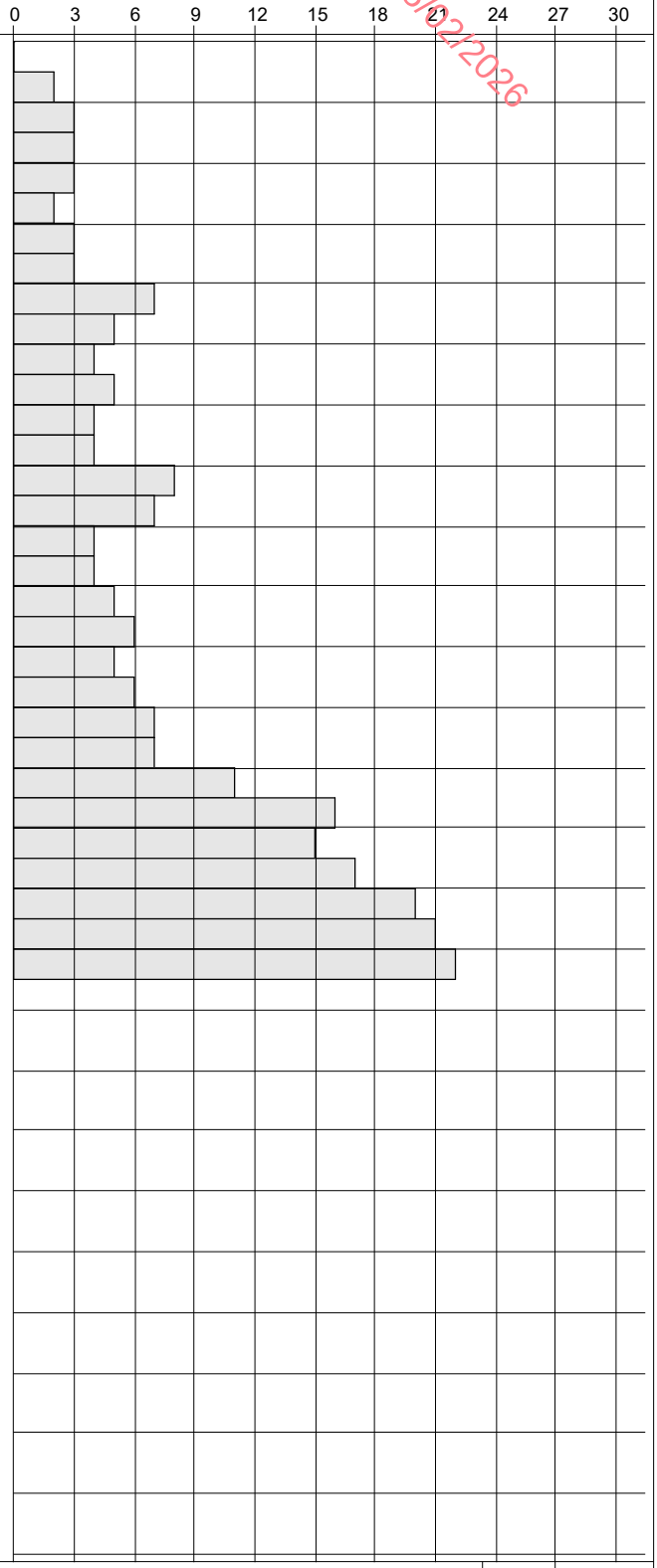
Site	Probe Number
Sandford Park Milltown	DP08

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	18.35	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	717041.3 E 731264.6 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		18.35	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	3			
0.50-0.60	2		17.85	0.50
0.60-0.70	3			
0.70-0.80	3			
0.80-0.90	7			
0.90-1.00	5			
1.00-1.10	4		17.35	1.00
1.10-1.20	5			
1.20-1.30	4			
1.30-1.40	4			
1.40-1.50	8			
1.50-1.60	7		16.85	1.50
1.60-1.70	4			
1.70-1.80	4			
1.80-1.90	5			
1.90-2.00	6			
2.00-2.10	5		16.35	2.00
2.10-2.20	6			
2.20-2.30	7			
2.30-2.40	7			
2.40-2.50	11			
2.50-2.60	16		15.85	2.50
2.60-2.70	15			
2.70-2.80	17			
2.80-2.90	20			
2.90-3.00	21			
3.00-3.10	22		15.35	3.00
			14.85	3.50
			14.35	4.00
			13.85	4.50
			13.35	5.00



Remarks

Scale (approx)	Logged By
1:25	NM

Figure No.
9338-12-19.DP08

Ground Investigations Ireland Ltd
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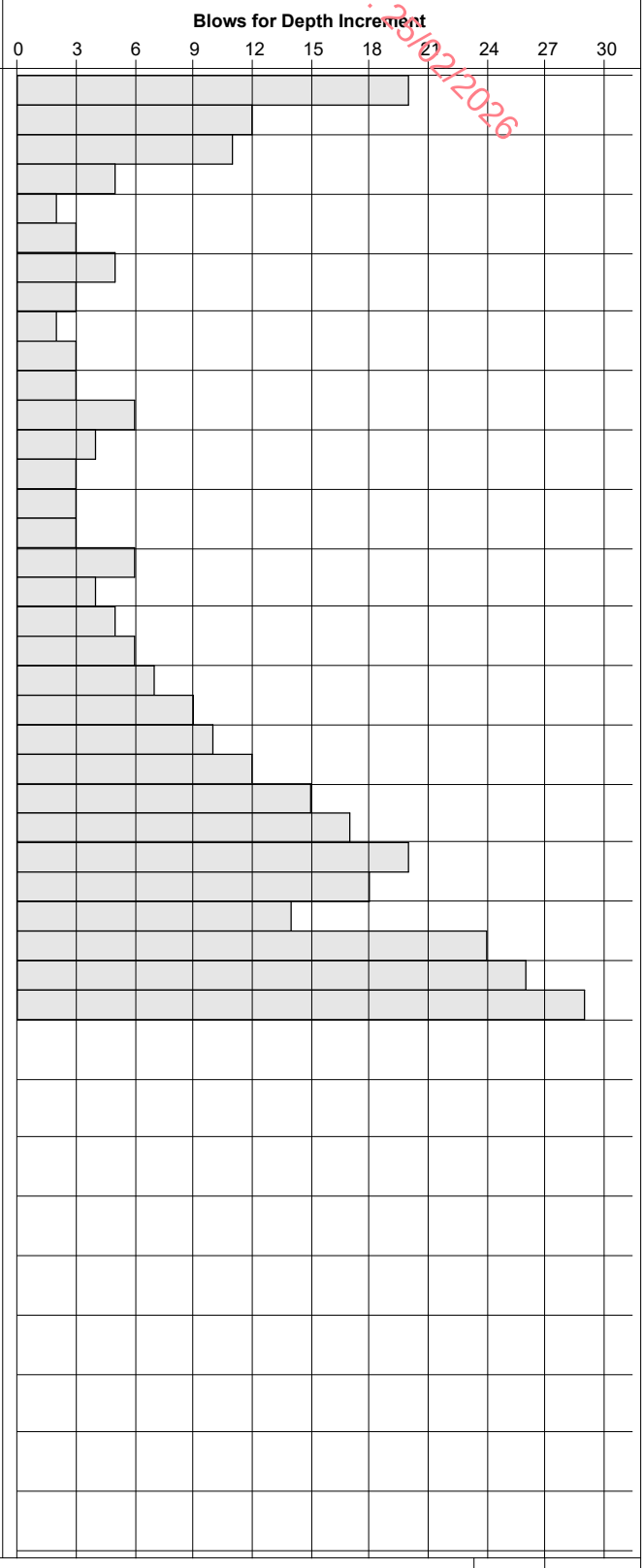
Site	Probe Number
Sandford Park Milltown	DP09

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	19.34	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	717000.4 E 731224.3 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	20		19.34	0.00
0.10-0.20	12			
0.20-0.30	11			
0.30-0.40	5			
0.40-0.50	2			
0.50-0.60	3		18.84	0.50
0.60-0.70	5			
0.70-0.80	3			
0.80-0.90	2			
0.90-1.00	3			
1.00-1.10	3		18.34	1.00
1.10-1.20	6			
1.20-1.30	4			
1.30-1.40	3			
1.40-1.50	3			
1.50-1.60	3		17.84	1.50
1.60-1.70	6			
1.70-1.80	4			
1.80-1.90	5			
1.90-2.00	6			
2.00-2.10	7		17.34	2.00
2.10-2.20	9			
2.20-2.30	10			
2.30-2.40	12			
2.40-2.50	15			
2.50-2.60	17		16.84	2.50
2.60-2.70	20			
2.70-2.80	18			
2.80-2.90	14			
2.90-3.00	24			
3.00-3.10	26		16.34	3.00
3.10-3.20	29			
			15.84	3.50
			15.34	4.00
			14.84	4.50
			14.34	5.00



Remarks
Tarmacadam present between GL - 0.10m BGL

Scale (approx)	Logged By
1:25	NM

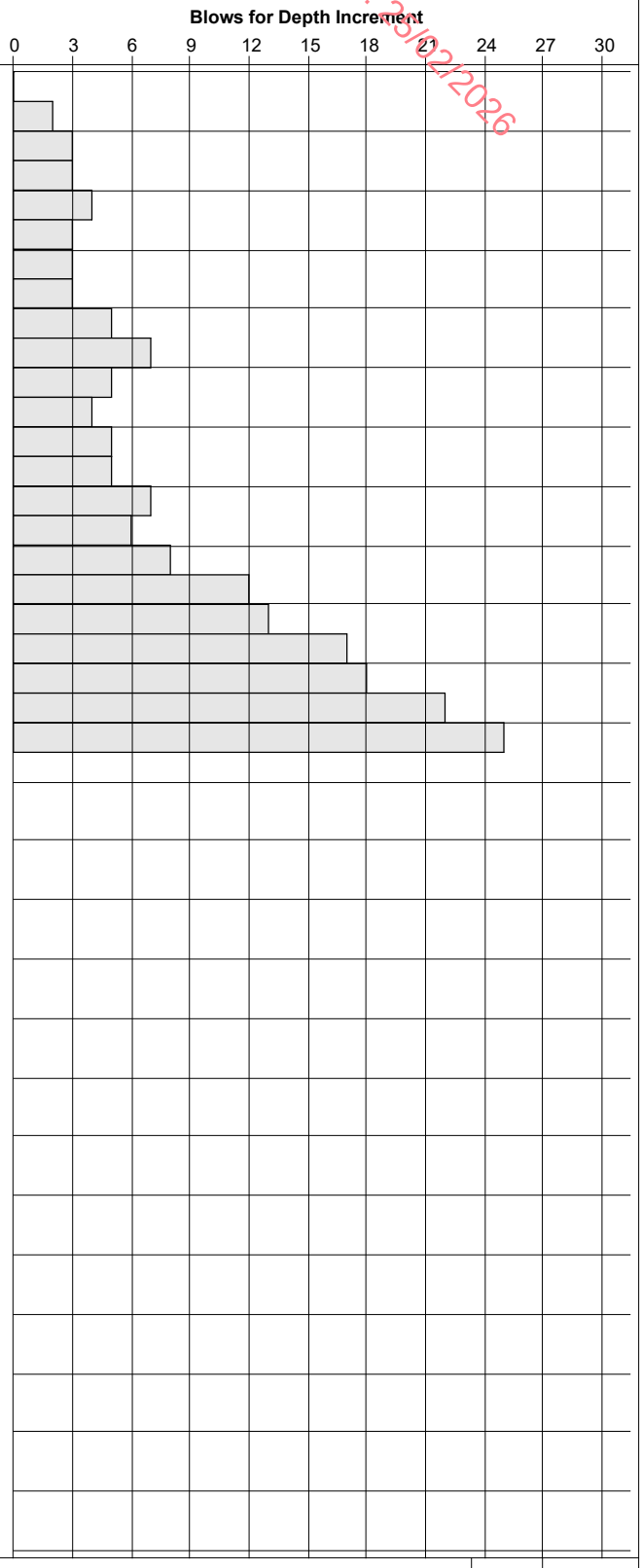
Figure No.
9338-12-19.DP09

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Sandford Park Milltown	DP10

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	20.09	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	716884.6 E 731276.8 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	0		20.09	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	4			
0.50-0.60	3		19.59	0.50
0.60-0.70	3			
0.70-0.80	3			
0.80-0.90	5			
0.90-1.00	7			
1.00-1.10	5		19.09	1.00
1.10-1.20	4			
1.20-1.30	5			
1.30-1.40	5			
1.40-1.50	7			
1.50-1.60	6		18.59	1.50
1.60-1.70	8			
1.70-1.80	12			
1.80-1.90	13			
1.90-2.00	17			
2.00-2.10	18		18.09	2.00
2.10-2.20	22			
2.20-2.30	25			
			17.59	2.50
			17.09	3.00
			16.59	3.50
			16.09	4.00
			15.59	4.50
			15.09	5.00



Remarks
Refusal at 2.30m BGL, 25 Blows for 50mm

Scale (approx)	Logged By
1:25	NM

Figure No.
9338-12-19.DP10

Ground Investigations Ireland Ltd
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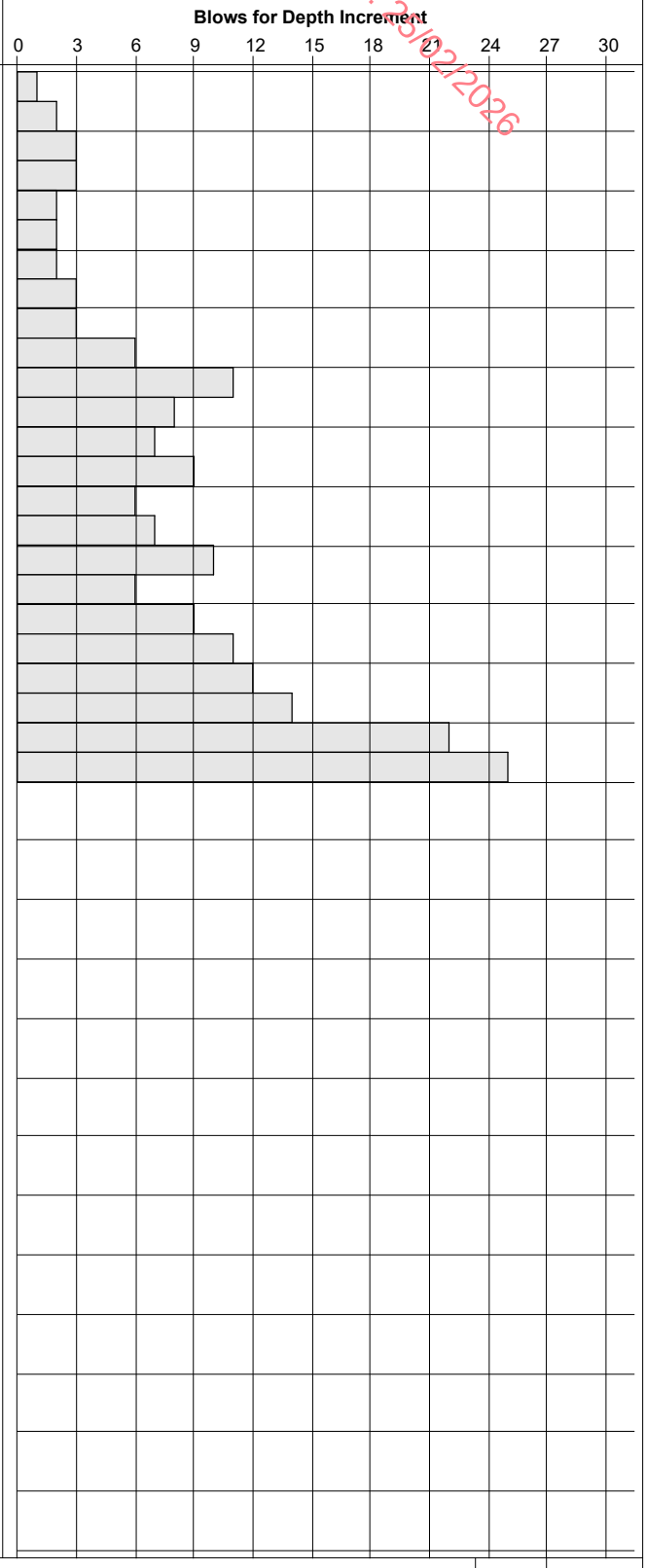
Site	Probe Number
Sandford Park Milltown	DP11

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	20.52	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	716879.6 E 731254.9 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		20.52	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	2			
0.50-0.60	2		20.02	0.50
0.60-0.70	2			
0.70-0.80	3			
0.80-0.90	3			
0.90-1.00	6			
1.00-1.10	11		19.52	1.00
1.10-1.20	8			
1.20-1.30	7			
1.30-1.40	9			
1.40-1.50	6			
1.50-1.60	7		19.02	1.50
1.60-1.70	10			
1.70-1.80	6			
1.80-1.90	9			
1.90-2.00	11			
2.00-2.10	12		18.52	2.00
2.10-2.20	14			
2.20-2.30	22			
2.30-2.40	25			
			18.02	2.50
			17.52	3.00
			17.02	3.50
			16.52	4.00
			16.02	4.50
			15.52	5.00



Remarks
Refusal at 2.40m BGL, 25 Blows for 50mm

Scale (approx)	Logged By
1:25	NM

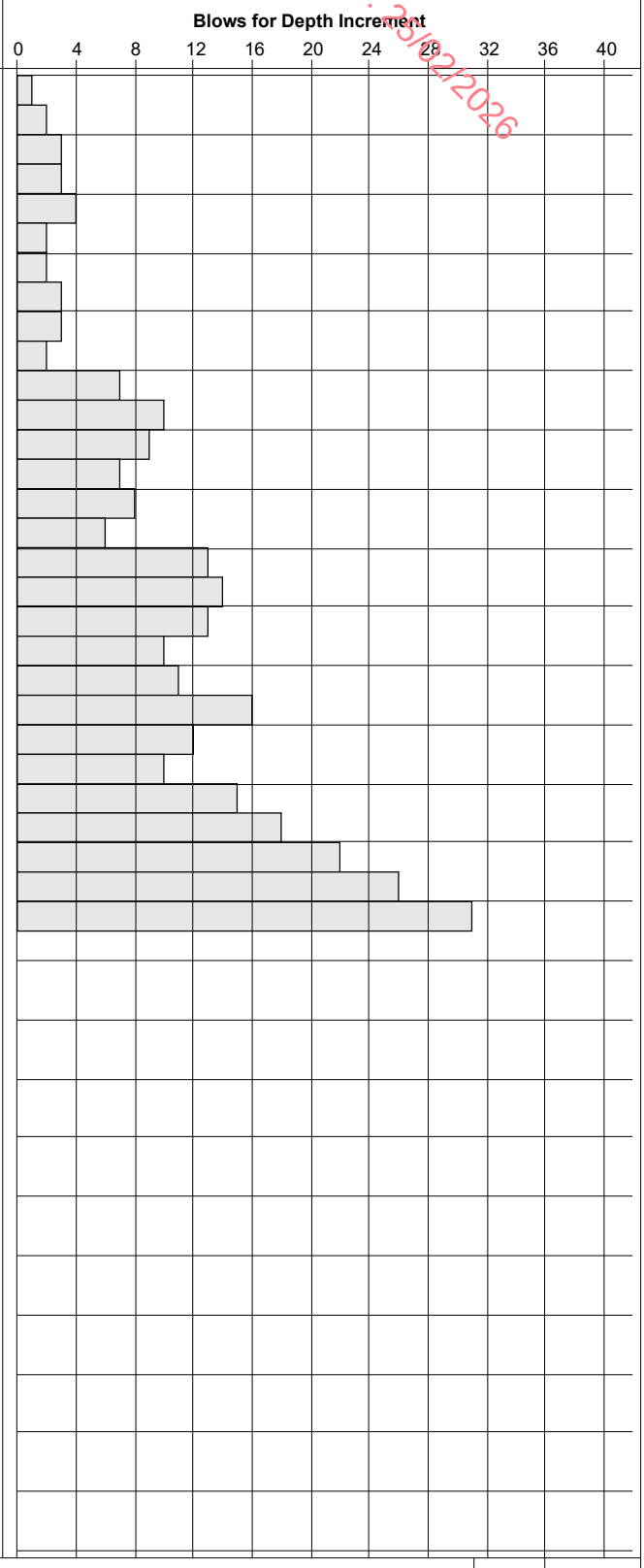
Figure No.
9338-12-19.DP11

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Sandford Park Milltown	DP12

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	20.68	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	716873.3 E 731234.7 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		20.68	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	4			
0.50-0.60	2		20.18	0.50
0.60-0.70	2			
0.70-0.80	3			
0.80-0.90	3			
0.90-1.00	2			
1.00-1.10	7		19.68	1.00
1.10-1.20	10			
1.20-1.30	9			
1.30-1.40	7			
1.40-1.50	8			
1.50-1.60	6		19.18	1.50
1.60-1.70	13			
1.70-1.80	14			
1.80-1.90	13			
1.90-2.00	10			
2.00-2.10	11		18.68	2.00
2.10-2.20	16			
2.20-2.30	12			
2.30-2.40	10			
2.40-2.50	15			
2.50-2.60	18		18.18	2.50
2.60-2.70	22			
2.70-2.80	26			
2.80-2.90	31			
			17.68	3.00
			17.18	3.50
			16.68	4.00
			16.18	4.50
			15.68	5.00



Remarks

Scale (approx)	Logged By
1:25	NM

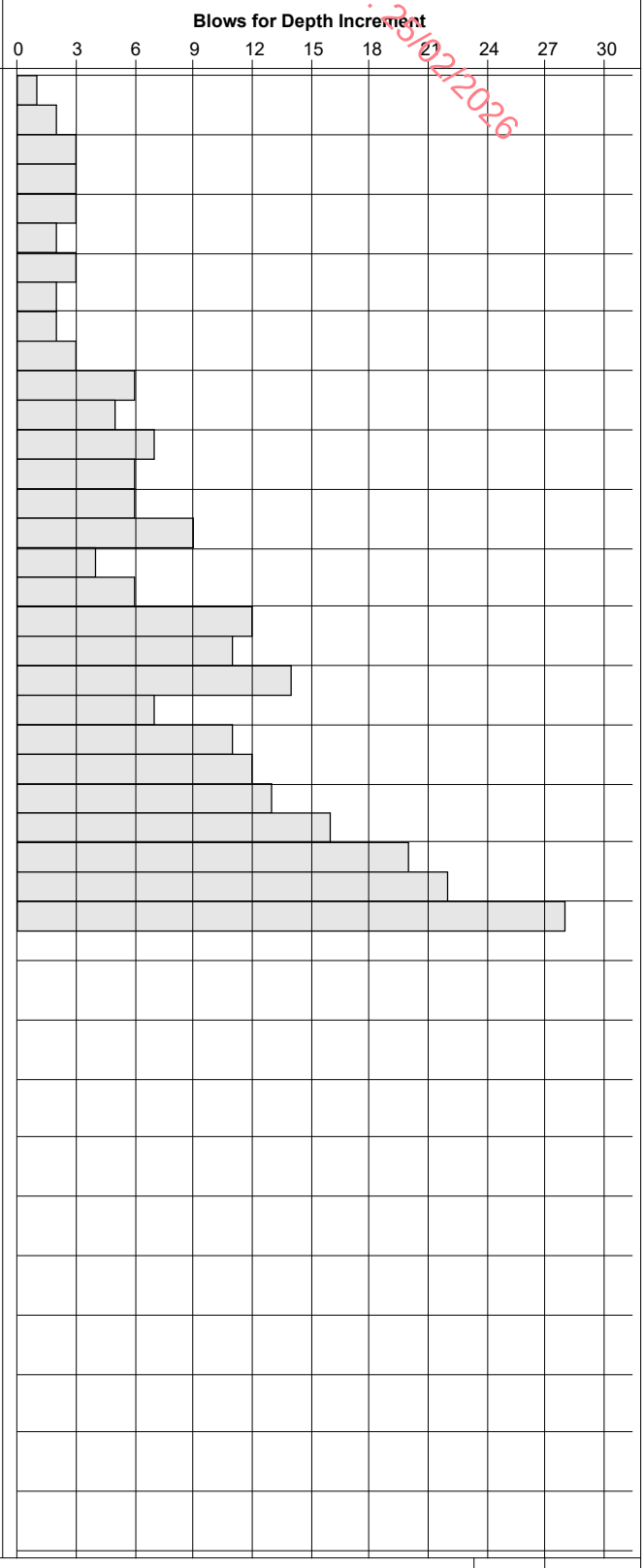
Figure No.
9338-12-19.DP12

Ground Investigations Ireland Ltd
www.gii.ie

Site	Probe Number
Sandford Park Milltown	DP13

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic probe DPH. Fall height 500mm. Hammer weight 50kg	Diameter 43.7mm	21.16	DBFL	9338-12-19
	Location	**Dates**	**Engineer**	**Sheet**
	716868.8 E 731214.3 N	16/01/2020	DBFL	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
0.00-0.10	1		21.16	0.00
0.10-0.20	2			
0.20-0.30	3			
0.30-0.40	3			
0.40-0.50	3			
0.50-0.60	2		20.66	0.50
0.60-0.70	3			
0.70-0.80	2			
0.80-0.90	2			
0.90-1.00	3			
1.00-1.10	6		20.16	1.00
1.10-1.20	5			
1.20-1.30	7			
1.30-1.40	6			
1.40-1.50	6			
1.50-1.60	9		19.66	1.50
1.60-1.70	4			
1.70-1.80	6			
1.80-1.90	12			
1.90-2.00	11			
2.00-2.10	14		19.16	2.00
2.10-2.20	7			
2.20-2.30	11			
2.30-2.40	12			
2.40-2.50	13			
2.50-2.60	16		18.66	2.50
2.60-2.70	20			
2.70-2.80	22			
2.80-2.90	28			
			18.16	3.00
			17.66	3.50
			17.16	4.00
			16.66	4.50
			16.16	5.00



Remarks

Scale (approx)	Logged By
1:25	NM

Figure No.
9338-12-19.DP13

APPENDIX 6 – Window Sample Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Number** WS01
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m 68mm to 2.40m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 16/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL.		
					0.30			
					(0.20)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with redbrick mortar and charcoal fragments.		
					0.50			
0.70	EN				(1.05)	Firm light brown grey mottled slightly sandy slightly gravelly CLAY.		
					1.55			
1.70	EN				(0.85)	Stiff brown grey slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
2.40	EN				2.40	Complete at 2.40m		

Remarks
Refusal at 2.40m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS01

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Number** WS02
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m 68mm to 2.54m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 16/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40) 0.40	TOPSOIL.		
					(0.30) 0.70	Firm light brown slightly sandy slightly gravelly CLAY with one sub-angular cobble.		
0.70	EN				(0.30) 1.00	No recovery.		
1.70	EN				(1.20) 2.20	Firm to stiff light brown grey mottled slightly sandy slightly gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
2.50	EN				(0.34) 2.54	Stiff brown grey slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
						Complete at 2.54m		

Remarks
Refusal at 2.54m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS02

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS03
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m 68mm to 2.70m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 16/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15) 0.15	TOPSOIL.		
					(0.15) 0.30	POSSIBLE MADE GROUND: Brown slightly sandy slightly gravelly Clay.		
					(0.45)	Firm to stiff light brown grey mottled slightly sandy slightly gravelly CLAY with rare sub-angular to sub-rounded cobbles.		
0.70	EN				0.75			
					(0.25)	No recovery.		
					1.00			
					(1.10)	Stiff light brown grey mottled slightly sandy slightly gravelly CLAY with rare sub-angular to sub-rounded cobbles.		
1.70	EN				2.10			
					(0.60)	Brown dark grey slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
2.70	EN				2.70	Complete at 2.70m		

Remarks
Refusal at 2.70m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS03

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS04
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.08) 0.08	TARMACADAM		
					(0.32)	MADE GROUND: Grey angular Gravel.		
					0.40	Firm to stiff light brown grey mottled slightly sandy gravelly CLAY.		
0.70	EN				(1.30)			
1.70	EN				1.70	No recovery.		
					(0.30)			
					2.00	Complete at 2.00m		

Remarks
Refusal at 2.00m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS04

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS05
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 16/01/2020	**Project Contractor** GII

Job Number 9338-12-19

Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40) 0.40	TOPSOIL		
0.70	EN				(1.60)	Firm to stiff light brown grey mottled slightly sandy gravelly CLAY with occasional sub-rounded cobbles.		
1.70	EN				2.00	Complete at 2.00m		

Remarks
Refusal at 2.00m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS05

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS06
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 16/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40) 0.40	TOPSOIL		
0.70	EN				(1.60)	Firm to stiff light brown grey mottled slightly sandy gravelly CLAY with occasional sub-rounded cobbles.		
1.70	EN				2.00	Complete at 2.00m		

Remarks
Refusal at 2.00m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS06

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS07
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m 68mm to 2.60m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 16/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40)	TOPSOIL		
					0.40	Firm to stiff light brown grey mottled slightly sandy gravelly CLAY.		
0.70	EN							
					(1.90)			
1.70	EN							
					2.30	Stiff grey slightly sandy gravelly CLAY.		
					(0.30)			
2.60	EN				2.60	Complete at 2.60m		

Remarks
Refusal at 2.60m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS07

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS08
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m 68mm to 2.66m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.08) 0.08	TARMACADAM.		
					(0.12) 0.20	MADE GROUND: Grey angular slightly clayey Gravel.		
					(0.25) 0.45	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with mortar redbrick and charcoal fragments.		
0.70	EN				(1.55) 2.00	Firm to stiff light brown slightly sandy gravelly CLAY.		
1.70	EN				(0.66) 2.66	Stiff dark grey slightly sandy gravelly CLAY.		
2.60	EN					Complete at 2.66m		

Remarks
Refusal at 2.66m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS08

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS09
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m 68mm to 2.60m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 16/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40)	TOPSOIL.		
					0.40 (0.10) 0.50	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with mortar and redbrick fragments.		
0.70	EN				(1.00)	Firm light brown slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
					1.50			
1.70	EN				(0.70)	Firm to stiff light brown grey slightly sandy gravelly CLAY.		
					2.20			
					(0.40)	Stiff dark grey slightly sandy gravelly CLAY.		
2.60	EN				2.60	Complete at 2.60m		

Remarks
Refusal at 2.60m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS09

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS10
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m 68mm to 2.50m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 16/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.35) 0.35	TOPSOIL.		
					(0.15) 0.50	MADE GROUND: Light brown slightly sandy slightly gravelly Clay with mortar and redbrick fragments.		
0.70	EN				(1.80)	Firm to stiff brown grey slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
1.70	EN							
2.30	EN				2.30 (0.20) 2.50	No recovery.		
						Complete at 2.50m		

Remarks
Refusal at 2.50m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS10

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS11
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m 68mm to 2.30m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 16/01/2020	**Project Contractor** GII

Job Number 9338-12-19

Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40)	TOPSOIL.		
					0.40	MADE GROUND: Brown slightly sandy slightly gravelly Clay with mortar and redbrick fragments.		
0.70	EN				0.40	Firm to stiff brown grey slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
					(1.80)			
1.70	EN							
2.20	EN				2.20	No recovery.		
					(0.10)			
					2.30	Complete at 2.30m		

Remarks
Refusal at 2.30m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	**Logged By**
1:25	NM

Figure No. 9338-12-19.WS11

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS12
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m 68mm to 2.57m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.08) 0.08	TARMACADAM.		
					(0.27) 0.35	MADE GROUND: Grey angular slightly clayey Gravel.		
0.70	EN				(0.85) 1.20	Firm to stiff light brown slightly sandy slightly gravelly CLAY.		
1.70	EN				(1.00) 2.20	Stiff brown slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles		
2.50	EN				(0.37) 2.57	Stiff to very stiff dark grey slightly sandy gravelly CLAY.		
						Complete at 2.57m		

Remarks
Refusal at 2.57m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS12

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS13
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 1.50m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 17/01/2020	**Project Contractor** GII

Job Number 9338-12-19

Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30) 0.30	TOPSOIL.		
					(0.20) 0.50	MADE GROUND: Brown slightly sandy slightly gravelly Clay with redbrick mortar and bone fragments.		
0.70	EN				(0.90)	Firm to stiff brown grey mottled slightly sandy gravelly CLAY.		
1.40	EN				1.40 (0.10) 1.50	No recovery.		
						Complete at 1.50m		

Remarks
Refusal at 1.50m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS13

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Number** WS14
Machine : Geotech 10 **Method :** Drive-in Windowless Sampler	**Dimensions** 88mm to 2.00m 68mm to 2.75m	**Ground Level (mOD)**	**Client** DBFL
	Location	**Dates** 17/01/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30) 0.30	TOPSOIL.		
					(0.20) 0.50	MADE GROUND: Brown slightly sandy slightly gravelly Clay with redbrick and charcoal fragments.		
0.70	EN				(1.50)	Firm brown grey mottled slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
1.70	EN				2.00	Stiff to very stiff dark grey slightly sandy gravelly CLAY.		
2.70	EN				(0.75) 2.75	Complete at 2.75m		

Remarks
Refusal at 2.75m BGL due to obstruction, possible boulder.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:25	NM

Figure No. 9338-12-19.WS14

Sandford Park, Milltown: Window Sample Photographs

WS01

WS02

WS03

WS04

WS05

WS06

WS07

WS08

WS09

WS10

WS11

WS12

WS13

WS14

APPENDIX 7 – Borehole Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Borehole Number** BH01
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 5.70m	**Ground Level (mOD)** 18.33	**Client** DBFL	**Job Number** 9338-12-19
	Location (dGPS) 717027.6 E 731285.9 N	**Dates** 04/03/2020-05/03/2020	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					18.03	(0.30) 0.30	Dark brown sandy slightly gravelly TOPSOIL with occasional rootlets.		
0.50	B				17.53	(0.50) 0.80	Soft light brown slightly sandy slightly gravelly CLAY.		
1.00-1.45 1.00	SPT(C) N=11 B			1,2/2,3,3,3			Firm to stiff light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
2.00-2.45 2.00	SPT(C) N=19 B			2,3/4,5,5,5		(1.70)			
3.00-3.45 3.00	SPT(C) N=40 B			3,5/7,9,11,13	15.83	2.50	Very stiff dark grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
4.00-4.45 4.00	SPT(C) N=39 B			5,6/7,9,9,14		(3.20)			
5.00-5.38 5.00	SPT(C) 50/225 B			6,9/13,17,19,1					
					12.63	5.70	Refusal at 5.70m		

Remarks
No groundwater encountered during drilling
Borehole backfilled on complertion.
Borehole terminated at 5.70m BGL due to obstruction, possible boulder or rock
Chiselling from 5.70m to 5.70m for 1 hour.

Scale (approx)	Logged By
1:50	PM

Figure No. 9338-12-19.BH01

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Borehole Number** BH02
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 7.00m	**Ground Level (mOD)** 18.40	**Client** DBFL
	Location (dGPS) 717045.9 E 731268.6 N	**Dates** 06/03/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					18.10	(0.30) 0.30	Dark brown slightly sandy slightly gravelly TOPSOIL with occasional rootlets.			
0.50	B					(0.80)	Soft light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
1.00-1.45 1.00	SPT(C) N=14 B			1,2/3,3,4,4	17.30	1.10	Firm to stiff light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
2.00-2.45 2.00	SPT(C) N=18 B			2,3/4,5,4,5		(1.20)				
3.00-3.45 3.00	SPT(C) N=33 B			4,6/7,8,9,9	16.10	2.30	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
4.00-4.40 4.00	SPT(C) 50/250 B			6,8/11,15,17,7		(4.70)				
5.00-5.40 5.00	SPT(C) 50/250 B			7,10/13,15,17,5						
6.00-6.30 6.00	SPT(C) 50/150 B			8,10/17,21,12						
7.00-7.00 7.00	SPT(C) 25*/0 50/0 B			25/50	11.40	7.00	Refusal at 7.00m			

Remarks
No groundwater encountered during drilling
Slotted pipe with pea gravel surround from 7.0m BGL to 1.0m BGL, plain pipe with bentonite seal from 1.0m BGL to GL, finished with an upright cover
Borehole terminated at 7.00m BGL due to obstruction, possible boulder or rock
Chiselling from 7.00m to 7.00m for 1 hour.

Scale (approx)	Logged By
1:50	PM

Figure No. 9338-12-19.BH02

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Borehole Number** BH03
Machine : Dando 2000, Beretta T44 **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 7.20m 63mm cased to 20.00m	**Ground Level (mOD)** 19.67	**Client** DBFL
	Location 716904.5 E 731274.9 N	**Dates** 06/03/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					19.37	(0.30) 0.30	Dark brown slightly sandy slightly gravelly TOPSOIL with occasional rootlets.			
0.50	B					(0.60)	Soft light brown slightly sandy slightly gravelly CLAY.			
1.00 1.00-1.45	B SPT(C) N=13			1,2/3,2,4,4	18.77 18.47	0.90 (0.30) 1.20	Soft light brown mottled orange grey slightly sandy slightly gravelly CLAY.			
2.00 2.00-2.45	B SPT(C) N=22			7,4/5,6,6,5		(1.10)	Firm to stiff light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Some yellow and grey mottling.			
3.00 3.00-3.31	B SPT(C) 50/160			7,12/18,25,7	17.37	2.30	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
4.00 4.00-4.45	B SPT(C) N=39			7,10/8,9,11,11		(4.20)				
5.00 5.00-5.45	B SPT(C) N=47			6,8/10,12,12,13						
6.00 6.00-6.45	B SPT(C) N=50			6,9/10,11,14,15						
7.00 7.00-7.22	B SPT(C) 50/70			10,20/50	13.17 12.67	6.50 (0.50) 7.00	Very stiff brown slightly sandy gravelly CLAY.			
7.00	TCR: 75	SCR	RQD	FI			Very stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
8.20-8.28 8.20				22,3/50 SPT(C) 25*/75 50/0		(4.20)				
	TCR: 93	SCR								
9.70-9.78 9.70				22,3/50 SPT(C) 25*/75 50/0						

Remarks
No groundwater encountered during cable percusion drilling.
Cable percussion to 7.00m BGL with Rotary core follow on to 20.00m BGL.
Slotted pipe installed from 8.5m BGL to 3m BGL with pea grval filter zone from 8.5m BGL to 1.0m BGL and bentonite seal from 1.0m BGL to GL, finished with an upright cover
Chiselling from 7.20m to 7.20m for 1 hour.

Scale (approx)	Logged By
1:50	PM, CB

Figure No. 9338-12-19.BH03

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Borehole Number** BH03
Machine : Dando 2000, Beretta T44 **Flush :** Water **Core Dia :** 63 mm **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 7.20m 63mm cased to 20.00m	**Ground Level (mOD)** 19.67	**Client** DBFL
	Location 716904.5 E 731274.9 N	**Dates** 06/03/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	93				26/50 SPT(C) 26*/75 50/0	8.47	11.20	Very stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.			
11.20-11.28 11.20	67				25/50 SPT(C) 25*/0 50/0	6.27	(2.20) 13.40	Very stiff grey slightly sandy gravelly CLAY with many subangular to subrounded cobbles and boulders. Gravel is subangular to subrounded fine to coarse.			
12.70-12.70 12.70	73				25/50 SPT(C) 25*/0 50/0						
14.20-14.20 14.20	73				22,3/50 SPT(C) 25*/75 50/0		(3.80)				
15.70-15.78 15.70	100				21,4/50 SPT(C) 25*/75 50/0	2.47	17.20	Poor recovery. Recovery consists of slightly clayey slightly gravelly clayey subangular to subrounded COBBLES of limestone.			
17.20-17.28 17.20	33					1.22	(1.25) 18.45	Poor recovery. Recovery consists of COBBLES of limestone. Presumed rock.			
18.70	62					-0.33	(1.55) 20.00				
20.00											

Remarks

Scale (approx)	Logged By
1:50	PM, CB

Figure No. 9338-12-19.BH03

Ground Investigations Ireland Ltd
www.gii.ie

Site	Borehole Number
Sandford Park Milltown	BH04

Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 7.30m	Ground Level (mOD) 19.44	Client DBFL	Job Number 9338-12-19
	Location 716966.1 E 731262.2 N	Dates 10/03/2020	Project Contractor GII	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					19.24	(0.20) 0.20	Dark brown sandy slightly gravelly TOPSOIL with occasional rootlets.		
0.50	B					(0.70)	Soft to firm light brown mottled grey slightly sandy slightly gravelly CLAY.		
1.00-1.45 1.00	SPT(C) N=8 B			1,1/2,1,2,3	18.54	0.90 (0.50)	Soft to firm light brown slightly sandy slightly gravelly CLAY.		
					18.04	1.40	Firm to stiff light brown slightly sandy slightly gravelly CLAY.		
2.00-2.02 2.00	SPT(C) 25*/20 50/0 B			25/50		(1.10)			
					16.94	2.50	Very stiff, dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
3.00-3.45 3.00	SPT(C) N=47 B			6,8/11,12,13,11					
4.00-4.45 4.00	SPT(C) N=50 B			6,8/11,13,14,12					
						(4.40)			
5.00-5.43 5.00	SPT(C) 50/275 B			7,8/10,15,16,9					
6.00-6.37 6.00	SPT(C) 50/215 B			9,10/14,16,20					
					12.54	6.90	Very stiff greyish brown slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
7.00-7.35 7.00	SPT(C) 50/195 B			10,10/15,20,15		(0.40)			
					12.14	7.30	Refusal at 7.30m		

Remarks
No groundwater encountered during drilling
Borehole backfilled on complertion.
Borehole terminated at 7.30m BGL due to obstruction, possible boulder or rock
Chiselling from 2.50m to 2.62m for 0.75 hours. Chiselling from 7.30m to 7.30m for 1 hour.

Scale (approx)	Logged By
1:50	PM

Figure No.
9338-12-19.BH04

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Borehole Number** BH05
Machine : Dando 2000, Beretta T44 **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 5.30m 63mm cased to 16.50m	**Ground Level (mOD)** 18.75	**Client** DBFL
	Location 717014 E 731253.8 N	**Dates** 03/03/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					18.65	0.10	MADE GROUND: Tarmacadam		
						(0.40)	MADE GROUND: Light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional fragments of red brick cloth fibres and tarmacadam.		
0.50	B				18.25	0.50			
1.00 1.00-1.45	B SPT(C) N=12			1,2/3,3,3,3		(1.70)	Firm light brown slightly sandy slightly gravelly CLAY. Some orange mottling.		
2.00 2.00-2.45	B SPT(C) N=37			2,4/5,7,12,13	16.55	2.20	Very stiff dark grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
3.00 3.00-3.45	B SPT(C) N=51			5,7/11,11,14,15 Water strike(1) at 3.10m, rose to 2.60m in 20 mins, sealed at NOm.					▼1 ▽1
4.00 4.00-4.45	B SPT(C) N=55			5,7/10,13,15,17		(4.50)			
5.00 5.00-5.30	B SPT(C) 50/150			7,15/20,30					
5.30	TCR: 25	SCR	RQD	FI					
6.70-6.85 6.70	TCR: 100	SCR	RQD	FI	12.05	6.70	Very stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles and boulders. Gravel is subanugular to subrounded fine to coarse.		
8.20-8.28 8.20	TCR: 100	SCR	RQD	FI					
9.70-9.78 9.70				14,22/50 SPT(C) 50/0 22,3/50 SPT(C) 25*/75 50/0 22,3/50 SPT(C) 25*/75 50/0					

Remarks
Groundwater encountered at 3.10m BGL.
Borehole backfilled on completion.
Cable percussion to 5.30m BGL with Rotary core follow on to 16.50m BGL.
Chiselling from 5.30m to 5.30m for 1 hour.

Scale (approx)	Logged By
1:50	PM, CB

Figure No. 9338-12-19.BH05

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Borehole Number** BH05
Machine : Dando 2000, Beretta T44 **Flush :** Water **Core Dia :** 63 mm **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 5.30m 63mm cased to 16.50m	**Ground Level (mOD)** 18.75	**Client** DBFL
	Location 717014 E 731253.8 N	**Dates** 03/03/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	93						(6.60)			
11.20-11.28 11.20	73				22,3/50 SPT(C) 25*/75 50/0					
12.70-13.15 12.70					8,9/10,12,12,11 SPT(C) N=45					
13.30	50	22	22			5.45	13.30	Weak- medium strong fine grained grey LIMESTONE distinctly weathered with calcite veining and occasional beds of stiff brown Clay. (possible residual mudstone) One set of fractures. F1: 0-10 degrees. Very closely-closely spaced undulating smooth occasionally open with brown staining and clay smearing.		
14.20	87	59	52	7			(3.20)			
15.40								From 15.40 to 16.50 Non Intact.		
15.70	81	23	16	N.I.						
16.50						2.25	16.50	Complete at 16.50m		

Remarks

Scale (approx)	Logged By
1:50	PM, CB

Figure No. 9338-12-19.BH05

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Borehole Number** BH06
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 8.00m	**Ground Level (mOD)** 20.32	**Client** DBFL
	Location 716893.6 E 731242.4 N	**Dates** 11/03/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					20.12	(0.20) 0.20	Dark brown sandy slightly gravelly TOPSOIL with occasional rootlets.		
						(0.40)			
0.50	B				19.72	0.60	Soft light brown slightly sandy slightly gravelly CLAY with some grey mottling.		
1.00-1.45 1.00	SPT(C) N=10 B			1,1/2,2,3,3			Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
						(1.60)			
2.00-2.45 2.00	SPT(C) N=19 B			2,2/3,4,5,7	18.12	2.20	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
3.00-3.42 3.00	SPT(C) 50/265 B			10,10/10,15,15,10					
4.00-4.39 4.00	SPT(C) 50/235 B			11,12/13,14,16,7					
						(4.80)			
5.00-5.38 5.00	SPT(C) 50/230 B			10,12/12,16,17,5					
6.00-6.35 6.00	SPT(C) 50/200 B			11,13/17,19,14					
7.00-7.33 7.00	SPT(C) 50/180 B			12,14/16,22,12	13.32	7.00	Very stiff light brown slightly sandy slightly gravelly CLAY.		
						(1.00)			
8.00-8.28 8.00	SPT(C) 50/125 B			16,19/25,25	12.32	8.00	Complete at 8.00m		

Remarks
No groundwater encountered during drilling
Borehole terminated at 8.00m BGL

Scale (approx)	Logged By
1:50	PM

Figure No. 9338-12-19.BH06

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Borehole Number** BH07
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 8.00m	**Ground Level (mOD)** 20.00	**Client** DBFL
	Location 716950.4 E 731230.1 N	**Dates** 12/03/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B					(1.00)	MADE GROUND: Light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional fragments of concrete and red brick.			
1.00-1.45 1.00	SPT(C) N=5 B			1,1/1,2,1,1	19.00	1.00 (0.40)	POSSIBLE MADE GROUND: Light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
2.00-2.45 2.00	SPT(C) N=27 B			1,2/4,6,8,9	18.60	1.40 (1.00)	Firm to Stiff light brown slightly sandy slightly gravelly CLAY.			
3.00-3.45 3.00	SPT(C) N=44 B			5,7/10,11,11,12	17.60	2.40	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
4.00-4.44 4.00	SPT(C) 50/285 B			8,8/11,14,15,10						
5.00-5.43 5.00	SPT(C) 50/275 B			9,11/11,13,17,9		(4.80)				
6.00-6.37 6.00	SPT(C) 50/220 B			11,14/15,16,19						
7.00-7.37 7.00	SPT(C) 50/220 B			12,12/14,16,20	12.80	7.20 (0.80)	Very stiff light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
8.00-8.31 8.00	SPT(C) 50/155 B			14,17/20,25,5	12.00	8.00	Complete at 8.00m			

Remarks
No groundwater encountered during drilling
Slotted pipe with pea gravel surround from 8.0m BGL to 1.0m BGL, plain pipe with bentonite seal from 1.0m BGL to GL, finished with an upright cover
Borehole terminated at 8.00m BGL

Scale (approx)	Logged By
1:50	PM

Figure No. 9338-12-19.BH07

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Borehole Number** BH08
Machine : Dando 2000, Beretta T44 **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 8.00m 96mm cased to 13.70m	**Ground Level (mOD)** 19.76	**Client** DBFL
	Location 716987.3 E 731204.4 N	**Dates** 13/03/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					19.66	0.10	CONCRETE.		
						(0.40)			
					19.26	0.50	MADE GROUND: Light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional fragments of red brick and concrete.		
0.50	B								
1.00	B						Soft light brown very sandy slightly gravelly CLAY.		
1.00-1.45	SPT(C) N=5			1,1/1,1,1,2		(0.80)			
					18.46	1.30	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
2.00	B					(1.30)			
2.00-2.45	SPT(C) N=9			1,1/1,2,3,3					
					17.16	2.60	Very stiff dark grey slightly sandy slightly gravelly CLAY with rare subangular to subrounded cobbles.		
3.00	B								
3.00-3.45	SPT(C) N=38			5,5/8,9,10,11					
4.00	B								
4.00-4.45	SPT(C) N=41			4,5/8,10,11,12					
5.00	B					(4.60)			
5.00-5.45	SPT(C) N=41			5,6/7,9,11,14					
6.00	B								
6.00-6.45	SPT(C) N=47			8,9/10,11,13,13					
7.00	B								
7.00-7.37	SPT(C) 55/220			11,14/16,17,22	12.56	7.20	Very stiff dark brown very sandy very gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
						(0.80)			
8.00	B			14,20/27,23					
8.00-8.25	SPT(C) 50/95				11.76	8.00	Very stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and boulders. Gravel is subangular to subrounded fine to coarse.		
8.00	TCR 100	SCR	RQD	FI					
8.20						(1.70)			
	63								
9.70-9.78				12,13/50 SPT(C) 25*/75 50/0	10.06	9.70	Medium strong- strong fine grained grey LIMESTONE partially- distinctly weathered with calcite veining.		
9.70									

Remarks
No groundwater encountered during drilling
Cable percussion to 8.00m BGL with Rotary core follow on to 13.70m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	PM, CB

Figure No. 9338-12-19.BH08

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Borehole Number** BH08
Machine : Dando 2000, Beretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 8.00m 96mm cased to 13.70m	**Ground Level (mOD)** 19.76	**Client** DBFL	**Job Number** 9338-12-19
	Location 716987.3 E 731204.4 N	**Dates** 13/03/2020	**Project Contractor** GII	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	100	67	60					Two sets of fractures. F1: 0-10 degrees. Very closely-closely spaced undulating smooth occasionally open with clay smearing. F2: 30-45 degrees. Very closely-closely spaced undulating smooth closed.		
11.20	100	59	59	9			(4.00)			
12.50	100	75	68							
13.70						6.06	13.70	Complete at 13.70m		

Remarks

Scale (approx)	Logged By
1:50	PM, CB

Figure No. 9338-12-19.BH08

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Borehole Number** BH09
Machine : Dando 2000, Beretta T44 **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 8.00m 63mm cased to 18.70m	**Ground Level (mOD)** 20.84	**Client** DBFL
	Location 716881.5 E 731214.8 N	**Dates** 17/03/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.30)	Dark brown sandy slightly gravelly TOPSOIL with occasional rootlets.			
					20.54	0.30				
0.50	B					(0.60)	Soft light brown slightly sandy slightly gravelly CLAY.			
1.00	B				19.94	0.90				
1.00-1.45	SPT(C) N=10			1,1/2,3,3,2			Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
						(1.50)				
2.00	B									
2.00-2.45	SPT(C) N=11			1,2/3,3,3,2						
					18.44	2.40				
3.00	B						Very stiff dark grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
3.00-3.45	SPT(C) N=28			2,3/5,7,7,9						
4.00	B									
4.00-4.45	SPT(C) N=38			5,7/7,9,11,11						
5.00	B					(5.20)				
5.00-5.45	SPT(C) N=43			7,7/8,10,12,13						
6.00	B									
6.00-6.44	SPT(C) 50/285			10,12/12,14,14,10						
7.00	B									
7.00-7.34	SPT(C) 50/190			12,14/16,23,11						
				12,17/24,26	13.24	7.60				
8.00	B					(0.40)	Very stiff light brown slightly sandy slightly gravelly CLAY with rare subangular to subrounded cobbles.			
8.00-8.28	SPT(C) 50/125				12.84	8.00				
8.00	TCR 100 SCR	RQD	FI				Very stiff slightly sandy slightly gravelly CLAY with occsional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.			
8.20										
	100					(2.50)				
				12,22/50						
9.70-9.85	SPT(C) 50/0									
9.70										

Remarks
No groundwater encountered durig cable percussion drilling
Cable percussion drilling to 8.00m BGL with rotary follow on to 18.70m BGL.
Slotted pipe installed from 9.5 BGL to 3.0m BGL with pea gravel filter zone from 9.5m BGL to 1.0m BGL and bentonite seal from 1.0m BGL to GL, finished with an upright cover

Scale (approx)	Logged By
1:50	PM, CB

Figure No. 9338-12-19.BH09

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Borehole Number** BH09
Machine : Dando 2000, Beretta T44 **Flush :** Water **Core Dia :** 63 mm **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 8.00m 63mm cased to 18.70m	**Ground Level (mOD)** 20.84	**Client** DBFL
	Location 716881.5 E 731214.8 N	**Dates** 17/03/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	100					10.34	10.50	Very stiff brown slightly sandy slightly gravelly CLAY with somel subangular to subrounded cobbles and boulders.			
11.20-11.28 11.20	83				19,6/50 SPT(C) 25*/75 50/0		(2.50)				
12.70	27					7.84	13.00	No recovery. Driller notes possible rock at 13.00m.			
							(1.20)				
14.20	77					6.64	14.20	Possible weathered rock recovered as slightly sandy gravelly CLAY with subangular to subrounded cobbles of limestone.			
							(1.50)				
15.70	93	51	51			5.14	15.70	Medium strong- strong fine grained grey LIMESTONE partially to distinctly weathered, with closely to medium spaced thin beds of stiff brown Clay (possible residual mudstone). One set of fractures. F1: 0-10 degrees. Very closely-closely spaced undulating smooth occasionally open with brown staining and clay smearing.			
							(3.00)				
17.20	80	32	32								
18.70						2.14	18.70	Complete at 18.70m			

Remarks

Scale (approx)	Logged By
1:50	PM, CB

Figure No. 9338-12-19.BH09

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Borehole Number** BH10
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 7.20m	**Ground Level (mOD)** 20.35	**Client** DBFL	**Job Number** 9338-12-19
	Location 716944.1 E 731201 N	**Dates** 17/03/2020-18/03/2020	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					20.15	(0.20) 0.20	Dark brown sandy slightly gravelly TOPSOIL with occasional rootlets.		
0.50	B					(1.00)	Soft light brown slightly sandy slightly gravelly CLAY. Mottled grey.		
1.00-1.45 1.00	SPT(C) N=11 B			1,1/2,3,3,3	19.15	1.20	Firm to stiff light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
2.00-2.45 2.00	SPT(C) N=21 B			2,3/4,5,5,7		(1.30)			
					17.85	2.50	Very stiff dark grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
3.00-3.45 3.00	SPT(C) N=44 B			5,7/9,10,12,13					
4.00-4.44 4.00	SPT(C) 50/285 B			7,9/11,14,16,9 Water strike(1) at 4.30m, rose to 4.20m in 20 mins.					▼1 ▽1
						(4.70)			
5.00-5.40 5.00	SPT(C) 44/245 B			7,10/10,10,17,7					
6.00-6.37 6.00	SPT(C) 50/215 B			9,11/14,17,19					
7.00-7.17 7.00	SPT(C) 50/20 B			12,14/50	13.15	7.20	Refusal at 7.20m		

Remarks
Groundwater encountered at 4.30m.
Borehole backfilled on completion
Borehole terminated at 7.20m BGL due to obstruction, possible boulder or rock

Scale (approx)	Logged By
1:50	PM

Figure No. 9338-12-19.BH10

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Borehole Number** BH11
Machine : Dando 2000, Beretta T44 **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 8.00m 96mm cased to 13.00m	**Ground Level (mOD)** 20.45	**Client** DBFL
	Location 716967.5 E 731182.2 N	**Dates** 18/03/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					20.35	0.10	MADE GROUND: Tarmacadam			
						(0.40)	MADE GROUND: Light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles			
0.50	B				19.95	0.50				
					19.75	(0.20) 0.70	Soft light brown slightly sandy slightly gravelly CLAY with rare subangular to subrounded cobbles.			
1.00	B					(0.50)				
1.00-1.45	SPT(C) N=6			1,1/1,2,1,2	19.25	1.20	Soft light brown mottled grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
							Firm light brown slightly sandy slightly gravelly CLAY.			
2.00	B					(1.20)				
2.00-2.45	SPT(C) N=12			1,1/2,3,3,4						
					18.05	2.40	Very stiff dark grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.			
3.00	B									
3.00-3.45	SPT(C) N=48			7,9/10,12,12,14						
4.00	B									
4.00-4.45	SPT(C) N=49			7,10/10,12,14,13						
						(4.70)				
5.00	B									
5.00-5.44	SPT(C) 50/285			8,9/11,12,13,14						
6.00	B									
6.00-6.40	SPT(C) 50/245			8,10/12,14,14,10						
7.00	B			10,11/14,16,20						
7.00-7.37	SPT(C) 50/220				13.35	7.10	Very stiff light brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles.			
7.00	TCR 33	SCR -	RQD	FI		(0.90)				
8.00-8.34	B			12,14/17,20,15						
8.00	SPT(C) 52/190				12.45	8.00	Very stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles and boulders.			
8.20	TCR 87	SCR 18	RQD 9	FI		(1.00)				
9.00					11.45	9.00	Medium strong-strong grey fine grained LIMESTONE partially weathered with calcite veining. Two sets of fractures. F1: 0-10 degrees. Very closely- closely spaced undulating smooth closed. F2 35-45 degrees. Closely- medium spaced undulating smooth closed.			
9.70										

Remarks
No groundwater encountered during cable percussive drilling
Cable percussion to 8.00m BGL with Rotary core follow on to 13.00m BGL.
Slotted pipe installed from 7.0m BGL to 3m BGL with pea gravel filter zone from 7.0m BGL to 1.0m BGL and bentonite seal from 1.0m BGL to GL, finished with a flush cover.

Scale (approx)	Logged By
1:50	PM, CB

Figure No. 9338-12-19.BH11

Ground Investigations Ireland Ltd
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Site Sandford Park Milltown			**Borehole Number** BH11
Machine : Dando 2000, Beretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 8.00m 96mm cased to 13.00m	**Ground Level (mOD)** 20.45	**Client** DBFL	**Job Number** 9338-12-19
	Location 716967.5 E 731182.2 N	**Dates** 18/03/2020	**Project Contractor** GII	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	93	89	87	8			(4.00)				
11.20	100	67	36								
12.70	100	67	67								
13.00						7.45	13.00	Complete at 13.00m			

Remarks

Scale (approx)	Logged By
1:50	PM, CB

Figure No. 9338-12-19.BH11

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Borehole Number** BH12
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 8.00m	**Ground Level (mOD)** 21.41	**Client** DBFL
	Location 716865.6 E 731202.8 N	**Dates** 19/03/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.30)	Dark brown sandy slightly gravelly TOPSOIL with occasional rootlets.		
					21.11	0.30			
0.50	B					(0.70)	POSSIBLE MADE GROUND: light brown sandy gravelly CLAY.		
1.00-1.45 1.00	SPT(C) N=6 B			1,1/1,1,2,2	20.41	1.00			
						(0.90)	Soft light brown mottled grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
2.00-2.45 2.00	SPT(C) N=10 B			2,2/2,3,3,2	19.51	1.90			
						(0.70)	Firm light brown slightly sandy slightly gravelly CLAY.		
3.00-3.45 3.00	SPT(C) N=25 B			2,3/4,5,7,9	18.81	2.60			
4.00-4.45 4.00	SPT(C) N=30 B			3,4/5,7,9,9			Very stiff dark grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
5.00-5.45 5.00	SPT(C) N=35 B			6,6/7,8,9,11		(5.40)			
6.00-6.45 6.00	SPT(C) N=46 B			7,10/10,11,12,13					
7.00-7.40 7.00	SPT(C) 50/245 B			10,12/14,14,15,7					
8.00-8.37 8.00	SPT(C) 50/220 B			10,14/16,17,17	13.41	8.00	Complete at 8.00m		

Remarks
No groundwater encountered durig drillling
Borehole backfilled on completion.
Borehole complete at 8.00m BGL

Scale (approx)	Logged By
1:50	PM

Figure No. 9338-12-19.BH12

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Borehole Number** BH13
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 3.70m	**Ground Level (mOD)** 22.64	**Client** DBFL
	Location 716891.5 E 731106.3 N	**Dates** 05/10/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.30)	Brown slightly sandy slightly gravelly TOPSOIL with occasional rootlets		
					22.34	0.30			
0.50	B						Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional rootlets. Gravel is subangular to subrounded fine to coarse		
1.00-1.45 1.00	SPT(C) N=7 B			1,2/2,1,2,2		(1.70)			
					20.64	2.00			
2.00-2.45 2.00	SPT(C) N=14 B			2,2/3,3,4,4		(0.60)	Firm to stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
					20.04	2.60			
3.00-3.45 3.00	SPT(C) N=39 B			4,6/7,9,10,13		(1.10)	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
					18.94	3.70			
3.70	B						Obstruction: presumed boulder		
							Complete at 3.70m		

Remarks
Borehole terminated at 3.70m BGL due to an obstruction on a presumed boulder
No groundwater encountered during drilling
Borehole backfilled upon completion
Chiselling from 3.70m to 3.70m for 1 hour.

Scale (approx)	Logged By
1:50	PC

Figure No. 9338-12-19.BH13

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Borehole Number** BH14
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 3.50m	**Ground Level (mOD)** 22.96	**Client** DBFL
	Location 716916.3 E 731074.5 N	**Dates** 05/10/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.40)	Brown slightly sandy slightly gravelly TOPSOIL with occasional rootlets			
0.50	B				22.56	0.40	Firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse			
1.00-1.45 1.00	SPT(C) N=11 B			2,2/2,3,3,3		(1.60)				
2.00-2.45 2.00	SPT(C) N=15 B			2,3/3,3,4,5	20.96	2.00	Firm to stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse			
						(0.70)				
3.00-3.45 3.00	SPT(C) N=36 B			4,5/6,8,10,12	20.26	2.70	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		▼1	
						(0.80)				
3.50	B			Water strike(1) at 3.50m, rose to 3.00m in 20 mins.	19.46	3.50	Obstruction: presumed boulder		▽1	
							Complete at 3.50m			

Remarks
Borehole terminated at 3.50m BGL due to an obstruction on a presumed boulder
Groundwater encountered at 3.50m BGL
Slotted pipe with pea gravel surround from 3.50m BGL to 1.00m BGL, plain pipe with bentonite seal from 1.00m BGL to GL, finished with a flush cover
Chiselling from 3.50m to 3.50m for 1 hour.

Scale (approx)	Logged By
1:50	PC

Figure No. 9338-12-19.BH14

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Borehole Number** BH15
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 9.50m	**Ground Level (mOD)** 22.71	**Client** DBFL
	Location 716914.3 E 731092 N	**Dates** 06/10/2020	**Project Contractor** GII
			Job Number 9338-12-19 **Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.30)	Brown slightly sandy slightly gravelly TOPSOIL with occasional rootlets		
					22.41	0.30			
0.50	B					(0.60)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional rootlets and occasional fragments of concrete and red brick		
					21.81	0.90			
1.00-1.45 1.00	SPT(C) N=13 B			2,2/3,3,3,4			Firm to stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
						(1.10)			
					20.71	2.00			
2.00-2.45 2.00 2.00	SPT(C) N=17 B EN			2,3/3,4,5,5		(0.40)	Stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
					20.31	2.40			
							Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
3.00-3.45 3.00 3.00	SPT(C) N=32 B EN			3,5/6,8,9,9					
4.00-4.45 4.00	SPT(C) N=39 B			3,6/7,10,11,11					
5.00-5.42 5.00	SPT(C) 50/270 B			5,8/11,15,17,7					
						(6.70)			
6.00-6.39 6.00	SPT(C) 50/240 B			4,7/12,15,19,4					
7.00-7.38 7.00	SPT(C) 50/225 B			5,9/13,15,22					
8.00-8.36 8.00	SPT(C) 50/210 B			6,10/14,17,19					
9.00-9.38 9.00	SPT(C) 50/225 B			5,9/12,18,20	13.61	9.10			
						(0.40)	Very stiff brown slightly sandy gravelly CLAY with some angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
9.50	B				13.21	9.50	Obstruction: presumed boulder		
							Complete at 9.50m		

Remarks
Borehole terminated at 9.50m BGL due to an obstruction on a presumed boulder
No groundwater encountered during drilling
Borehole backfilled upon completion
Chiselling from 9.40m to 9.50m for 1 hour.

Scale (approx)	Logged By
1:50	PC

Figure No. 9338-12-19.BH15

Ground Investigations Ireland Ltd
www.gii.ie

Site Sandford Park Milltown			**Borehole Number** BH16
Machine : DANDO 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 5.70m	**Ground Level (mOD)** 21.38	**Client** DBFL
	Location 716896.6 E 731165.2 N	**Dates** 07/10/2020	**Project Contractor** GII
			Job Number 9338-12-19
			Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.40)	Brown slightly sandy slightly gravelly TOPSOIL with occasional rootlets			
					20.98	0.40				
0.50	B						Firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional rootlets			
1.00-1.45 1.00	SPT(C) N=12 B			2,2/3,3,3,3		(1.40)				
				Water strike(1) at 1.80m, rose to 1.30m in 20 mins.	19.58	1.80			▼1	
2.00 2.00-2.45	B SPT(C) N=15			2,3/4,3,4,4			Medium dense greyish brown slightly clayey sandy subangular to subrounded fine to coarse GRAVEL with occasional angular to subrounded cobbles		▽1	
3.00-3.45 3.00	SPT(C) N=16 B			3,4/3,3,5,5		(2.70)				
4.00-4.17 4.00	SPT(C) 25*/95 50/75 B			19,6/50						
					16.88	4.50	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse			
5.00-5.45 5.00	SPT(C) N=41 B			4,3/7,9,12,13		(1.20)				
					15.68	5.70	Obstruction: presumed boulder			
5.70	B						Complete at 5.70m			

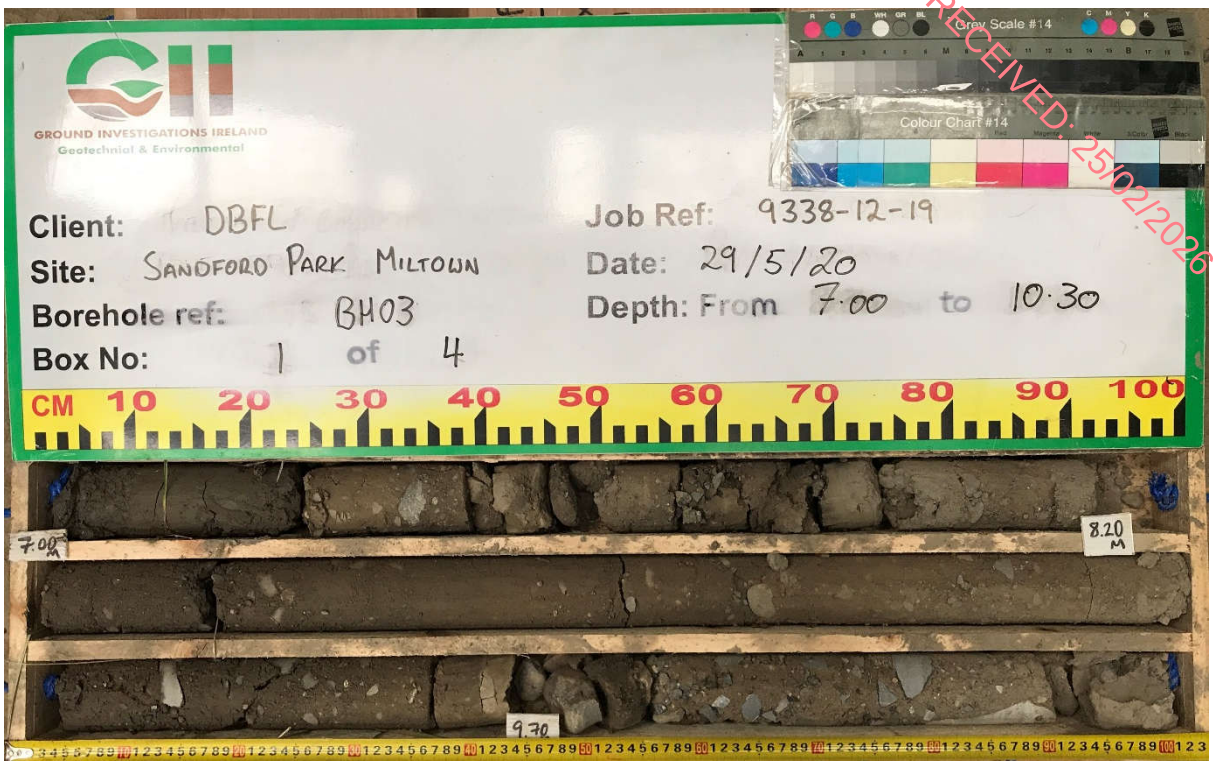
Remarks
Borehole terminated at 5.70m BGL due to an obstruction on a presumed boulder
Groundwater encountered at 1.80m BGL
Slotted pipe with pea gravel surround from 5.70m BGL to 1.00m BGL, plain pipe with bentonite seal from 1.00m BGL to GL, finished with a raised cover
Chiselling from 4.30m to 4.40m for 0.10 hours. Chiselling from 5.70m to 5.70m for 1 hour.

Scale (approx)	Logged By
1:50	PC

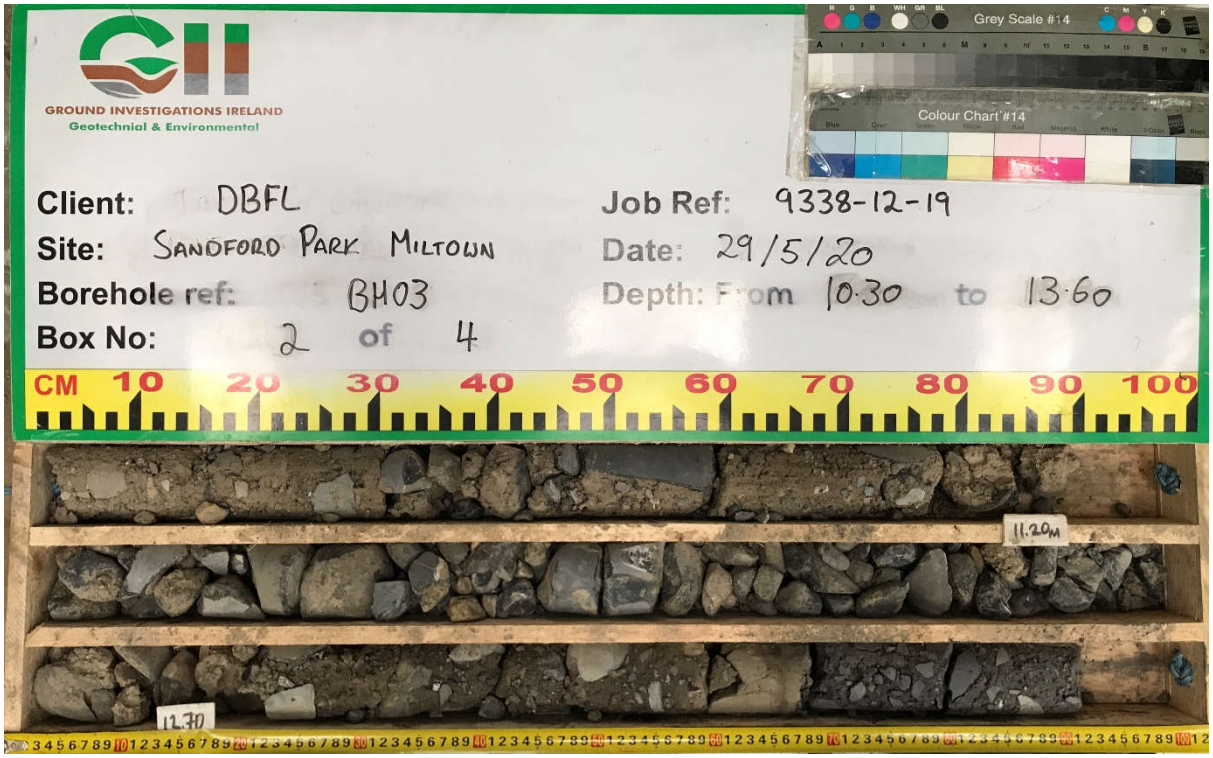
Figure No. 9338-12-19.BH16

Sandford Park Miltown – DBFL 9338-12-19
Rotary Core Photographs

BH03 B1



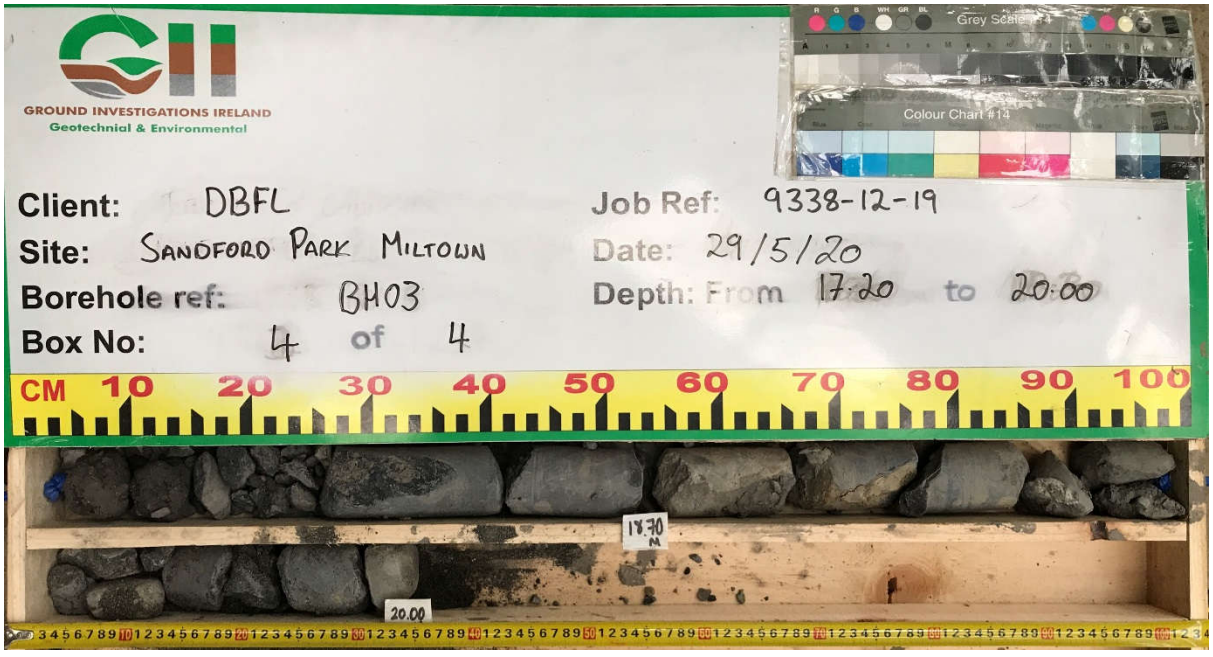
BH03 B2



Sandford Park Miltown – DBFL 9338-12-19
Rotary Core Photographs

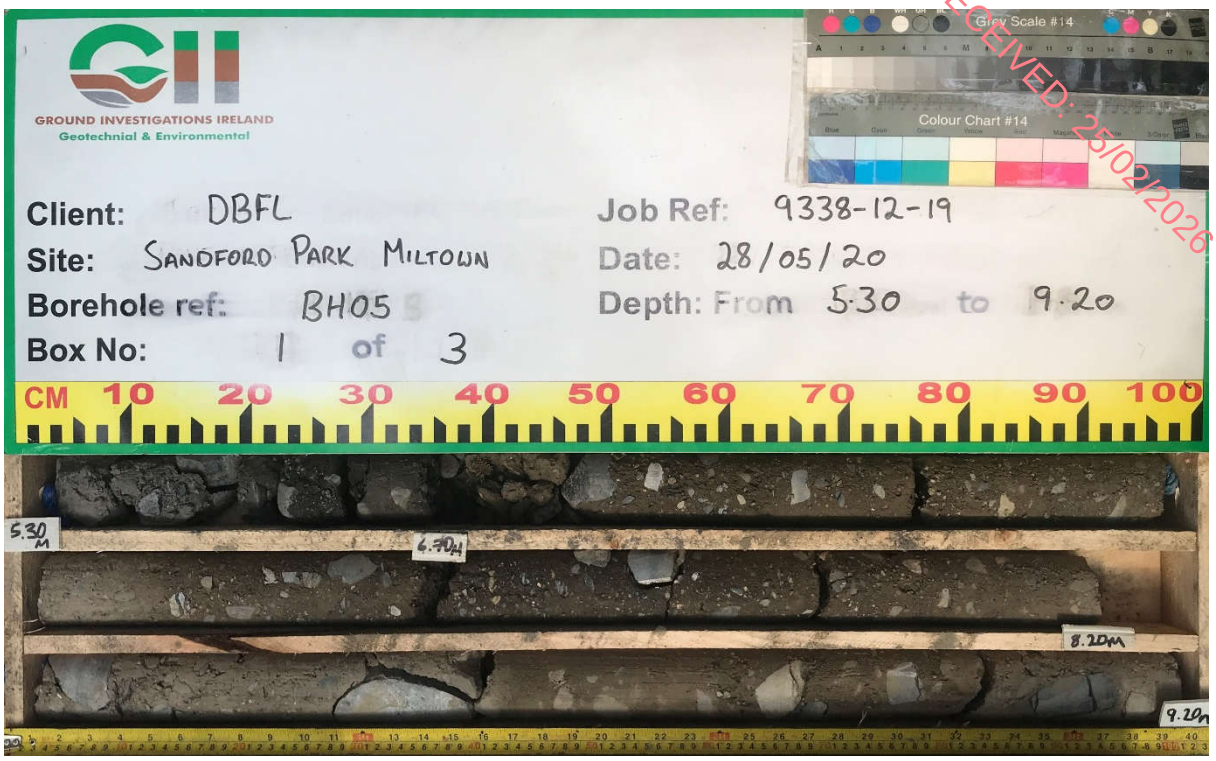
BH03 B3

BH03 B4

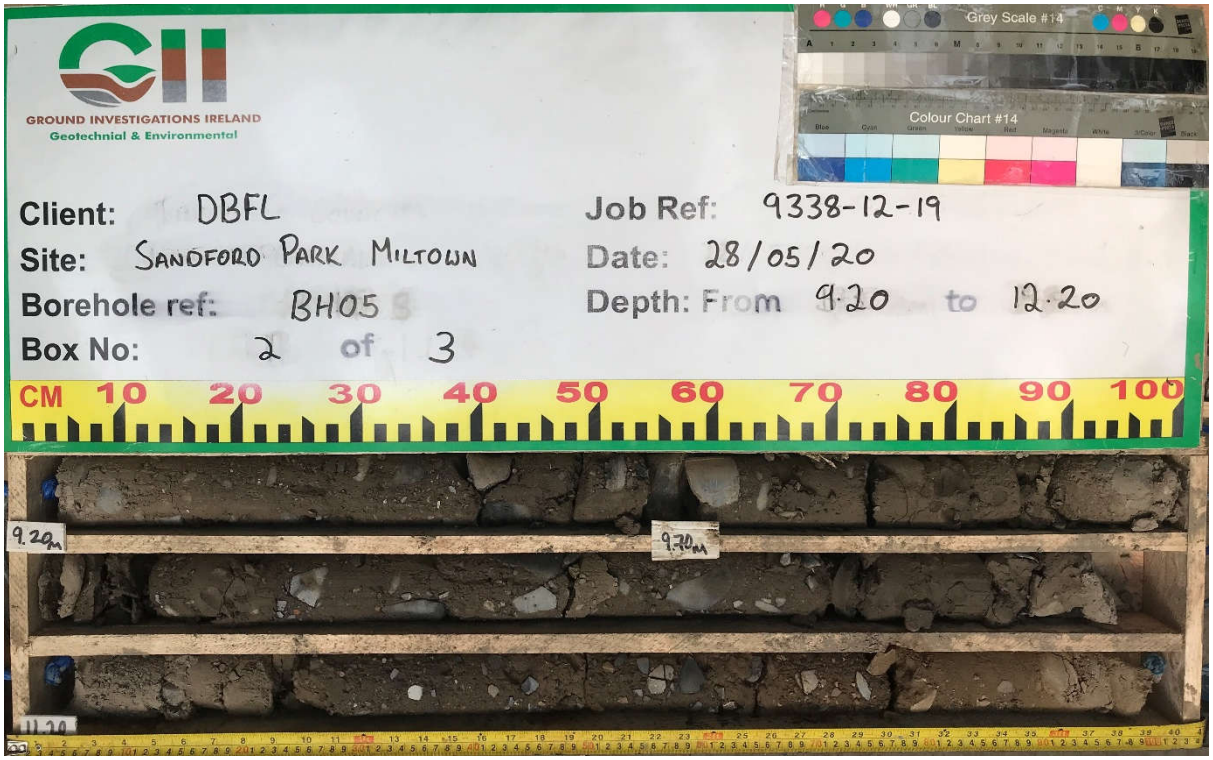


Sandford Park Miltown – DBFL 9338-12-19
Rotary Core Photographs

BH05 B1



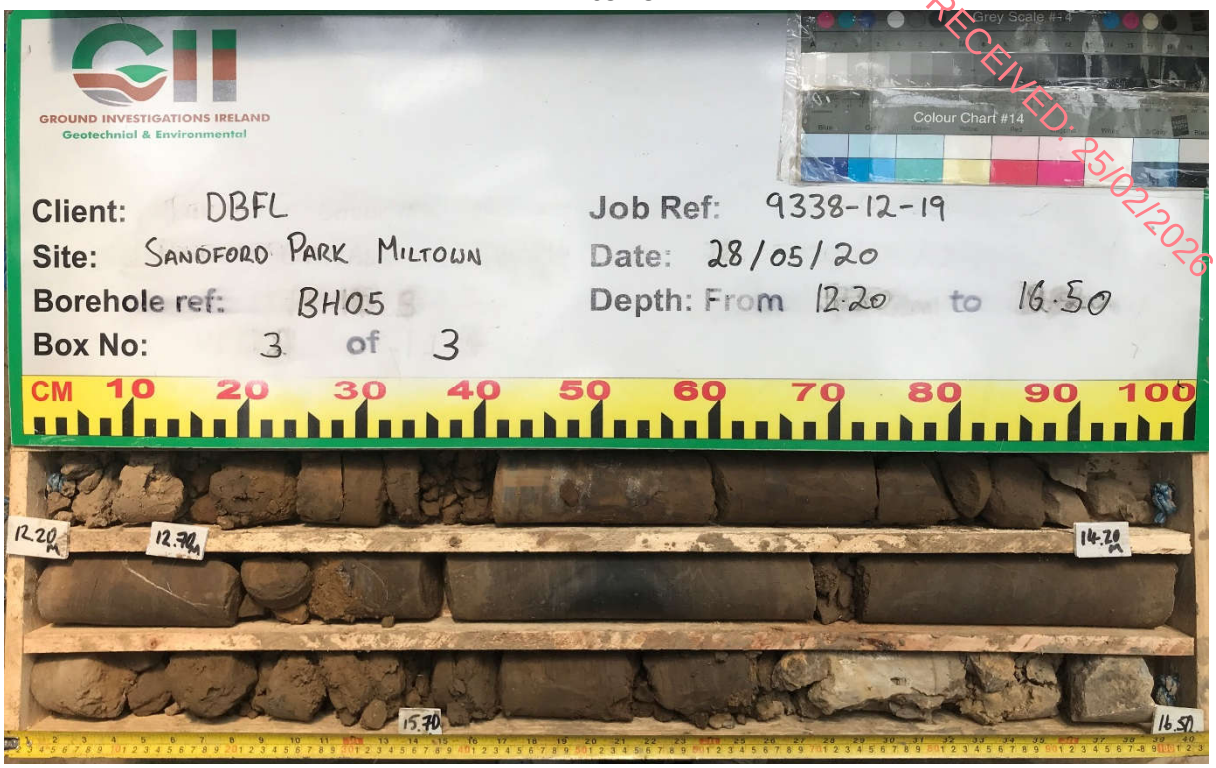
BH05 B2



Sandford Park Miltown – DBFL 9338-12-19

Rotary Core Photographs

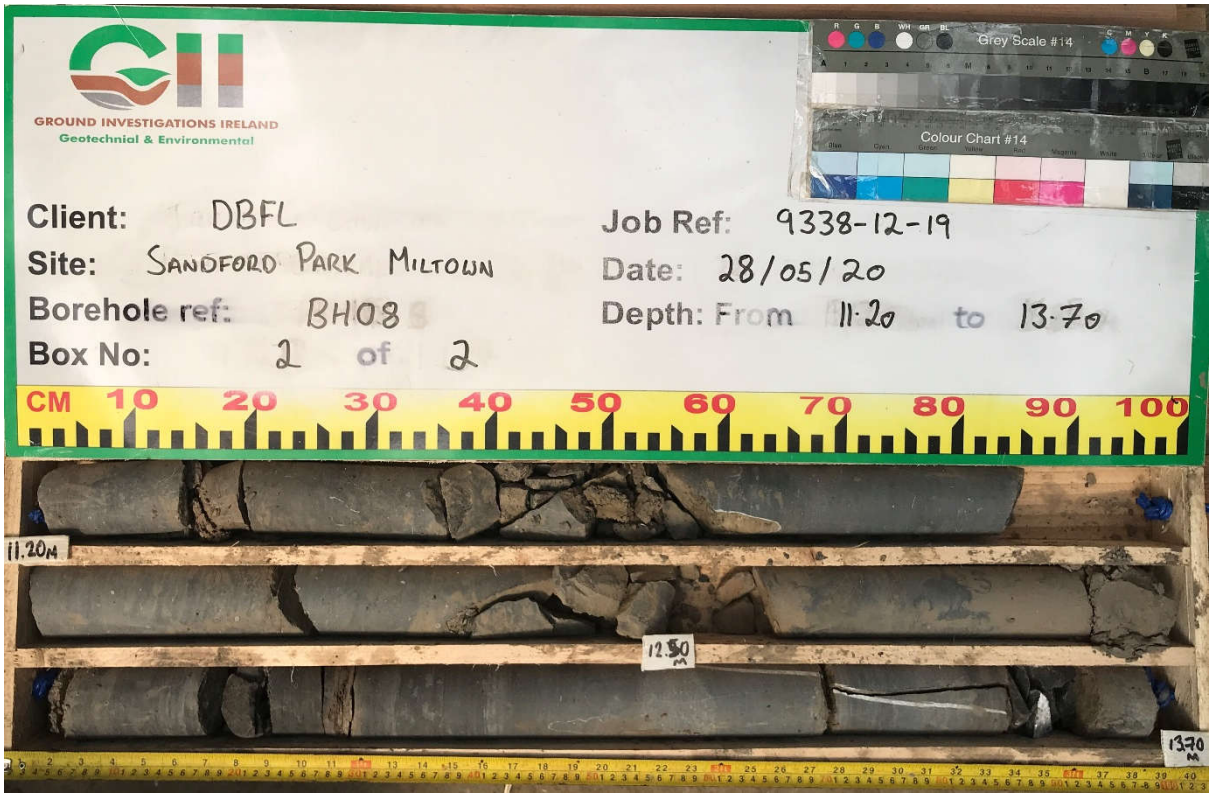
BH05 B3



Sandford Park Miltown – DBFL 9338-12-19
Rotary Core Photographs

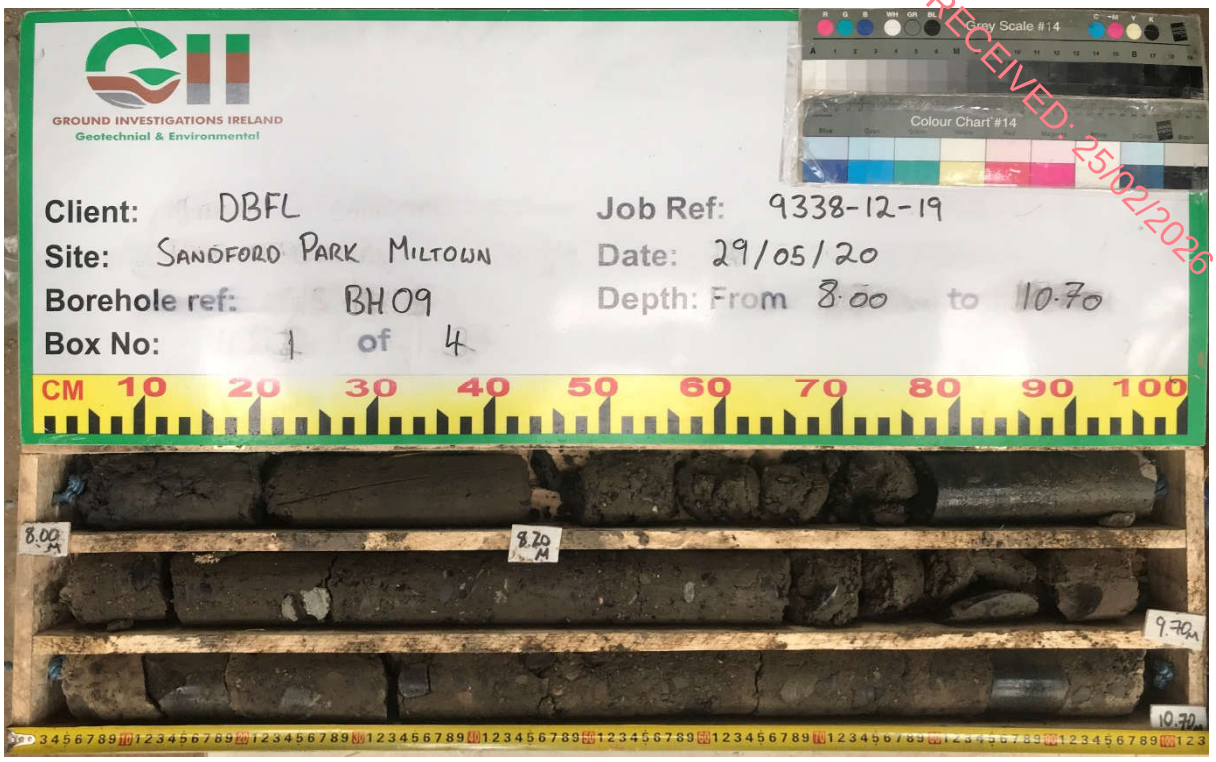
BH08 B1

BH08 B2

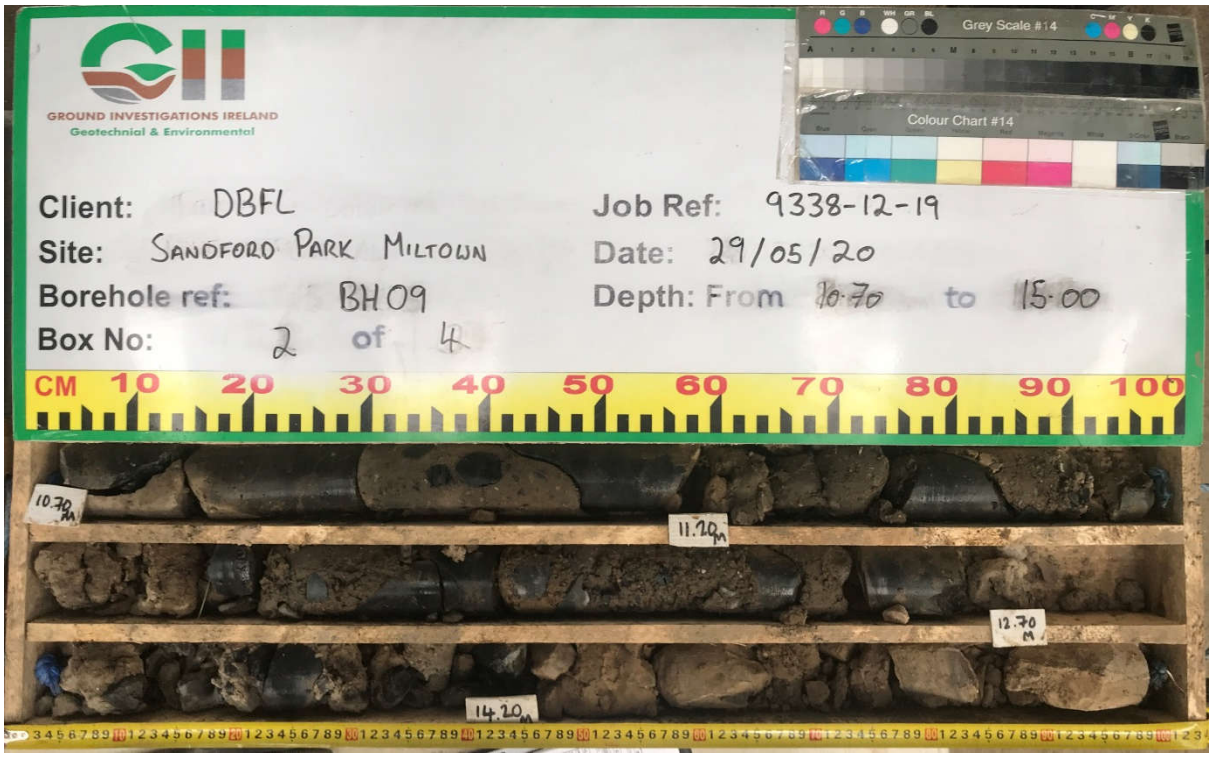


Sandford Park Miltown – DBFL 9338-12-19
Rotary Core Photographs

BH09 B1

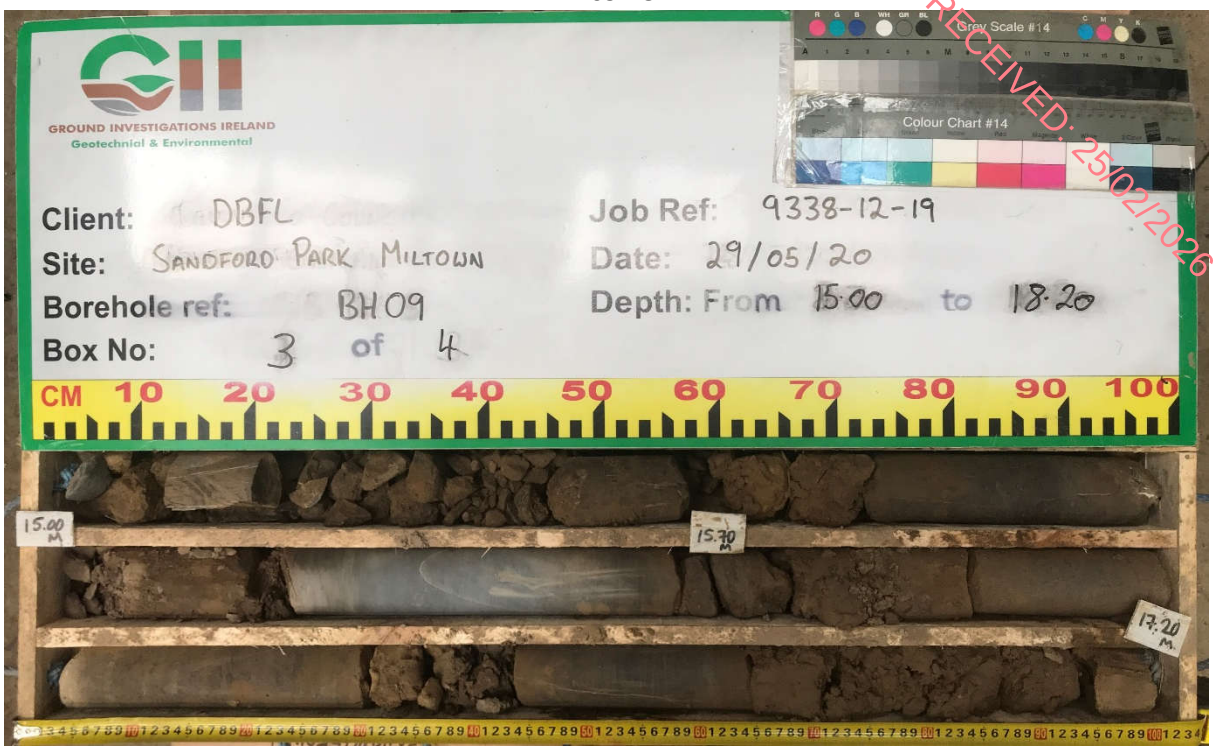


BH09 B2

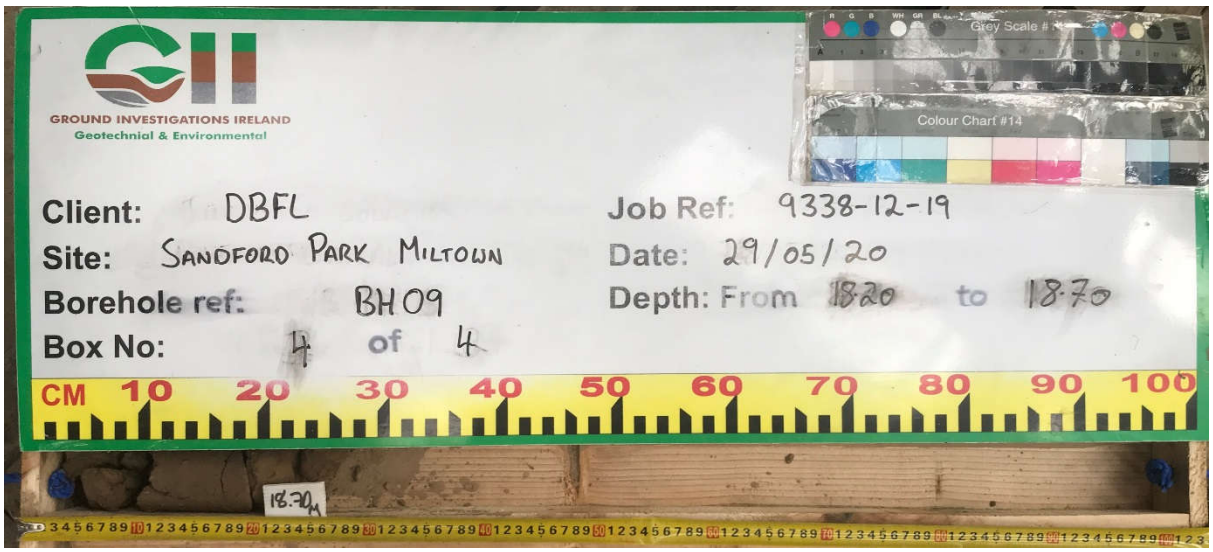


Sandford Park Miltown – DBFL 9338-12-19
Rotary Core Photographs

BH09 B3

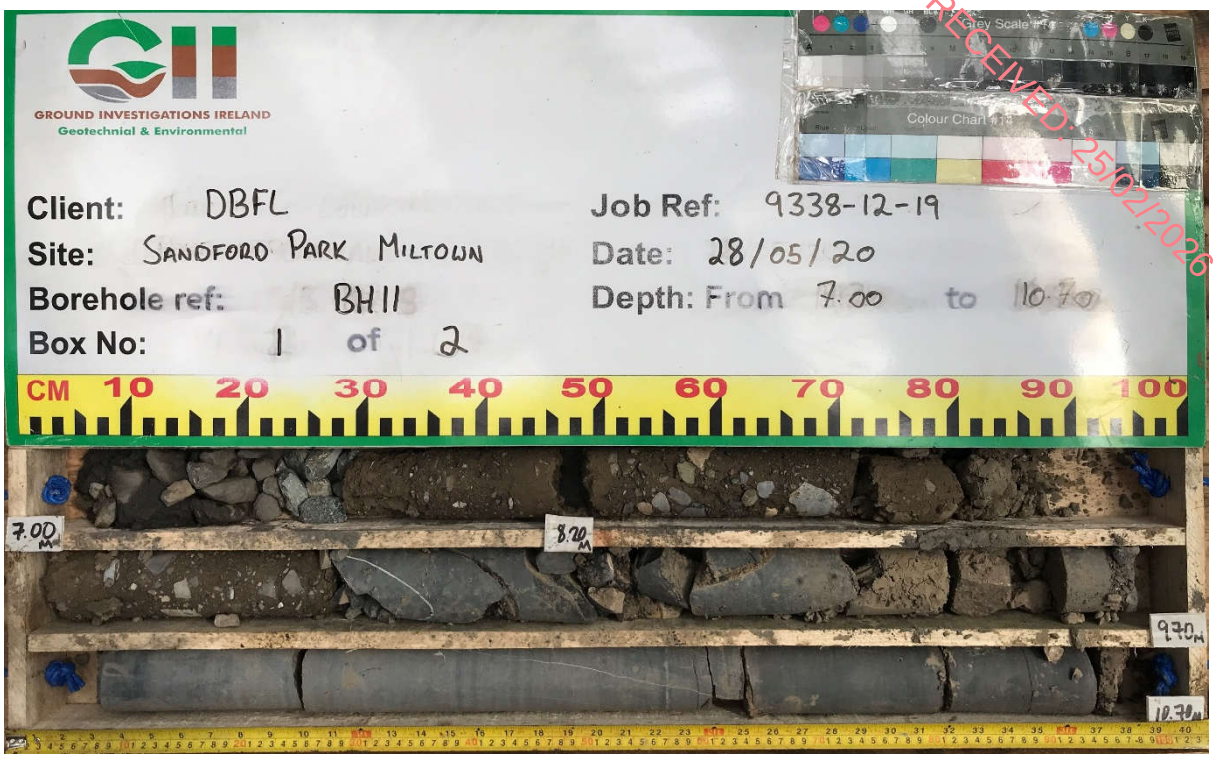


BH09 B4

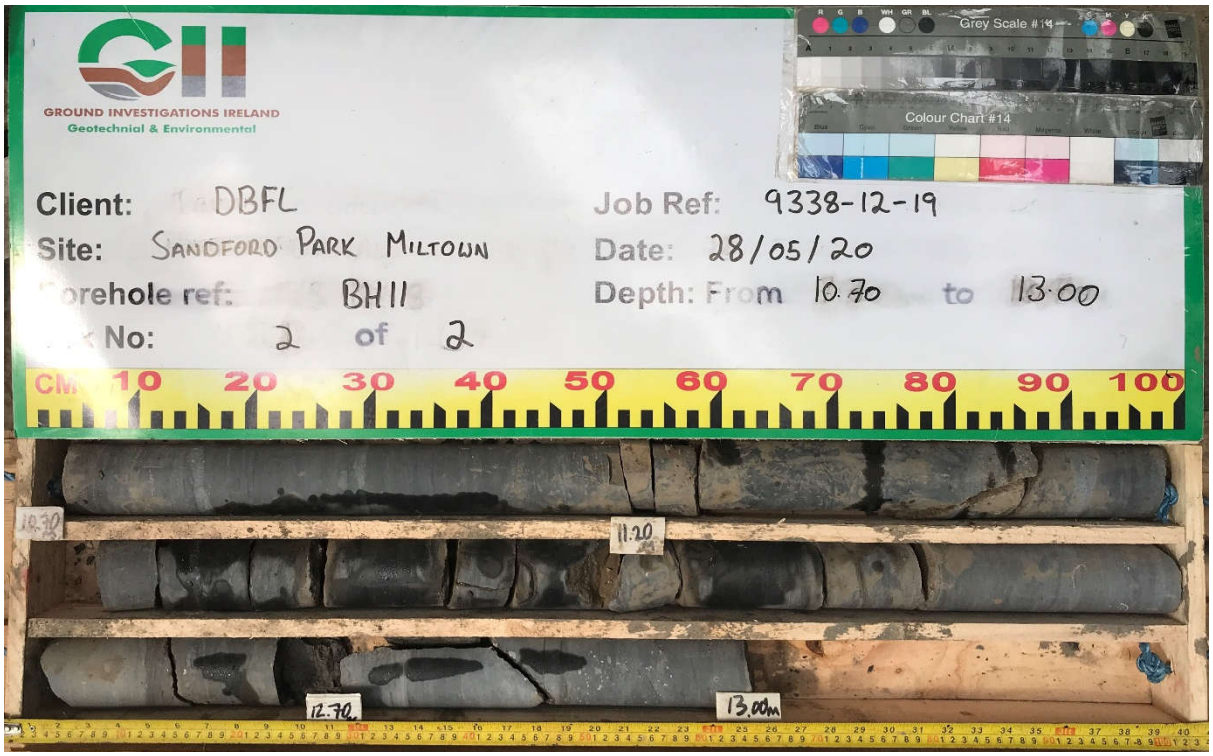


Sandford Park Miltown – DBFL 9338-12-19
Rotary Core Photographs

BH11 B1



BH11 B2



APPENDIX 8 - Laboratory Testing

LABORATORY REPORT

4043

Contract Number: PSL20/2056

Report Date: 01 May 2020

Client's Reference: 9338-12-19

Client Name: Ground Investigations Ireland Ltd
Catherinestown House
Hazelhatch Road
Newcastle
Co Durham

For the attention of: Mike Sutton

Contract Title: Sandford Park, Miltown

Date Received: 15/4/2020
Date Commenced: 15/4/2020
Date Completed: 01/5/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	R Cowles (Senior Technician)

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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH04			0.50		Brown very gravelly very sandy CLAY.
BH05			2.00		Brown very gravelly very sandy CLAY.
BH06			0.50		Brown very gravelly very sandy CLAY.
BH07			2.00		Brown gravelly very sandy CLAY.
BH07			4.00		Brown very gravelly very sandy CLAY.
BH11			4.00		Brown very gravelly very sandy CLAY.

UKAS TESTING
4043

PSL
Professional Soils Laboratory

Sandford Park Miltown

Contract No:
PSL20/2056
Client Ref:
9338-12-19

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
BH04			0.50		17			36	20	16	61	Intermediate plasticity CI.
BH07			2.00		15			30	17	13	67	Low plasticity CL.
BH07			4.00		14			25	14	11	60	Low plasticity CL.

SYMBOLS : NP : Non Plastic * : Liquid Limit and Plastic Limit Wet Sieved.

UKAS TESTING 4043

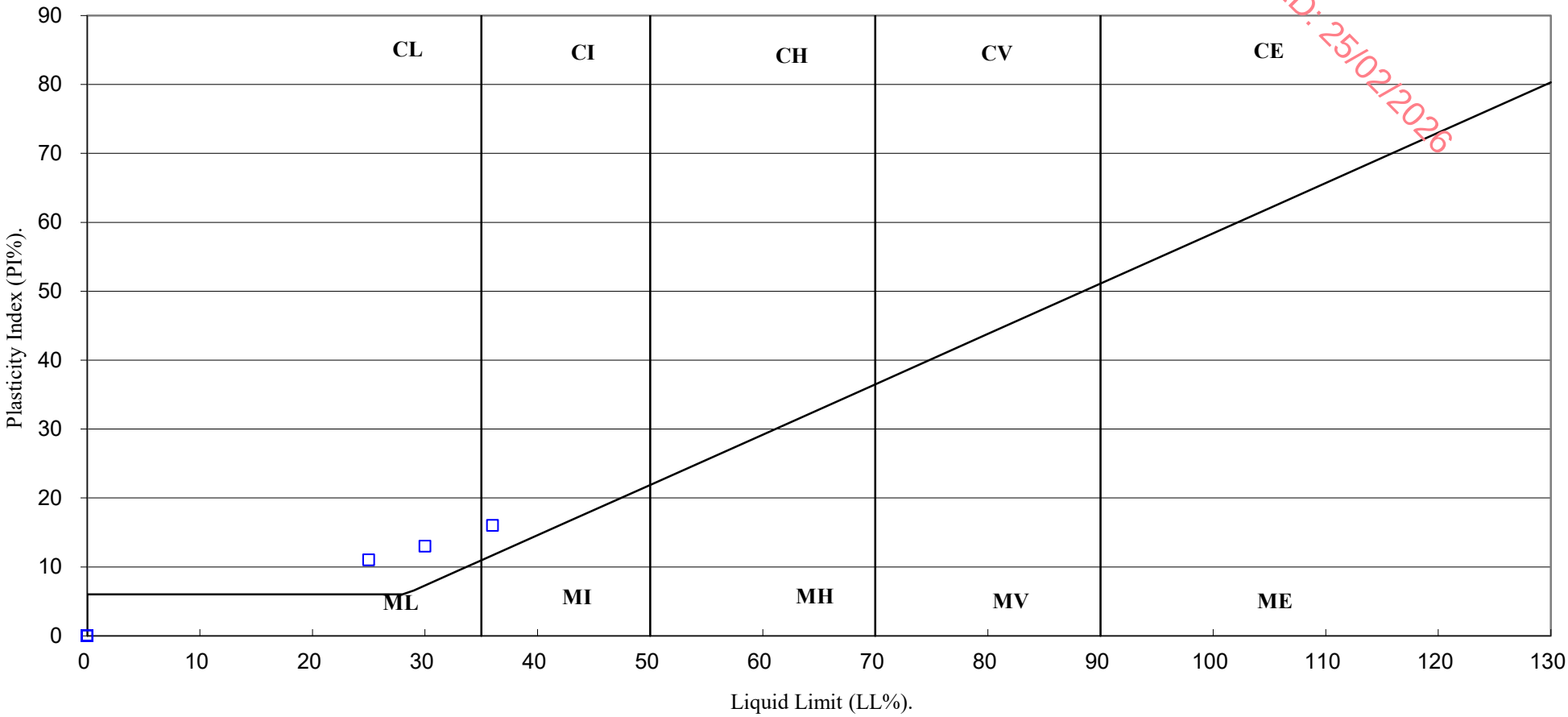
PSL Professional Soils Laboratory

Sandford Park Miltown

Contract No: PSL20/2056

Client Ref: 9338-12-19

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Sandford Park Miltown	Contract No: PSL20/2056
			Client Ref: 9338-12-19

PARTICLE SIZE DISTRIBUTION TEST

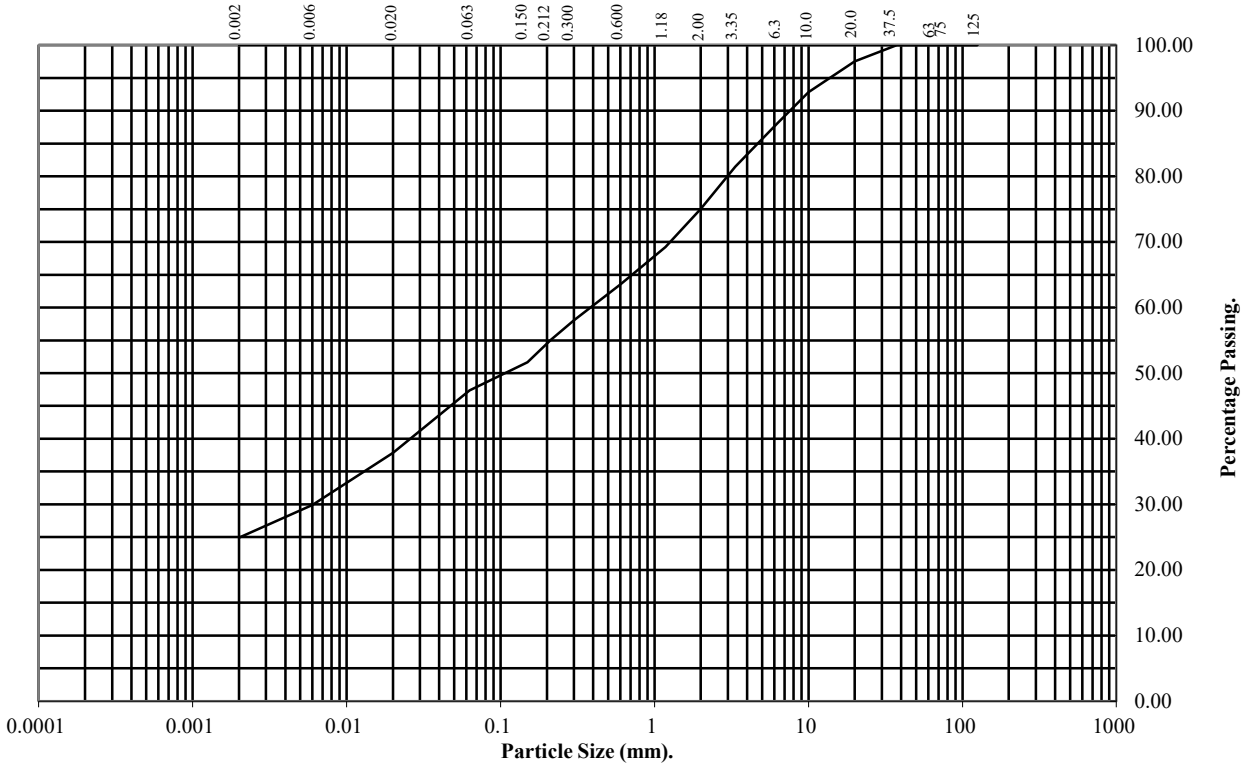
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH04 **Top Depth (m):** 0.50

Sample Number: **Base Depth(m):**

Sample Type:



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	98
10	93
6.3	88
3.35	81
2	75
1.18	69
0.6	64
0.3	58
0.212	55
0.15	52
0.063	47

Particle Diameter	Percentage Passing
0.02	38
0.006	30
0.002	25

Soil Fraction	Total Percentage
Cobbles	0
Gravel	25
Sand	28
Silt	22
Clay	25

Remarks:
See Summary of Soil Descriptions

UKAS TESTING 4043

PSL Professional Soils Laboratory

Sandford Park Miltown

Contract No:
PSL20/2056
Client Ref:
9338-12-19

PARTICLE SIZE DISTRIBUTION TEST

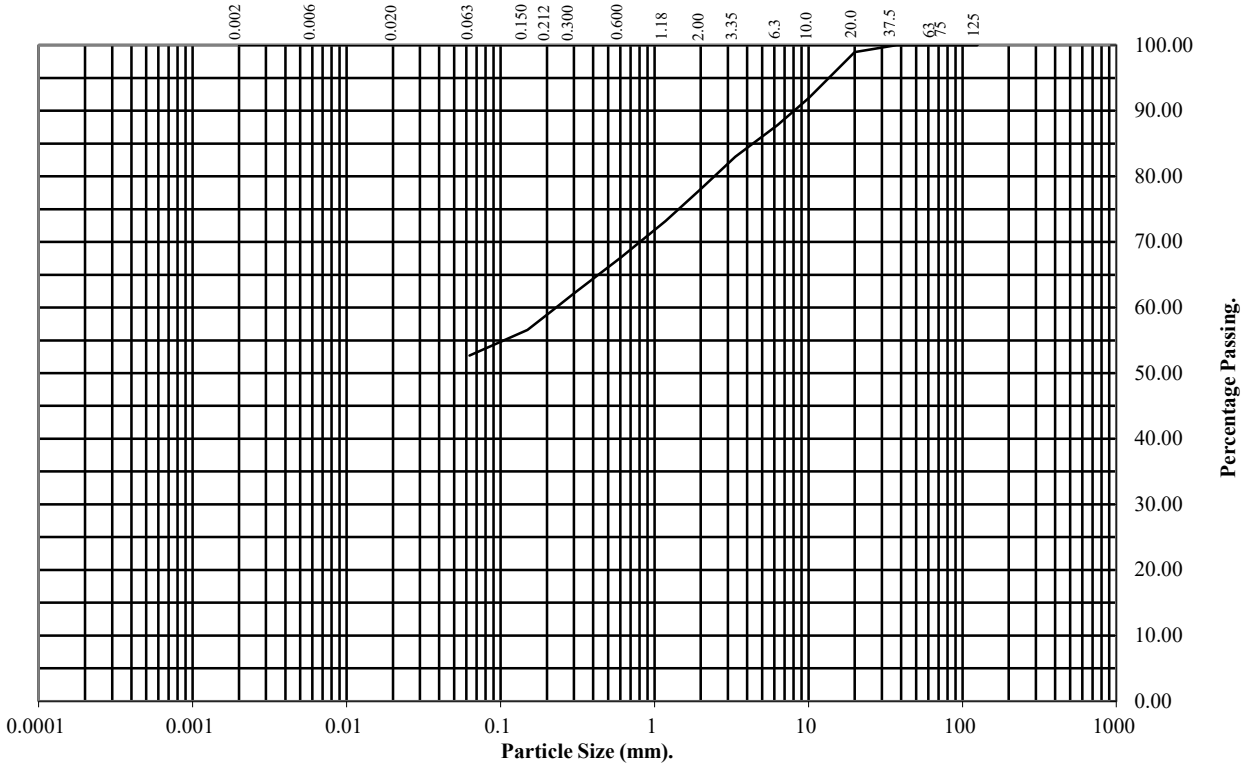
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: BH05 **Top Depth (m):** 2.00

Sample Number: **Base Depth(m):**

Sample Type:



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	99
10	92
6.3	88
3.35	83
2	78
1.18	73
0.6	68
0.3	62
0.212	59
0.15	57
0.063	53

Soil Fraction	Total Percentage
Cobbles	0
Gravel	22
Sand	25
Silt/Clay	53

Remarks:
See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

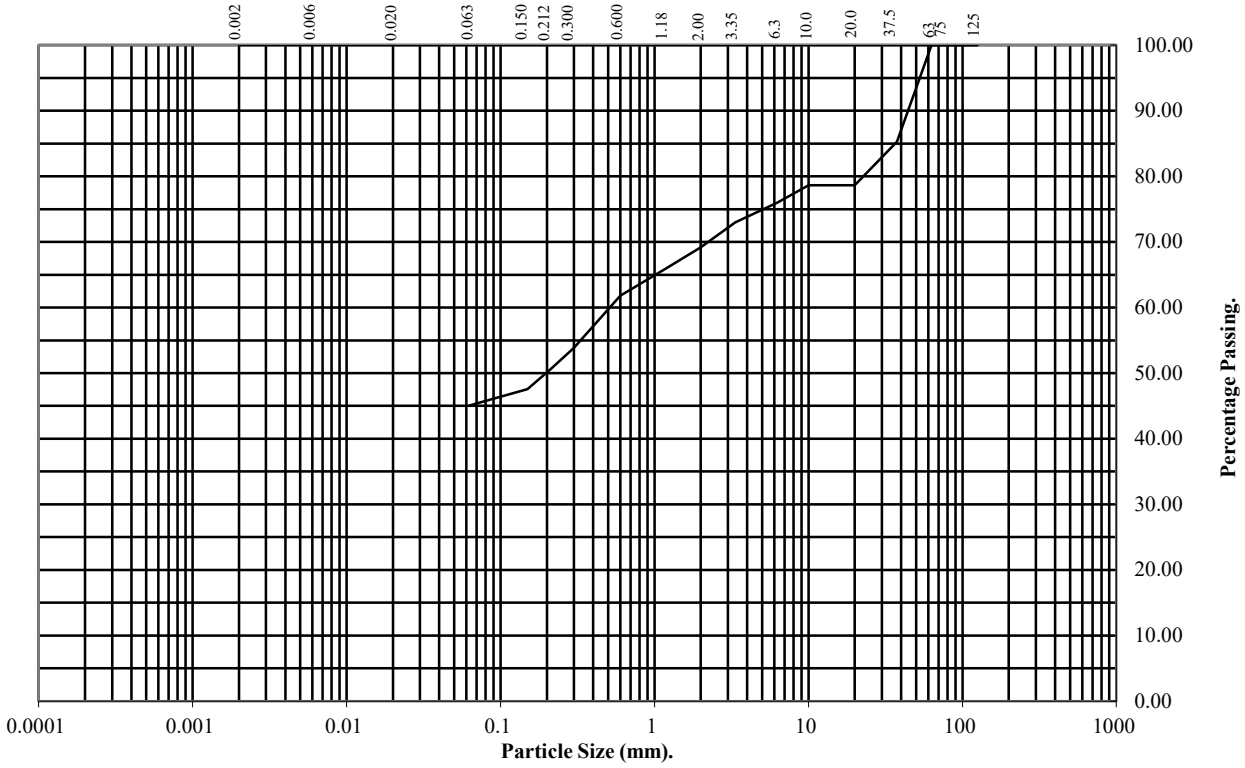
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: BH06 **Top Depth (m):** 0.50

Sample Number: **Base Depth(m):**

Sample Type:



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	85
20	79
10	79
6.3	76
3.35	73
2	69
1.18	66
0.6	62
0.3	54
0.212	51
0.15	48
0.063	45

Soil Fraction	Total Percentage
Cobbles	0
Gravel	31
Sand	24
Silt/Clay	45

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043

PSL Professional Soils Laboratory

Sandford Park Miltown

Contract No: PSL20/2056

Client Ref: 9338-12-19

PARTICLE SIZE DISTRIBUTION TEST

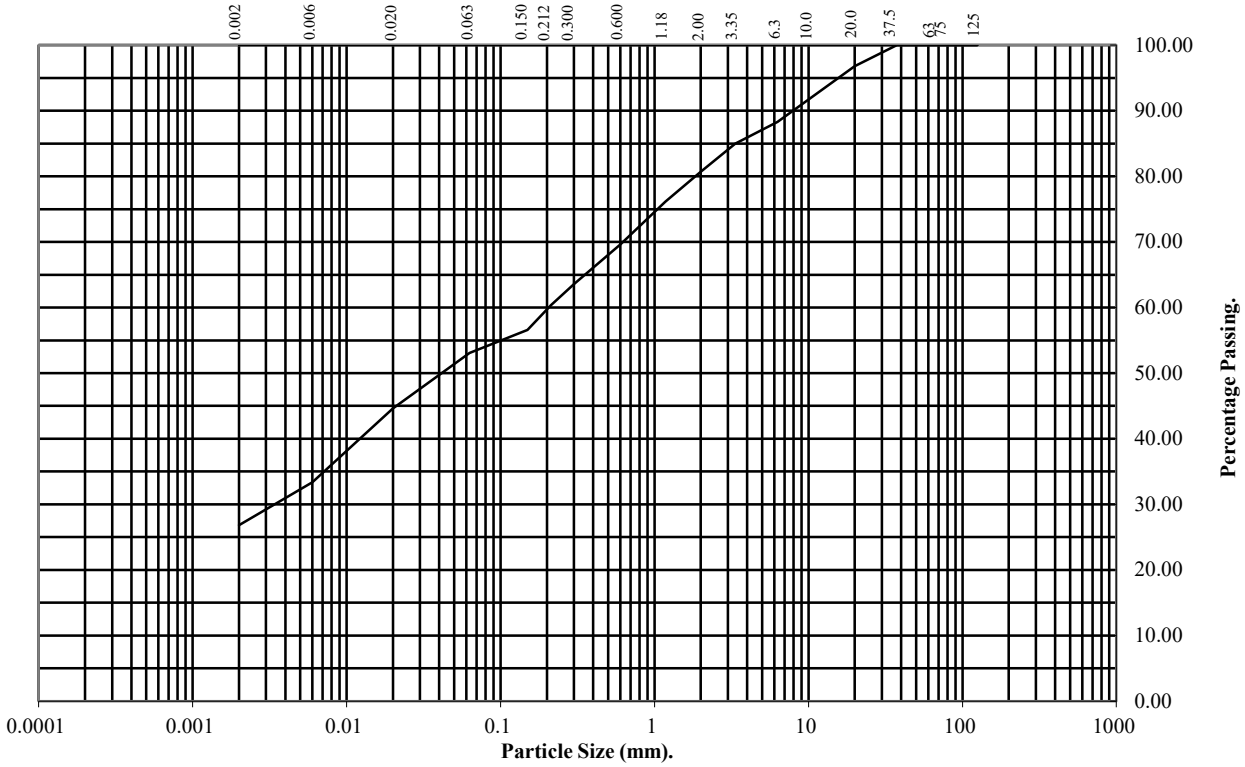
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH07 **Top Depth (m):** 2.00

Sample Number: **Base Depth(m):**

Sample Type:



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	97
10	92
6.3	88
3.35	85
2	81
1.18	76
0.6	70
0.3	64
0.212	60
0.15	57
0.063	53

Particle Diameter	Percentage Passing
0.02	45
0.006	33
0.002	27

Soil Fraction	Total Percentage
Cobbles	0
Gravel	19
Sand	28
Silt	26
Clay	27

Remarks:
See Summary of Soil Descriptions

UKAS TESTING 4043

PSL Professional Soils Laboratory

Sandford Park Miltown

Contract No:
PSL20/2056
Client Ref:
9338-12-19

PARTICLE SIZE DISTRIBUTION TEST

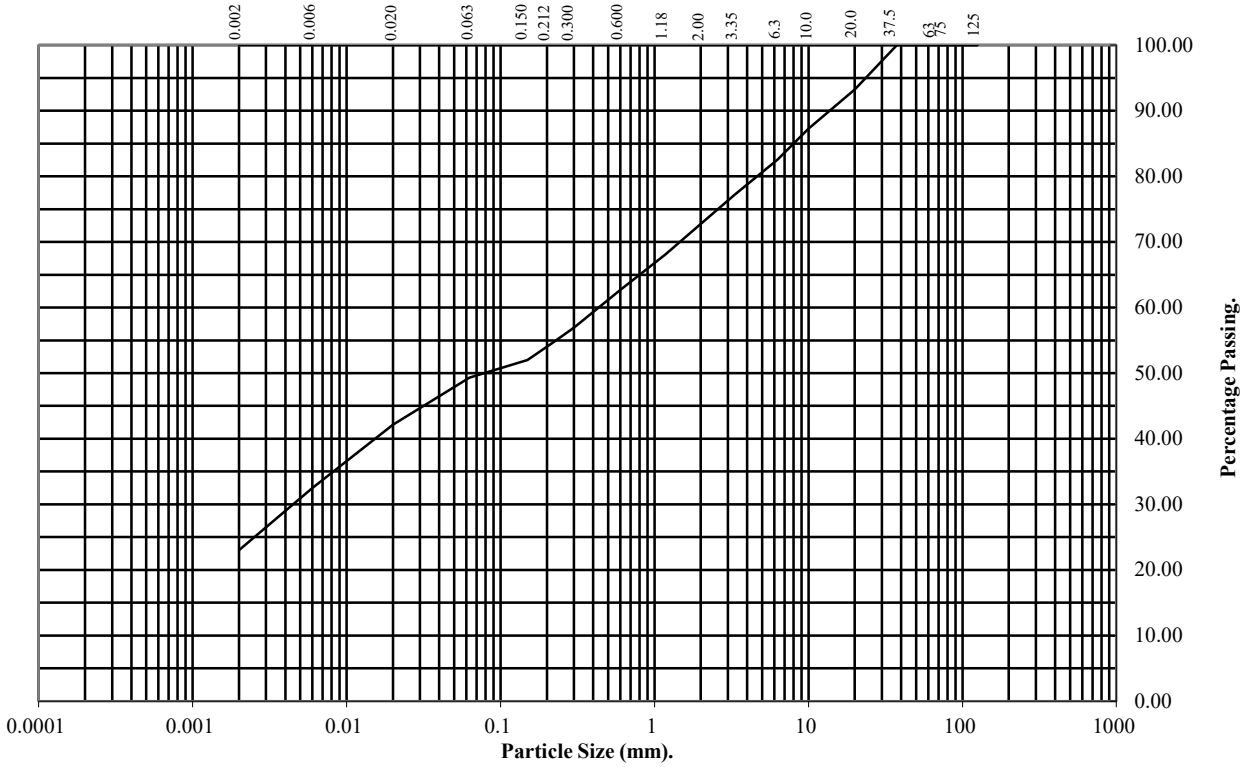
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH07 **Top Depth (m):** 4.00

Sample Number: **Base Depth(m):**

Sample Type:



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	93
10	87
6.3	83
3.35	77
2	73
1.18	68
0.6	63
0.3	57
0.212	54
0.15	52
0.063	49

Particle Diameter	Percentage Passing
0.02	42
0.006	32
0.002	23

Soil Fraction	Total Percentage
Cobbles	0
Gravel	27
Sand	24
Silt	26
Clay	23

Remarks:
See Summary of Soil Descriptions

UKAS TESTING 4043

PSL Professional Soils Laboratory

Sandford Park Miltown

Contract No:
PSL20/2056
Client Ref:
9338-12-19

PARTICLE SIZE DISTRIBUTION TEST

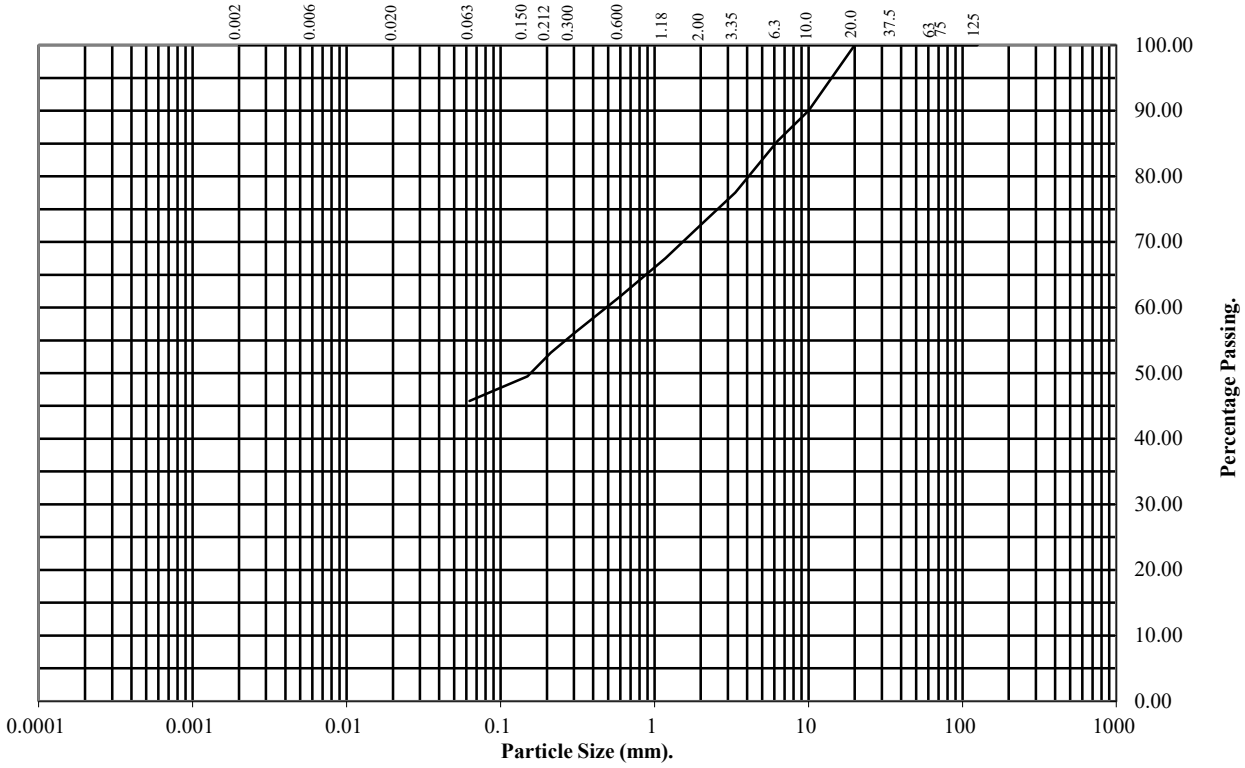
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: BH11 **Top Depth (m):** 4.00

Sample Number: **Base Depth(m):**

Sample Type:



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	90
6.3	85
3.35	78
2	73
1.18	68
0.6	62
0.3	56
0.212	53
0.15	50
0.063	46

Soil Fraction	Total Percentage
Cobbles	0
Gravel	27
Sand	27
Silt/Clay	46

Remarks:
See Summary of Soil Descriptions

UKAS TESTING 4043

PSL Professional Soils Laboratory

Sandford Park Miltown

Contract No: PSL20/2056

Client Ref: 9338-12-19

Element Materials Technology
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Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention :	Barry Sexton
Date :	15th April, 2020
Your reference :	9338-12-19
Our reference :	Test Report 20/4896 Batch 1
Location :	Sandford Park Milltown
Date samples received :	30th March, 2020
Status :	Final report
Issue :	1

Ten samples were received for analysis on 30th March, 2020 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc
Senior Project Manager

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford Park Milltown
Contact: Barry Sexton
EMT Job No: 20/4896

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH010	BH011	BH012			
Depth	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	26/03/2020	26/03/2020	26/03/2020	26/03/2020	26/03/2020	27/03/2020	27/03/2020	27/03/2020	27/03/2020	27/03/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020			
Antimony	1	2	2	2	1	2	2	2	2	2	<1	mg/kg	TM30/PM15
Arsenic #	6.2	8.8	6.8	10.3	5.2	9.5	10.6	10.0	10.6	10.2	<0.5	mg/kg	TM30/PM15
Barium #	48	59	56	84	39	90	76	75	76	78	<1	mg/kg	TM30/PM15
Cadmium #	1.2	1.8	1.6	2.0	1.0	2.0	2.3	1.8	2.4	1.8	<0.1	mg/kg	TM30/PM15
Chromium #	40.0	47.4	41.8	44.4	28.8	43.9	43.2	42.5	52.4	39.3	<0.5	mg/kg	TM30/PM15
Copper #	19	27	26	33	18	32	28	33	35	32	<1	mg/kg	TM30/PM15
Lead #	14	48	15	18	12	20	17	18	19	17	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	3.5	3.7	3.6	4.1	2.5	3.7	5.0	4.0	4.3	3.8	<0.1	mg/kg	TM30/PM15
Nickel #	23.7	33.7	33.5	40.2	22.0	38.7	35.6	39.0	38.6	36.3	<0.7	mg/kg	TM30/PM15
Selenium #	2	3	2	3	2	2	3	4	3	6	<1	mg/kg	TM30/PM15
Zinc #	54	73	71	89	50	84	89	83	130	67	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	76	84	88	89	88	76	94	86	66 SV	82	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford Park Milltown
Contact: Barry Sexton
EMT Job No: 20/4896

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH010	BH011	BH012			
Depth	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	26/03/2020	26/03/2020	26/03/2020	26/03/2020	26/03/2020	27/03/2020	27/03/2020	27/03/2020	27/03/2020	27/03/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020			
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 #	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	<52	<52	<52	<52	<52	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM36/PM12
Benzene #	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM36/PM12
Toluene #	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM36/PM12
Ethylbenzene #	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM36/PM12
m/p-Xylene #	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM36/PM12
o-Xylene #	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM36/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford Park Milltown
Contact: Barry Sexton
EMT Job No: 20/4896

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH010	BH011	BH012			
Depth	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	26/03/2020	26/03/2020	26/03/2020	26/03/2020	26/03/2020	27/03/2020	27/03/2020	27/03/2020	27/03/2020	27/03/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020			
Natural Moisture Content	10.9	12.6	10.4	9.7	11.4	8.5	12.6	11.4	11.4	12.1	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	9.8	11.2	9.4	8.8	10.3	7.8	11.2	10.2	10.2	10.8	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.1184	0.1489	0.2553	-	0.1121	-	0.1614	-	0.1405	-	<0.0015	g/l	TM38/PM20
Chromium III	40.0	47.4	41.8	44.4	28.8	43.9	43.2	42.5	52.4	39.3	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.54	0.57	0.63	0.67	0.71	0.63	0.63	0.68	0.66	0.98	<0.02	%	TM21/PM24
pH #	8.13	8.24	8.02	8.23	8.25	8.20	8.44	8.51	8.29	8.68	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1035	0.1005	0.1009	0.1009	0.1032	0.0988	0.1024	0.0755	0.1178	0.1088		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford Park Milltown
Contact: Barry Sexton
EMT Job No: 20/4896

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH010	BH011	BH012			
Depth	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	26/03/2020	26/03/2020	26/03/2020	26/03/2020	26/03/2020	27/03/2020	27/03/2020	27/03/2020	27/03/2020	27/03/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020			
Dissolved Antimony #	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.019	0.029	0.024	0.024	0.029	0.037	0.033	0.006	0.023	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.19	0.29	0.24	0.24	0.29	0.37	0.33	0.06	0.23	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.022	0.021	0.021	0.026	0.019	0.022	0.022	0.025	0.028	0.021	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.22	0.21	0.21	0.26	0.19	0.22	0.22	0.25	0.28	0.21	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	0.021	0.021	<0.003	0.027	0.028	0.039	0.034	0.015	0.030	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	0.21	0.21	<0.03	0.27	0.28	0.39	0.34	0.15	0.30	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.004	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	0.04	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00002$_{AA}$	<0.00001	0.00001	0.00001	<0.00001	0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0002$_{AA}$	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	0.4	<0.3	0.4	0.4	<0.3	0.4	0.4	<0.3	0.4	0.4	<0.3	mg/l	TM173/PM0
Fluoride	4	<3	4	4	<3	4	4	<3	4	4	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	32.8	35.5	74.7	47.1	32.6	41.2	25.7	7.0	34.2	2.0	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	328	355	747	471	326	412	257	70	342	20	<5	mg/kg	TM38/PM0
Chloride #	11.0	11.9	<0.3	18.4	12.7	14.8	11.2	1.6	11.3	<0.3	<0.3	mg/l	TM38/PM0
Chloride #	110	119	<3	184	127	148	112	16	113	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	2	<2	<2	2	2	2	2	<2	3	3	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	20	<20	20	<20	30	30	<20	mg/kg	TM60/PM0
pH	8.30	8.12	8.15	7.77	7.83	8.09	7.99	8.07	8.00	8.26	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	114	146	172	178	131	109	99	56	123	36	<35	mg/l	TM20/PM0
Total Dissolved Solids #	1140	1461	1719	1780	1310	1090	990	560	1230	360	<350	mg/kg	TM20/PM0

All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford Park Milltown
Contact: Barry Sexton
EMT Job No: 20/4896

Report : **EN12457_2**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH010	BH011	BH012						
Depth	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	26/03/2020	26/03/2020	26/03/2020	26/03/2020	26/03/2020	27/03/2020	27/03/2020	27/03/2020	27/03/2020	27/03/2020						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1						
Date of Receipt	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020						
Solid Waste Analysis																
Total Organic Carbon #	0.54	0.57	0.63	0.67	0.71	0.63	0.63	0.68	0.66	0.98	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025 SV	<0.025 SV	<0.025 SV	<0.025 SV	<0.025 SV	<0.025 SV	<0.025 SV	<0.025 SV	<0.025 SV	<0.025 SV	6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.19	0.29	0.24	0.24	0.29	0.37	0.33	0.06	0.23	<0.03	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0002 BA	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.22	0.21	0.21	0.26	0.19	0.22	0.22	0.25	0.28	0.21	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	0.21	0.21	<0.03	0.27	0.28	0.39	0.34	0.15	0.30	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	0.04	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	1140	1461	1719	1780	1310	1090	990	560	1230	360	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	20	<20	20	<20	30	30	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1035	0.1005	0.1009	0.1009	0.1032	0.0988	0.1024	0.0755	0.1178	0.1088	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	86.7	89.6	89.4	89.3	87.1	91.2	88.1	118.4	76.5	82.5	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.886	0.89	0.889	0.889	0.887	0.891	0.888	0.9	0.872	0.881	-	-	-		l	NONE/PM17
Eluate Volume	0.75	0.6	0.6	0.35	0.2	0.2	0.1	0.3	0.1	0.85	-	-	-		l	NONE/PM17
pH #	8.13	8.24	8.02	8.23	8.25	8.20	8.44	8.51	8.29	8.68	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	4	<3	4	4	<3	4	4	<3	4	4	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	328	355	747	471	326	412	257	70	342	20	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	110	119	<3	184	127	148	112	16	113	<3	800	15000	25000	<3	mg/kg	TM38/PM0

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford Park Milltown
Contact: Barry Sexton

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
20/4896	1	BH03	3.00	1-3	No interpretation possible
20/4896	1	BH04	3.00	4-6	No interpretation possible
20/4896	1	BH05	3.00	7-9	No interpretation possible
20/4896	1	BH06	3.00	10-12	No interpretation possible
20/4896	1	BH07	3.00	13-15	No interpretation possible
20/4896	1	BH08	3.00	16-18	No interpretation possible
20/4896	1	BH09	3.00	19-21	No interpretation possible
20/4896	1	BH010	3.00	22-24	No interpretation possible
20/4896	1	BH011	3.00	25-27	No interpretation possible
20/4896	1	BH012	3.00	28-30	No interpretation possible

Client Name: Ground Investigations Ireland
Reference: 19/12/9338
Location: Sandford Park Milltown
Contact: Barry Sexton

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/4896	1	BH03	3.00	2	08/04/2020	**General Description (Bulk Analysis)**	Soil/Stones
					08/04/2020	**Asbestos Fibres**	NAD
					08/04/2020	**Asbestos ACM**	NAD
					08/04/2020	**Asbestos Type**	NAD
					08/04/2020	**Asbestos Level Screen**	NAD
20/4896	1	BH04	3.00	5	08/04/2020	**General Description (Bulk Analysis)**	Soil/Stones
					08/04/2020	**Asbestos Fibres**	NAD
					08/04/2020	**Asbestos ACM**	NAD
					08/04/2020	**Asbestos Type**	NAD
					08/04/2020	**Asbestos Level Screen**	NAD
20/4896	1	BH05	3.00	8	08/04/2020	**General Description (Bulk Analysis)**	soil/stones
					08/04/2020	**Asbestos Fibres**	NAD
					08/04/2020	**Asbestos ACM**	NAD
					08/04/2020	**Asbestos Type**	NAD
					08/04/2020	**Asbestos Level Screen**	NAD
20/4896	1	BH06	3.00	11	08/04/2020	**General Description (Bulk Analysis)**	Soil/Stones
					08/04/2020	**Asbestos Fibres**	NAD
					08/04/2020	**Asbestos ACM**	NAD
					08/04/2020	**Asbestos Type**	NAD
					08/04/2020	**Asbestos Level Screen**	NAD
20/4896	1	BH07	3.00	14	08/04/2020	**General Description (Bulk Analysis)**	Soil/Stones
					08/04/2020	**Asbestos Fibres**	NAD
					08/04/2020	**Asbestos ACM**	NAD
					08/04/2020	**Asbestos Type**	NAD
					08/04/2020	**Asbestos Level Screen**	NAD
20/4896	1	BH08	3.00	17	08/04/2020	**General Description (Bulk Analysis)**	Soil/Stones
					08/04/2020	**Asbestos Fibres**	NAD
					08/04/2020	**Asbestos ACM**	NAD
					08/04/2020	**Asbestos Type**	NAD
					08/04/2020	**Asbestos Level Screen**	NAD
20/4896	1	BH09	3.00	20	08/04/2020	**General Description (Bulk Analysis)**	soil/stones
					08/04/2020	**Asbestos Fibres**	NAD
					08/04/2020	**Asbestos ACM**	NAD

Client Name: Ground Investigations Ireland
Reference: 19/12/9338
Location: Sandford Park Milltown
Contact: Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/4896	1	BH09	3.00	20	08/04/2020	**Asbestos Type**	NAD
					08/04/2020	**Asbestos Level Screen**	NAD
20/4896	1	BH010	3.00	23	08/04/2020	**General Description (Bulk Analysis)**	soil/stones
					08/04/2020	**Asbestos Fibres**	NAD
					08/04/2020	**Asbestos ACM**	NAD
					08/04/2020	**Asbestos Type**	NAD
					08/04/2020	**Asbestos Level Screen**	NAD
20/4896	1	BH011	3.00	26	08/04/2020	**General Description (Bulk Analysis)**	soil/stones
					08/04/2020	**Asbestos Fibres**	NAD
					08/04/2020	**Asbestos ACM**	NAD
					08/04/2020	**Asbestos Type**	NAD
					08/04/2020	**Asbestos Level Screen**	NAD
20/4896	1	BH012	3.00	29	08/04/2020	**General Description (Bulk Analysis)**	Soil/Stones
					08/04/2020	**Asbestos Fibres**	NAD
					08/04/2020	**Asbestos ACM**	NAD
					08/04/2020	**Asbestos Type**	NAD
					08/04/2020	**Asbestos Level Screen**	NAD

Element Materials Technology

Notification of Deviating Samples

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford Park Milltown
Contact: Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/4896						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 20/4896

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x2 Dilution

BA	x2 Dilution

EMT Job No: 20/4896

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK Soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

EMT Job No: 20/4896

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK Soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE re	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE re	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes

EMT Job No: 20/4896

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK Soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

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Ireland

Attention :	Barry Sexton
Date :	16th April, 2020
Your reference :	9338-12-19
Our reference :	Test Report 20/5209 Batch 1
Location :	Sandford Park
Date samples received :	9th April, 2020
Status :	Final report
Issue :	1

One sample was received for analysis on 9th April, 2020 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc
Senior Project Manager

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford Park
Contact: Barry Sexton
EMT Job No: 20/5209

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1										LOD/LOR	Units	Method No.
Sample ID	BH-10												
Depth	2.00												
COC No / misc													
Containers	T												
Sample Date	18/03/2020												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	09/04/2020												
Sulphate as SO4 (2:1 Ext) #	0.0039										<0.0015	g/l	TM38/PM20
pH #	8.55										<0.01	pH units	TM73/PM11

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Notification of Deviating Samples

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford Park
Contact: Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/5209						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 20/5209

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 20/5209

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK Soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

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Ireland

Attention :	Mike Sutton
Date :	21st October, 2020
Your reference :	9338-12-19
Our reference :	Test Report 20/14166 Batch 1
Location :	Sandford park Milltown
Date samples received :	15th October, 2020
Status :	Final report
Issue :	1

Two samples were received for analysis on 15th October, 2020 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc
Senior Project Manager

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford park Milltown
Contact: Mike Sutton
EMT Job No: 20/14166

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1	2									LOD/LOR	Units	Method No.
Sample ID	BH-15	BH-15											
Depth	2.00	3.00											
COC No / misc													
Containers	T	T											
Sample Date	06/10/2020	06/10/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	15/10/2020	15/10/2020											
Sulphate as SO4 (2:1 Ext) #	0.0078	0.0933									<0.0015	g/l	TM38/PM20
pH #	8.32	8.12									<0.01	pH units	TM73/PM11

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Notification of Deviating Samples

Client Name: Ground Investigations Ireland
Reference: 9338-12-19
Location: Sandford park Milltown
Contact: Mike Sutton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/14166						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 20/14166

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

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As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 20/14166

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

APPENDIX 9 – Groundwater Monitoring

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

GROUNDWATER MONITORING

Sandford Park Miltown

BOREHOLE	DATE	TIME	GROUNDWATER (m BGL)	Comments
BH02	04/06/2020	17:15	1.31	
BH02	09/06/2020	16:15	1.37	
BH03	05/06/2020	14:58	7.00	
BH03	09/06/2020	15:50	7.25	
BH07	05/06/2020	14:37	1.47	
BH07	09/06/2020	16:06	1.50	
BH09	05/06/2020	15:20	7.50	
BH09	09/06/2020	15:25	7.74	
BH11	05/06/2020	15:55	1.40	
BH11	09/06/2020	16:11	1.50	

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GROUNDWATER MONITORING

Sandford Park Miltown

BOREHOLE	DATE	TIME	GROUNDWATER (m BGL)	Comments
BH02	23/10/2020	09:05	0.77	
BH03	23/10/2020	08:50	6.30	
BH07	23/10/2020	08:52	1.37	
BH09	23/10/2020	08:47	6.69	
BH11	23/10/2020	09:00	1.10	
BH14	23/10/2020	08:35	1.43	
BH16	23/10/2020	08:45	1.22	